

Transactions
American Laryngological Association

Fiftieth Volume

TRANSACTIONS

OF THE

FIFTIETH ANNUAL MEETING
(SEMI-CENTENNIAL)

OF THE

American Laryngological Association

HELD AT WASHINGTON, D. C.
MAY 1, 2 AND 3, 1928

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OFFICERS FOR 1927-1928

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CHEVALIER JACKSON, M.D.

TRANSACTIONS OF THE FIFTIETH (SEMI-CENTENNIAL)
ANNUAL CONGRESS
OF THE
AMERICAN LARYNGOLOGICAL ASSOCIATION

HELD AT
WASHINGTON, D. C., MAY 1, 2 AND 3, 1928

THE Fiftieth Annual Congress of the American Laryngological Association convened at the Hotel Raleigh, Washington, D. C., Tuesday, May 1, 1928, at 10 A.M., under the Presidency of Dr. D. Bryson Delavan. Dr. Delavan opened the meeting with the following remarks:

THE PRESIDENT: Gentlemen, in the name of the American Laryngological Association, which meets today to celebrate its Fiftieth Anniversary, I bid you welcome.

First, I extend the hearty welcome of the Association, as well as of myself, to our distinguished guest of honor, Sir St. Clair Thomson. No greater compliment could be paid us than to have as our guest the acknowledged leader of laryngology in the "Old World."

In the name of the Association, I welcome the younger members, especially those recently admitted. As for our old friends, such of them as are left, they know well the welcome that is in our hearts for them.

I cannot open this address more fittingly than to quote from the Presidential Address of that dear man, Dr. Logan, who in 1910 filled this place, and who opened the exercises as follows:

"It is something, I think it is much, to be able to escape even for a brief space the heavy atmosphere of the sordid plain in which we

pass our workaday lives and get a few whiffs of the ozone that comes from the heights of impersonal, unselfish endeavor."

In such spirit let us celebrate this anniversary. Just thirty-four years ago I had the honor to occupy this Presidential chair. The remarks with which I opened the meeting at that time may interest you, because there is need for so little change in them today:

"As President, the option is accorded me of inaugurating our exercises with the time-honored ceremony of a Presidential address. While some have held the value of the Presidential address in question, I believe that it should be considered, in like manner with our annual dinners, a very desirable if not an indispensable part of each yearly gathering, affording opportunity to call attention to ideas and suggestions of timely interest which could hardly otherwise be presented, and to record and study events of historical value in the career of the Association.

"Surely the experience gained in sixteen years (now we can say fifty years) should give light enough to illuminate for us the present and enable us to look forward somewhat into the future. In trying to forecast the future, too, it is eminently right that we should indulge in retrospect, particularly for the benefit of any who may have recently come among us, and to whom our early history may be unknown, for the history of the Association is almost that of laryngology itself."

REGISTRATION

The following Fellows enrolled during the course of the meeting:

BABBITT, JAMES A.	CHAMBERLIN, WILLIAM B.
BARLOW, ROY ALEXANDER	CLARK, J. PAYSON
BARNES, HARRY A.	CLERF, LOUIS H.
BARNHILL, JOHN F.	COATES, GEORGE M.
BECK, JOSEPH C.	COFFIN, LEWIS A.
BERRY, GORDON	DABNEY, VIRGINIUS
BIRKETT, HERBERT S.	DEAN, LEE WALLACE
BLAIR, VILRAY P.	DELAVAN, D. BRYSON
BRYAN, JOSEPH H.	DENNIS, FRANK LOWNDES
CARMODY, THOMAS E.	EMERSON, FRANCIS P.

FAULKNER, E. ROSS
FENTON, RALPH A.
FETTEROLF, GEORGE
FORBES, HENRY HALL
GITTINS, THOMAS ROY
GOLDSMITH, PERRY G.
GOLDSTEIN, MAX A.
GOODYEAR, HENRY M.
GREENE, JOSEPH B.
HARRIS, THOMAS J.
HASTINGS, HILL
HILL, FREDERICK T.
HURD, LEE MAIDMENT
IMPERATORI, CHARLES J.
INGERSOLL, JOHN M.
JACKSON, CHEVALIER
JARVIS, DEFOREST C.
KENYON, ELMER L.
KING, JAMES JOSEPH
LAW, FREDERICK M.
LEWIS, FIELDING OTIS
LILLIE, HAROLD I.
LUKENS, ROBERT M.
LYNCH, ROBERT CLYDE
MACKENTY, JOHN E.
MACPHERSON, DUNCAN
MAYER, EMIL
McCULLAGH, SAMUEL
McGINNIS, EDWIN
McKIMMIE, OSCAR A. M.
McKINNEY, RICHMOND
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MULLIN, WILLIAM V.

MYERSON, MERVIN C.
MYLES, ROBERT C.
NEW, GORDON B.
NEWHART, HORACE
ORTON, HENRY B.
PIERCE, NORVAL H.
PORTER, CHARLES T.
PROETZ, ARTHUR W.
RANDALL, B. ALEXANDER
RENNER, W. SCOTT
RICHARDS, GEORGE L.
RICHARDSON, CHARLES W.
ROY, DUNBAR
SAUER, WILLIAM EMIL
SEWELL, EDWARD CECIL
SHAMBAUGH, GEORGE E.
SHEA, JOHN JOSEPH
SHURLY, BURT R.
SKILLERN, ROSS H.
SMITH, HARMON
SONNENSCHN, ROBERT
SPENCER, FRANK ROBERT
STEIN, OTTO J.
STOUT, GEORGE C.
SWAIN, HENRY L.
TAYLOR, HERMON MARSHALL
THEISEN, CLEMENT F.
WHERRY, WILLIAM P.
WHITE, FRANCIS W.
WHITE, LEON E.
WILSON, J. GORDON
WOOD, GEORGE B.

ADDRESS OF THE PRESIDENT

D. BRYSON DELAVAN, M.D.

THE American Laryngological Association commemorates this year the most significant and interesting event in its history, its Fiftieth Anniversary. As its representative, I bid you welcome.

First, let me extend the hearty welcome of the Association as well as of myself to our distinguished guest of honor, my long-time and highly-valued friend, Sir St. Clair Thomson. No greater compliment could be paid us than the presence and support of him, the acknowledged leader of laryngology of the old world.

In the name of the Association I welcome the younger members, especially those recently admitted. As for our old friends, they know full well the welcome that is theirs.

And, let me say, this is no ordinary greeting, for we welcome you to the jubilee of an institution, the first of its kind, the oldest among those others which somewhat tardily followed its example. Always in the advance, for half a century of continuous usefulness it has sturdily upheld the high ethical and scientific standards set by those distinguished men who were its founders, and whose mantle of energy and genius has ever since rested upon their successors. We do well to set aside undue reticence and to celebrate the occasion with befitting eulogy, and with fair regard to justice and truth.

It is not without emotion that I stand before you today, overwhelmed by a flood of lovely memories. Especially do I recall the days of my entrance into the Association and the friends who were its members earlier than myself. But one of them remains—Dr. French—eminently deserving the Honorary Fellowship he is about to receive. Of those active at the time of my Presidency, in 1894, eight survive, namely, Birkett, Bryan, Coolidge, French, Rice, Swain, Wagner, Watson and myself. Four of us, Birkett, Bryan and Swain, are present at this meeting.

Thoroughly familiar with the earliest beginnings of the Association through my relations with Dr. Lefferts, one of its most active founders, and made still more intimate three years after its birth by seven years of service as its Secretary, my association with it has been a life-long satisfaction. No other medical interest of its kind has equalled it. For it I have labored with unremitting enthusiasm. From it I have drawn uplifting inspirations. In it I have made many of my best and warmest and most delightful friends. My interest in it has strengthened step by step with its steady, prosperous growth.

I cannot begin my remarks more fittingly than to quote the opening of the address of Dr. Logan, who in 1910, filling the Presidential chair, said:

"It is something, I think it is much, to be able to escape even for a brief space the heavy atmosphere of the sordid plain in which we pass our work-a-day lives and get a few whiffs of the ozone that comes from the heights of impersonal, unselfish endeavor." In such spirit, let us celebrate this anniversary.

Just thirty-four years ago I also had the honor to preside. My opening remarks at that time may interest you. There is need for little change in them today:

"As President, the option is accorded me of inaugurating our exercises with the time-honored ceremony of a Presidential address. While some have held the value of the Presidential address in question, I believe that it should be considered, in like manner with our annual dinners, a very desirable, if not an indispensable part of each yearly gathering, according opportunity to call attention to ideas and suggestions of timely interest which could hardly otherwise be presented, and to record and study events of historical value in the career of the Association.

"Surely the experience gained in sixteen years" (we can now say fifty years) "should give sufficient light to illumine the present and enable us to look forward somewhat into the future. In trying to forecast the future, it is eminently right, therefore, that we should indulge in retrospect, particularly for the benefit of any who have recently come among us to whom our early history may be unknown; for the history of the Association is almost the history of laryngology itself."

By an interesting coincidence, the year of our celebration falls upon the hundredth anniversary of the invention of that instrument of perennial fame, the venerable progenitor of an ever-increasing army of modified descendants throughout the world, the tonsillotome, devised by the distinguished Dr. Philip Physick of Philadelphia in 1828, twenty years before the birth of laryngology took place in New York.

No time than this could be more appropriate for a brief review of the influences which the United States has exerted in the domain of laryngology. What, it may be asked, has our country and this great National Society whose semicentennial we are now celebrating, done for the advancement of our specialty? The question is eloquently answered by the record of our achievements:

Thus, it was through the heroic efforts of Horace Green, in 1846, that, by the promulgation of his discovery of the tolerance of the larynx to the presence of a foreign body and the application of this discovery to the practical uses of clinical medicine, the science was founded. He well deserved the title universally accorded him of "Father of Laryngology." The contributions of Horace Green's contemporary, Gurdon Buck, rightfully won for him the distinction of "Father of Intralaryngeal Surgery." Following the introduction of the laryngoscope in Europe, Solis-Cohen of Philadelphia established organized instruction in laryngology in America, and in 1872 published the first complete system of this subject in either this country or in Europe. Clinton Wagner in 1873 organized the first special hospital in this country; but he far more greatly distinguished himself by founding, in 1873, the New York Laryngological Society, the first Society of laryngology in the world. The more than ten years of its existence, part of which I shared, were important factors in the progress of laryngology, for it was the arena in which was exploited the pioneer work of Bosworth, Jarvis, Beverley Robinson, Elsberg, Lefferts, Lincoln, Asch and others of the brilliant group which composed its membership. One of its most memorable meetings during my membership was that at which, in 1882, under the presiding of Dr. Lincoln, the Society entertained Sir Morell Mackenzie.

In 1873 Dr. Luis F. Sass of New York created a revolution in the

treatment of the upper air passages by the introduction of the spray apparatus, and Lefferts began his perfected system for the instruction in laryngology of undergraduates. Almost simultaneously Bosworth, acting upon the suggestion made many years before by Catlin, the American missionary to the Indians, and later by Clinton Wagner, demonstrated the evils of nasal obstruction and advanced principles for their relief which rightly won for him the title of "Father of Rhinology." Other early contributors of valuable original work in rhinology were Harrison Allen, John N. Mackenzie, Ernest Shurly, Bryan, Daly and Roe.

The pioneer work of Bryan in the study of the anatomy and pathology of the nasal sinuses and the highly original methods devised by Roe for the repair of deformities and injuries of the nasal framework long antedated similar work abroad. The same may be said of Bosworth and Asch in relation to the surgery of the nasal septum, and of Roe and Emil Mayer as the first to advocate and practice the method of submucous resection.

It was French who in the early eighties perfected the art of laryngeal photography, and Abbe who, years later, was the first to demonstrate the value of radium for the cure of laryngeal growths.

Another name, worthy of the highest rank, stands prominently forth. Joseph O'Dwyer, supplementing the discovery of Green of the tolerance of the larynx to the presence of a foreign body, established the great physiological principle of the tolerance of the larynx to the *continued* presence of a foreign body and acting upon this principle devised methods from which have been developed some of the most important advances of the present day. Thus, he perfected intubation for the relief of acute laryngeal obstruction; he was the first to propose the effective method of curing chronic cicatricial obstructions of the larynx by long-continued, excessive dilatation of the cicatricial tissue; and he anticipated bronchoscopy by the invention of a tube which inserted into the larynx enabled the foreign body to be expelled.

From the pioneer work of these great contributors and those who have succeeded them, we have indisputable evidence that the fundamental principles of laryngology and rhinology as known today were born of the genius of our fellow-countrymen.

Meanwhile, what has been the work of the American Laryngological Association?

The available evidence of the life and activities of the Association is set forth in its published *Transactions*. Since the inception of the Association every year has been represented by a volume in which has been preserved the results of the best thought and effort of the foremost of our leading specialists, to the number of more than 1700 original articles. Year after year these volumes have accumulated with absolute regularity, even during the most strenuous years of the war, although 35 of our active members were absent at that time on important military duty. We may look with just pride upon the splendid record of our Fellows in the World War as well as upon these fifty volumes themselves, which so conclusively establish the position of our Association as being the oldest and the most continuously active of its kind.

Reviewing the scientific material of our *Transactions*, we find that in the study of the upper air passages the Association has pursued a wide variety of subjects, intimately connected with its legitimate field. There has always been a strong desire to recognize the larynx as the point of all others deserving attention. Our statistics, however, show that while there have been presented to the Association since its founding to date approximately 325 articles relating to the larynx, their relative proportion has declined with the advance of time.

Thus, from 1879 to 1889	103
1889 to 1899	66
1899 to 1909	76
1909 to 1919	44
1919 to 1928	36
Total	325

This should not be.

The annual addresses of former Presidents of the Association have offered much in the way of stimulation and suggestion to the student of today. Thus, Dr. Elsberg in his inaugural announced as the aim of the Association "The Promotion of Knowledge in All That Pertains to the Diseases of the Upper Air Passages," and suggested various activities in which the Association might well interest itself. At the very outset he urged that the Association should become the means of introducing those of kindred tastes in the practice of medicine and of fostering the friendships thereby

made. The address of Dr. Rufus P. Lincoln, in 1900, was a masterpiece of thought and style. Dr. Swain, in his address in 1901, urged the necessity for the strong personal interest of members in the welfare of the Association—an interest which should be preëminent. Swain's advice as to the education of students in laryngology remains in force today and is well worthy of remembrance. Dr. Bryan, in his address in 1903 celebrating the twenty-fifth anniversary of the society, gave an interesting résumé of its progress which to that date had included the furnishing of 548 scientific papers. The suggestion of Dr. Bryan that a monument be erected to Dr. Joseph O'Dwyer is still pertinent.

The fact that our *Transactions* are not known to all our members is sometimes manifest. From the first of them to the last they are invariably interesting, whether studied from an historical point of view or to learn which of the original ideas and suggestions advanced in them have survived, which have been superseded, and which have been forgotten. No period could be more appropriate than this for a careful survey of their content, a task which could not fail to reveal much valuable information and throw light upon not a few forgotten or neglected treasures.

As a factor in the introduction of our science to this country the Association has from the outset played the leading part. Its members have been the inspiring instructors in all of the centers of teaching. With such masters as Solis-Cohen, Allen and Sajous in Philadelphia; Oliver, Knight and Hooper in Boston; Wagner, Lefferts, Bosworth, Elsberg in New York; French in Brooklyn; John Mackenzie in Baltimore; Shurly in Detroit; Ingals in Chicago; Glasgow in St. Louis; de Roaldes in New Orleans; Logan in Kansas City, and those who have followed—laryngology has reason to be proud of its sponsors.

Gleitsmann in his Presidential address in 1906 comments upon the progress of teaching at that time, as follows: "The position of laryngology in medical colleges and universities is more gratifying in the United States than abroad. Thus, in 29 colleges of the United States having the largest number of students it was taught by 14 professors in ordinary, in 2 by so-called special professors, in another 2 by professors residing elsewhere. Clinical professors taught in 8, lecturers in 2, and in the remaining 6 there was no

teacher of laryngology. Comparing conditions on the Continent, it was found that B. Frankel's assertion was still true, namely, "We have not yet a regular professorship for laryngology. The majority of teachers in the 20 German and Austrian and the 5 Swiss colleges are so-called extraordinary professors, with the exception of Brussels and Rostock, where laryngology combined with otology is taught by a full professor." Now, after twenty years, the advances made relatively here and abroad have not materially altered the situation. Every day is bringing new evidence, much of it from unprejudiced outside observers, of the rapidly growing superiority of our own special institutions and the character of the instruction which they afford.

The experience of fifty years has clearly demonstrated the value of broad investigation based upon modern scientific lines. It is time that a new era in laryngology should be introduced, through the employment of this method for the solving of our problems, especially those which relate to some of the most common and at the same time most pernicious ailments. Only within the past few months the study of the so-called "common cold" has been scientifically undertaken, although vast sums have been and are being expended upon the attempted discovery of the causes and cure of cancer, tuberculosis and other diseases far less prevalent.

While the years have brought innumerable betterments in our knowledge of the diseases of the upper air passages, a never-ending vista still leads to the things unknown. Thus, in many instances vasomotor coryza still defies us; questions relating to the diseases of the paranasal sinuses are unsettled; many other conditions remain to be explored.

One of the most brilliant examples of the intelligent conservation and grouping of the details pertaining to the histories of large numbers of important cases is shown in the extensive collection made by Dr. Chevalier Jackson of foreign bodies extracted by him from the air passages. These, with their histories, constitute a complete compendium of instruction and impart a striking lesson.

Another member of the Association, Dr. Mackenty, has done valuable service in the department of laryngectomy, not only by reason of the number of his successful operated cases but by the

painstaking compilation of their histories, from which he has made possible deductions of actual scientific importance; in like manner with Sir St. Clair Thomson in the study of laryngo-fissure. These are promising beginnings for a series of investigations which shall review the experiences of the past, eliminate its faults, recognize its successes and formulate methods embodying the practices which have proved the best.

The age-old discussion of the tonsils has become so trite as to make it almost the opprobrium of our medical gatherings. But with all the efforts put forth little precise knowledge has been established. A valuable step toward the better understanding of its pathology has been made by the recent work of Dr. French. Such contributions as his should be received with the seriousness which their value demands.

Every one knows the benefit derived from the proper treatment of diseased tonsils. How much better would it be for the patient if the tonsil were not allowed to develop conditions of hypertrophy and disease! There is no more urgent need today than that of an intensive, thoroughly scientific investigation of the physiology and pathology of the lymphoid structures of the pharynx, especially as relating to causes, metabolic or otherwise, which contribute to its common pathological changes. I earnestly commend this to your early and serious consideration.

More attention should be paid to the study of the physiology of the larynx, with especial reference to the production of the voice. Since the days of that greatest of all masters of tone production, Manuel Garcia, there have been other teachers of excellence and many fine singers have been developed; but even with the advanced instruction of the present day much improvement is desirable, while the quality and use of the voices of people in general is such as to call for our earnest attention, whether regarded from the point of view of esthetics or from the actual physical well-being of the individual. One of the most important contributions made by our Association to laryngology is the method of laryngeal photography originated and introduced by Dr. French more than forty years ago and now forgotten. Aided by this perfect method its inventor made elaborate studies not only of pathological conditions but of the vocal bands in action. He explained the technique of the production of the various tones of

the human voice as demonstrated in the larynges of highly-trained artists, both male and female, and was able to confirm or to correct the views empirically derived by the best masters of singing. That others should not have taken up the studies which he carried on with such scientific zeal and artistic demonstration has involved the loss of a great opportunity for scientific advancement.

As to the relations which exist between the Association and its Fellows, it cannot be too clearly understood that the scientific sessions of our Association are its most important function. The age of the Association, the superior ability of its membership, and the unbroken record of its progress all conspire to endow it with a dignity of position which is unique. We who are acquainted with its long history know full well the truth of this proposition. Since it is the best, we, individually, owe to it the *very* best of our endeavors. To it should be brought the first offering of any new achievement or promising theory. Only in this way can we sustain our traditions. Papers based upon the authority of well-substantiated observations should receive preference.

Our ethical standards must be carefully guarded in the future as they have been in the past, and our relations toward our fellow-members fostered upon the terms of friendship which have ever characterized us.

Conceding our debt to the Association, it must be remembered that the institution owes something to us in return. Attendance at its meetings involves labor in the preparation of our offerings, the expenditure of valuable time away from home, and the by no means inconsiderable cost of travel. Since the prime object of our meetings is scientific the least the Association can do in return for the zeal of its members is to fill the sessions with the most desirable material, see that they are conducted under the most favorable conditions, and that the social features of the Congress, however desirable and delightful they may be in themselves, shall not be allowed to interfere with the business in hand nor detract from its earnest prosecution.

As a rule our most successful meetings have been those where quietude and freedom from undue outside influences have prevailed.

The Association has always maintained itself upon a basis of financial independence; but there is no question that an endow-

ment of moderate proportions might furnish the means of increasing its usefulness. Thus, in suitable cases research work might be encouraged; as, also, the publication of valuable scientific work, possibly too voluminous to be otherwise included in the *Transactions*; the traveling expenses of members of the Council in attending to the work of the Association; provision for the entertainment of distinguished guests and specially invited lecturers; and such other matters as might legitimately appeal. Already a nucleus for such a fund has been provided through the generous foresight of Dr. Samuel Johnston.

It has long been my ambition that the Association might have for itself a general rallying place, a home which might be an established center for its activities other than its meetings, and be a depository for its material treasures. In it should be deposited the Archives of the Association, its memorabilia, the portraits of its members and of other distinguished colleagues, authoritative descriptions of original discoveries and new methods, and collections of objects of interest of all kinds pertaining to the history and development of our specialty. For this there should be an efficient custodian, thoroughly qualified by nature and experience and with a long tenure of office. Such a scheme would serve many useful purposes, some of which are obvious. A highly important function might be created, hitherto untried, a collection representing the original models of instruments and methods, for the purpose of placing these on record and on visible exhibition, to the end that the claims of priority of the actual inventor might be secured to him, and that recurring repetitions of undesirable instruments might be prevented. Also, in the presentation of original matter of any kind there should be some established and recognized authority for verifying the record, for the settlement of questions pertaining to claims and for the proper adjudication of credit. The findings thus arrived at would be permanently recorded for the reference and guidance of any who in the future might be interested. Had this method been pursued in the case of the department of laryngology, the United States would long ago have secured the credit which it so richly deserves from the world at large.

The originality and the scientific value of the work auspiciously begun by our Association, has been continued throughout its life

with unabated energy. Time is lacking to recall all of the notable contributions of its members or to give due credit to the men themselves. Our Fellows have been leaders as discoverers, inventors, educators, writers and students. Such names as Solis-Cohen, Harrison Allen, Carl Seiler, Sajous, of Philadelphia; Green, Buck, Bosworth, Lefferts, Jarvis, Elsberg, Lincoln, French, Robinson, Roe, Wagner, O'Dwyer, Lynah, of New York; Oliver, Knight, Hooper, Langmaid, of Boston; Ingals, Casselberry, of Chicago; Shurly, of Detroit; Glasgow, of St. Louis; John Mackenzie, of Baltimore, and the splendid array of those now living who are "carrying on," fully sustaining the ideals and supporting the advances of their predecessors, assure us of the continued preëminence of our country in the developments and achievements of laryngology and of our Association as its worthy representative.

Let us, individually, continue to pursue the work which Providence has placed in our hands, with abiding enthusiasm and a faith which "age cannot wither nor custom stale." Our Association has offered more than one brilliant example of sustained professional interest and still provides them, as witness J. Solis-Cohen, Ingals, French, Pearce, Birkett, Bryan, Swain, Moure, Desvernine, Schmiegelow, and our distinguished guest. Such careers are splendid inspirations to those who are conscious that the years bring with them grave responsibility of utilizing the rich accumulation of their experiences. Work!—the magic watchword of Pasteur, the stimulant of our energies, the solace of our trials, the promise of the fulfilment of our hopes, the only material thing that counts,—while the days last!

And so, always growing in strength, prosperity and usefulness, with the close of our first half century we enter upon a new era of endeavor, confident of the future because stimulated by the achievements of the past; with full faith that the same wisdom, foresight and unselfish devotion which created the American Laryngological Association and established for it the high ethical and scientific standards under which it has flourished preëminent for fifty years will be continued with unabated loyalty and zeal; and so continued, will carry forward its mission of truth and light with ever-increasing renown.

WHAT IS THE RELATION OF THE THYROID TO THE LARYNX?

W. V. MULLIN, M.D.

THERE has been a tendency to associate disturbances with the innervation of the larynx with diseases and enlargement of the thyroid gland. It would really seem, however, that their association is rather coincidental than relational, for in their embryonic development there is apparently no connection between these organs. In swallowing, the larynx and the thyroid move upward and downward simultaneously, but this contemporary movement is due to the action of the extrinsic laryngeal muscles.

Enlargements of one or both of the lobes of the thyroid gland may displace the trachea, producing the so-called "saber trachea," which may also cause a distortion of the larynx without apparently having any effect on the voice of the individual. Simple adenomata seem to produce no voice changes.

Individuals with hyperthyroidism may have a hoarseness, but this condition is not due to disturbances of innervation, but rather to the same tremor and muscular weakness that affects the entire body musculature, being similar to the tremor seen in the hand. Posterior or lateral enlargements of the lobes of the thyroid may project into the pharynx or trachea from behind or laterally. These may be large enough to involve the larynx or to extend down into it from above, but they apparently do not penetrate the laryngeal structures.

The recurrent laryngeal nerve in its course through the tracheoesophageal groove seems to be more closely associated with the esophagus than with the trachea, so that enlargements of the thyroid gland, except those which are malignant, do not seem to exert sufficient pressure upon this nerve to produce any ill-effects. In malignant cases, however, all the adjacent structures, even the nerve tissue itself, may become infiltrated with the disease. Thus a bilateral abductor paralysis associated with a thyroid gland which has not been operated upon in nearly all instances indicates

a malignant condition of the gland. In the observation of 219 cases of malignant tumors of the thyroid gland we have not found the larynx to be secondarily involved unless it has become eroded by pressure necrosis.

One observation will be reported; a case in which a malignant condition of the thyroid gland had involved both recurrent laryngeal nerves and caused bilateral abductor paralysis:

CASE REPORT. The patient, a man, aged sixty years, was first seen on April 7, 1928. He had been feeling well until seven weeks before this examination, at which time he had noticed a small mass in his neck of about the size of a walnut. The entire neck began gradually to enlarge and dyspnea developed.

Examination revealed a well-developed man who showed no evidence of any loss of weight. He had a fairly good voice, but dyspnea was marked. The larynx could not be examined without producing inspiratory stridor. The condition was diagnosed as bilateral abductor paralysis with the cords in the midline, together with a malignant condition of the thyroid gland.

A decompression of the thyroid gland was performed. The gland could be scooped out in soft masses. This operation was followed by tracheotomy and x-ray therapy was applied. The patient died of pneumonia on the third day after operation.

At necropsy the thyroid was found to be replaced by a tumor growth, with loss of all normal markings. A fistula extended into the trachea at about the second trachea ring, where the tracheotomy tube had been inserted. The tumor had invaded the adjacent muscle and connective tissue and in some places had extended into the skin. The lower pharynx was practically closed, due to the submucosal tumor mass which encroached upon the lumen of the pharynx. The vocal cords were in the midline and in apposition. The larynx mucosa was clean. The recurrent laryngeal nerves were directly invaded by the tumor. The carotid sheaths were surrounded by the tumor growth.

COMMENT.—The pathological findings in this case show that the laryngeal symptoms were not due to an invasion of the larynx itself, but rather to the extensive involvement of the laryngeal nerves.

DISCUSSION

DR. JOHN F. BARNHILL, Indianapolis, Ind.:

Dr. Mullin, with his usual thoroughness, has almost covered this subject; still there are a few points he did not mention which might be of interest.

He did not mention aberrant goiter. Perhaps it was his intention not to do so; but from aberrant goiter, it has been my experience, we have more laryngeal difficulty than we ordinarily do from goiter when in its normal position. The aberrant goiter in its early stage—that is, in infancy—gives the greatest difficulty, and we as laryngologists should know that rarely an infant dies during the first hours following birth from the so-called “circular” or misplaced goiter, which really chokes the child to death. I have had the privilege of examining postmortem two infants who died from this cause. Another type of aberrant goiter that gives rise to much difficulty, and is sometimes overlooked as to its being a goiter at all, is one which does not descend from its original location in the tongue to its normal place on the neck—goiters that lie in the base of the tongue and give rise to distress from hemorrhage and difficult deglutition and respiration.

I am convinced that the doctor is correct in his assertion that an adenomatous goiter, however large it may be, does not often cause laryngeal paralysis.

I once experimented on the recurrent laryngeal nerves—in animals, of course—for the purpose of determining how much injury they would withstand without loss of function, and would say that the result of my investigation was rather surprising. I found that the nerves withstand pinching, much pressure, other abuse and even infection often without losing their function. The point made, and one which should be recorded as a fact, I think, is that when one gets infiltration of the tissues that are involved, it is certain, if this infiltration is in the neighborhood of the recurrent nerves, to cause a laryngeal disturbance.

There are two types of ailments which cause infiltration. The doctor showed a picture of one of them. Any malignancy which infiltrates and hardens the thyroid and involves the tissues surrounding the gland will impair the function of the recurrent nerves and be followed by a crippled larynx.

Dr. Mullen is correct in his statement that malignant goiter does not usually involve the larynx, except by direct invasion of the cartilage. Neither does laryngeal cancer extend to or involve the thyroid very

often. I fancy the explanation of these facts is the relationship to, or the drainage of the larynx into, the cervical lymph nodes rather than into the goiter itself.

DR. WILLIAM B. CHAMBERLIN, Cleveland, Ohio:

Dr. Mullin mentioned the fact that the relationship of the thyroid to the esophagus was much more intimate than it was to the trachea. On the other hand, is it not a noteworthy fact that dyspnea is more frequently associated with thyroid enlargement than dysphagia?

DR. GORDON B. NEW, Rochester, Minn.

The relationship of the recurrent nerve to the upper part of the esophagus was worked out experimentally on dogs several years ago. It was found that if the recurrent laryngeal nerve was injured just as it entered the larynx the dogs had little, if any, trouble in swallowing. If the nerve was injured lower the dogs were unable to swallow and most of them died.

Regarding the relation of the recurrent laryngeal nerve to thyroid surgery, we know that a nerve may be injured by tying, pinching and cutting, or by edema or scarring about it. In work on animals we found that stretching the recurrent laryngeal nerve for a long period, as over muscles, may temporarily impair the function of the vocal cords, but this is probably due to operative trauma and not to stretching. It has been my experience that in most cases of recurrent laryngeal nerve injuries following thyroidectomy the vocal cord is in the median line or abductor position. If the nerve has been permanently injured the vocal cord stays in this position. In a small group of cases of nerve injuries the vocal cord is in the intermediate or cadaveric position following operation on the thyroid. If the injury is temporary the cord regains its function; if it is permanent the cord comes to the median line in three to four months and stays in this position permanently. This accounts for the fact that following thyroidectomy some patients are quite hoarse, and as their voice improves slight dyspnea is present. In such cases the bilateral cadaveric position has changed to a bilateral median-line or abductor position. In a post-mortem specimen of a case of bilateral median-line position of the vocal cords, following thyroidectomy several years previously, it was shown microscopically that both nerves and not the abductor fibers alone were completely destroyed. It has been impossible to produce experimentally a median-line or abductor position of the vocal cords except by cutting the recurrent nerve and stimulating the superior laryngeal nerve. It would seem, although it cannot be shown experimentally

in animals, that the median-line or abductor position of the cords, at least following thyroidectomy, is due to complete destruction of the nerve and not the abductor fibers alone.

SIR ST. CLAIR THOMSON, London, Eng.:

This is a subject that I would sooner write about than speak about; first, because I have not had a very great experience; second, because writing gives you time to clarify your thoughts, and, third, because I think it is a matter upon which statistics could do a good deal for us, especially in this country where goiter operations are so much more frequent than with us.

I can only recollect on a few occasions being consulted by patients for change of voice due to thyroid influence, and I rather patted myself on the back for discovering that this was due to early myxedema.

We discussed the subject of recurrent paralysis at a meeting in Edinburgh last summer, and it was very interesting there to hear a Swiss colleague on the subject. I shall not mention his name, in case I do not quote him quite correctly, but he bore out what has been mentioned this morning: that it is their opinion in Switzerland that preoperative paralysis, associated with enlargement of the thyroid gland, is so suggestive that it is almost pathognomonic of malignant disease.

That is not what we have in our records in England. There are cases on record there of paralysis existing before a goiter operation and disappearing after a successful goiter operation—not in my hands.

With regard to the subject of operative paralysis, I have had occasion to see cases that were referred to me of goiter, after the operation, in which the cords were quite mobile, and yet after a few weeks (or it may have been a month or two) paresis, perhaps a complete paralysis, occurred in one cord. On investigating that, it seemed to me this occurred in those cases which did not follow an entirely aseptic course, cases in which there was perhaps prolonged drainage and some suppuration, so that the paralysis was due to the contraction secondary to sepsis.

I think that should make us laryngologists to whom these cases are referred a little diffident in criticizing our surgical colleagues and condemning them as having cut the nerve, because this paresis might occur, if this thesis is correct, through no fault of theirs. So that we should gently scan our brother man.

DR. MULLIN (in closing):

I did not want to convey the impression that enlargements of the thyroid gland might produce more disturbances in the esophagus than

in the larynx or trachea, but that the recurrent laryngeal nerve with its branches really lies closer to the esophagus than the trachea.

In thyroidectomy, traction on the thyroid gland is not likely to injure the nerve, but it will pull it out of its bed and make it very easy for the surgeon or an assistant to grasp it with a hemostat, especially if hemorrhage is brisk.

I appreciate very much the discussion of Sir St. Clair Thomson. I have come to have a very charitable attitude toward the surgeon operating upon the thyroid gland. If he does not take out a sufficient amount of the gland he may not help the patient, or there may be a return of symptoms. If he takes out the required amount, he is working in a dangerous area. However, in the past he has been too prone to believe that if, following a thyroid operation, the patient had a good voice that the recurrent nerve had not been injured. Of course we know that a unilateral laryngeal paralysis with the cord in the midline may not give any voice disturbance.

I have examined cases immediately after their thyroid operation and up until they left the hospital and found the cords working normally, and then reexamined them in three or four months and found a paralysis on one or the other side. I can only infer that the nerve has become involved in scar tissue.

I have examined one case with a large tumor of the mediastinum. This patient had marked voice changes, and every one who came in contact with the case assumed that the recurrent nerve was involved, but examination revealed the cords and muscles in normal function.

In conclusion, I again state that simple enlargements of the thyroid are seldom a cause of laryngeal paralysis, but that when a bilateral abductor paralysis is found in association with an enlarged thyroid, it is always a suspicious sign of malignancy of the thyroid.

THE NOT-PLEASING NOSE

VILRAY P. BLAIR, M.D.

FIRST I am going to apologize for this title by explaining what it means. I want to present a surgical reaction to a psychological condition, as the best answer we know; not necessarily a good one. These pictures will likely bring up the thought that in many of the cases there is not sufficient reason for operation, but I am attacking the problem from the patient's point of view.

This is a selected group, mostly of earnest people. None was encouraged to submit to operation, and in most instances we hesitated considerably before acquiescing to their demands. The irresponsible and flippant types were eliminated wherever possible, and we have refused operation to more than we have operated upon. There are many people, and you have all seen them I am sure, who from some real or fancied facial disfigurement are obsessed with the idea that in their contact with others attention is focused on some facial feature and not on their personality or what they are trying to put out to their fellows, and this obsession, which frequently refers to the nose, can be an absolute handicap. That is my reason for taking this up.

It is dangerous to approach these with any idea that their correction is a trivial matter. They are much more difficult to deal with than the making of a whole new nose, because in one case you are dealing chiefly with physical facts, in the other you are dealing largely with psychological conditions, and in a few of them you will fail no matter what care you take.

The types of noses which we deal with are congenital, developmental or acquired. In these days of the introduction of syphilis into parlor conversation, saddle-nose is looked upon with suspicion by the observer and resentment by the victim. The retracted type gives the victim a feeling of insignificance. There are a number of other kinds, and when you classify all that you know about still other types will turn up.

In each instance the condition should be carefully studied

anatomically and the plan of correction made as nearly as possible to conform to the facts found. I am absolutely convinced that in most of the cases the patient will not be disappointed after a good operation, and in most instances where the surgeon is unable to satisfy the patient it is because of lack of artistry in the surgery. This conclusion is based upon the observation of my own and others' results. In the last analysis, the answer, if surgical, must be pleasing surgery.

I shall not attempt to present the details of technique, for it is not technique that I am trying to emphasize.

SADDLE-NOSE. It may be the whole dorsal line that is retracted, it may be the upper part or it may be the lower part. In these cases it is simply a matter of sliding in some solid matter to bring the dorsal line forward. The original type of nose and the type of the face must both be considered in making the restoration, and the outline of the filler should merge into the surrounding planes and lines without any disturbing contours. The *retroussé* nose does not fit all faces, and there are many cases in which raising the bridge without adjusting the tip will not satisfy. In some the dorsal line should be lengthened; in others shortened as well as raised; in all, the front as well as the lateral aspect should be considered. It is the former that the patient most frequently views in the mirror, but the latter is the more evident to the friends. The introduction of the filler to the tip demands particular attention.

LATERAL DISPLACEMENTS. These fall largely under the following headings: The fairly-recent fracture that requires simply to be replaced and fixed in position; the adult or adolescent fracture which has been allowed to become fixed in the malposition, which requires freeing with a chisel, and the early childhood fractures (usually at the time unnoticeable) that are followed by growth distortions and which are most complicated of all to correct. You all know the history of that type of nose. The child is hurt when it is very small; the mother brings it to the doctor and asks if the nose is broken. The doctor can tell little more about it than the mother, and unless he is on his guard he may commit himself unfortunately. Several years afterward it is noticed that the nose starts to turn to one side, and there seems to be almost no

limit to the progressive distortion. These deformities seem to result from the septum pushing the bone and other cartilages out of shape. In each the septum must be taken care of either before the time of the correction of the external deformity or afterward. In some the external deformity can be best attacked by chiseling the bony nose free subcutaneously from the other face bones, with or without freeing the septum from the maxillæ. The mobilized nose is then fixed in a new position or relation either by a splint attached to the teeth or by guy wires passing through the soft tissues to be attached to the teeth, the teeth being the only available anchorage points, and the nose is held up in the desired position until union takes place. Some of these growth deformities will demand adjustment of the lateral cartilages and the rearrangement of osteoplastic flaps.

THE RETRACTED NOSE. Of this class there are two general types: that in which the retraction is due to smallness or a shrunken condition of the soft parts, and that in which there is a retraction of the bony framework about the anterior nares. There may be a combination of both of these conditions. It may be congenital, developmental or acquired, and certain of the first class, the shrunken nose, are definitely due to lues. It is surgically not practical to advance the maxilla by bone cutting, and in but few is it advisable to attempt to advance the septum and nasal bones; but it is quite practical to bring forward the cheeks, lips, columella and skin of the dorsum, and after mobilization fixing them in this advanced position by sutures. In most instances the bridge can be advantageously brought farther forward with a filler either at the time of the first operation or subsequently. In some the lining of the nose will have to be lengthened in order to permit sufficient advancement, while in others the external covering will also have to be pieced out.

If in early operation for cleft lip and palate the jaws are drawn together forcefully there will likely result, in a certain number of cases, a lack of forward protrusion of the maxilla. If the ala is not put in proper relationship to the base of the columella a flat nostril on that side will result. Following an early backward replacement of the premaxilla in the correction of a complete double cleft the upper lip will be flat and the nose snubbed. In these congenital

left postoperative deformities the lip on one or both sides, and one side of or the whole columella, can be advanced to correct the retracted lip and flattened or snubbed nose.

The essentially or relatively small nose cannot be acceptably enlarged by simply inserting a cartilage in the dorsum, though at times we are induced to do it in the attempt to satisfy a patient whose time and finances are limited, as it is the only thing that can be done in one step in a condition that would require three or more steps to make a really worthwhile change.

When the tip is found to be drawn up and the nostrils everted by an external burn scar, the condition can be helped by an ellipse of full thickness of skin let in through a tranverse incision across the nose somewhere below the bony bridge.

ELONGATED TIP. The nose with an elongated tip can, in some cases, be treated by building out the dorsum, but usually it is preferable to shorten the lateral cartilages and septum. A symmetrical droop of the tip of the nose is often associated with a dorsal convexity. The droop of the tip becomes more evident and an undesirable breadth of the dorsum may result from the simple removal of the "hump." Under these circumstances the dorsum can be made narrow by chiseling the nasal bones free; but to raise the tip triplicate wedges of cartilage and mucosa, united by their bases, are removed from the septum and the lower lateral cartilages, the borders of these defects being immediately united by sutures. The unilateral droop that may be associated with poor repair of single hare-lip is best corrected by removal of a crescent of skin and lower lateral cartilage.

It may be that the nose blamed by its host is not at fault; it being free from intrinsic fault, has obliquity cast upon it by some other disproportionate feature. Not infrequently it is the chin or upper lip, or a depression over the frontal area, that is at fault. Sometimes both the nose and a neighboring feature share in the blame, and one cannot be advantageously changed without also dealing with the fellow culprit.

BIFID NOSE. The bifid nose varies from two more or less complete noses with increased breadth between the eyes to a slight spreading with notching in the midline. In early infancy the double nose can be successfully dealt with; but while the ocular

hypertelorism can be made less conspicuous by narrowing the bridge, it cannot be successfully changed.

Tumors, rhinophyma, etc., must be dealt with according to the condition.

The results must not only be immediately pleasing, but must be permanent to be fair to the patient. When needed we do not hesitate to make external incisions, as they are usually followed by inconspicuous scars, but we avoid them wherever possible.

It is an interesting fact that the majority of these patients are brought to us by their parents, or come in of their own volition, for the purpose of establishing or increasing their earning power.

DISCUSSION

DR. D. BRYSON DELAVAN, New York City:

This presentation of Dr. Blair's, coming at the time of our Fiftieth Anniversary, recalls to some of us the initial work in this department of Dr. John O. Roe. Dr. Roe was rightly called the Father of Intranasal Surgery. While advances have been made since his time, what he originated was very comprehensive of the subject and full of new ideas and practical methods. Thus, he was the first to propose and adopt submucous resection, almost synchronously with Dr. Emil Mayer, long antedating others. The results of his work in the restoration of various deformities of the interior of the nose are still worthy of serious attention, especially in view of some of the less desirable radical measures which seem to have superseded them. It is gratifying to know that the work so well begun by him is going on, as evidenced by the speaker and others who have taken it up and are achieving such good results.

FOREIGN BODIES IN THE STOMACH AND INTESTINES

M. C. MYERSON, M.D.

It is a fact that gastrotomy is frequently performed when it might be avoided. Individuals who swallow foreign bodies are usually referred to the laryngologist first. When the foreign body is no longer in a position for esophagoscopy, the question of its future management arises. The laryngologist, by virtue of his more frequent contact with these cases, should be able to determine what is the best procedure—gastroscopy, surgery, or shall the foreign body be permitted to pass through the bowel tract unmolessted?

Heretofore, this field has been covered principally by the surgeons. Because of its importance to the laryngologist, he should have an understanding of the various phases of foreign bodies in the stomach and intestines. When the laryngologist is called in and he finds that the foreign body is no longer in a position to be removed by him, he should be able to advise concerning the future behavior of the foreign body. He should also be able to direct the future care of the patient.

Little is generally known of what becomes of a foreign body when it reaches the stomach. The attending physician frequently joins with the family in its alarm when one of its members swallows a foreign body such as a coin, a pin or a nail. This alarm frequently leads to unnecessary or untimely surgery for the removal of the intruder. Much has been written upon isolated instances of perforation of a portion of the gastrointestinal tract.*

When a foreign body lodges in the stomach, there are *four* possibilities which must be considered: (1) As occasionally occurs, the foreign body may be regurgitated back into the esophagus or even out of it. (2) It may pass through the pylorus; or it may remain in the stomach because of its size and shape, or because the pylorus is abnormally small. (3) The next possibility, which is remote and of extremely rare occurrence, is that the foreign

* Some striking examples are cases of Carp,⁷ Allen,² Lupton,¹⁸ Eiselberg.⁹

body may perforate the wall of the stomach. (4) When the foreign body passes through the pylorus it will very likely pass through the intestinal tract and be evacuated with the stool. In an exceptional case it may lodge in the appendix or perforate the intestinal wall.

Perhaps the most unique experience which comes to the endoscopist occurs when a foreign body is regurgitated back into the esophagus or even out of it. Those that return to the esophagus are removed by the esophagoscopist. I have found 4 recorded instances in which an open safety-pin was returned to the esophagus with the ring end uppermost, and then removed esophagoscopically.* Those foreign bodies that remain in the stomach and cause distress are removed by either the gastroscopist or the surgeon; while those that pass through the pylorus usually pass through the bowel tract. Pointed foreign bodies should be closely watched until they have passed. There are comparatively few recorded instances in which foreign bodies which were under observation caused a perforation. It is noteworthy that in a majority of the instances of perforation caused by foreign bodies, there was no definite history of the ingestion of a foreign body. Fowler reviewed the literature on appendicitis due to foreign bodies, and made note of the fact that in only 5 of 63 cases was there a history of a foreign body having been swallowed. Ginsburg and Beller reported 15 cases of different types of surgical complications caused by foreign bodies in the intestines. In none of these cases was there any knowledge on the part of the patient that he had swallowed a foreign body. The fish bone, one of the most common of foreign bodies, is often swallowed unknowingly. Its presence may never be known. The experiments of Faber with foreign bodies of this class are interesting. He found that fish bones fed to individuals with a normal or hyperacidity did not appear in the stools, showing that they are decalcified in the normal process of gastric digestion.

At first thought it would appear that anything which passes through the cardia should also pass through the pylorus, if it were not for the unusual size and shape of some foreign bodies or possibly an abnormally small pylorus. A single foreign body will

* Recorded by Jackson,¹⁶ Taylor,²¹ Iglauder,¹⁵ Orton.¹⁹

remain in the stomach because it is too large to pass. Multiple foreign bodies may be small enough to pass individually but frequently form an entangling, obstructing mass which is too large to be propelled through the pylorus. This class of case is seen among the insane or among the professional swallowers.* Their stomachs have been emptied of an unusual content. Thorek²² reported the case of an actor, aged twenty-four years, whose stomach, upon being opened, yielded a total of 276 foreign bodies. These included nails, clips, and open and closed safety-pins. Griffith¹⁴ reported the case of a man, aged twenty-nine years, whose stomach contained 1½ pounds of assorted hooks, pieces of wire, and hair pins. Benjamin's⁵ patient was a glass and nail eater; 52 nails and 5 pieces of glass were removed from his stomach. Occasionally a woman is encountered who unconsciously swallows her hair. As a result she suffers a matted collection in her stomach which in time can form a cast of that organ. Balfour's⁴ patient had a stomach completely filled with a hair ball.

We are more particularly interested in the experiences of normal human beings, especially of children under the age of ten years. One is astonished at the numbers and types of foreign bodies which instead of remaining in the stomach not only pass out of it, but also pass through the entire intestinal tract. There are several reports of cases in which pointed and sharp foreign bodies ran the gamut of the intestinal kinks and movements, to emerge with the stool and without injury to the patient. Allison's³ case is most striking. A man, aged thirty years, swallowed a piece of a razor blade which traversed the intestinal tract and was evacuated within forty-eight hours. Carp's series includes the case of a boy aged six years, who swallowed a 3-inch nail. The nail reached the cecum on the second day and remained there for three weeks. It was passed with a barium enema.

Professional swallowers place in their stomach nails, screws, tacks, pieces of glass, pins and the like, and pass them by rectum. They come to grief however when a collection of these articles remains in the stomach and forms an obstructing mass. Safety-pins, both closed and open, are being swallowed more frequently

* See Lupton,¹⁸ Thorek,²² Adams,¹ Griffith,¹⁴ Benjamin,⁵ Brand.⁶

than is known, and are found in the baby's diaper with the stool by the unsuspecting mother. In the case of four open safety-pins of comparatively large size which were impacted in the esophagus of an infant, Jackson¹⁷ removed two endoscopically and pushed the other two into the stomach. They passed through the bowel without incident.

Experience has shown that foreign bodies prefer to travel through the intestinal tract with the heavier end foremost. This is demonstrated by the roentgen-ray studies of our metallic foreign body cases, and was proven by the experiments of Exner.¹⁰ Exner fed a dog 50 needles with his food. He introduced the needles, half pointing in the direction of the intestinal current and half pointing in the opposite direction. He found at the end of twenty-four hours that 48 needles had passed with the heavier ends first. In another experiment he introduced into the stomachs of a group of cats and dogs, 800 needles with points foremost. Seventy per cent of the needles were passed with the heavier ends first.

Carp, in considering the reasons for the passage of a pointed object through the intestinal tract with the heavier end first, drew conclusions from the relations which such a body may have to the intestinal current, the fecal mass, and the intestinal wall, during its passage. Exner, and later Carp, demonstrated that there was a protective reaction on the part of the mucous membrane when a point strikes it.

Open safety-pins almost invariably travel along the intestinal tract with the ring or closed end first. It appears to me that the compressing action of the intestinal walls upon the open safety-pin is the factor which propels the safety-pin along the smaller bowel tract, and that the current of the larger bowel carries the safety-pin along with it. Although the following simple experiments do not duplicate the conditions which obtain in the intestinal tract while an open safety-pin is passing through it, they are mentioned because the phenomena which they present are interesting:

I took a variety of open safety-pins and different sizes of rubber tubing. I found that if pressure was directed from behind against the sides of the tube in which the safety-pin was resting ring-end

foremost, the pin would be propelled forward. If the pin was too large for the tube it would remain wedged within it and there would be an attempt at rotation in an horizontal plane. If the pin was placed point-end forward and was small enough to turn over so that the pointed end would be behind, this would occur when pressure was made upon the sides of the tube behind the point of lodgment of the pin. If the pin was too large to turn over as described, it would rotate and remain in the same place inside of the tube.

It is exceedingly unusual for foreign bodies to remain in the intestinal tract for a comparatively long time. Smith²⁰ reported the case of a woman who passed a darning needle twenty years after she had swallowed it. Carp's patient, mentioned above, carried a 3-inch nail in his cecum for three weeks. Case 39 of this series was so sick that the safety-pin was temporarily forgotten, and it was not passed for more than two months from the time of its ingestion. A little patient of Jackson and Spencer had two interlocked, closed safety-pins in the stomach for seven weeks. These were removed by means of the gastroscope by Jackson.

The following is an analysis of 39 cases of foreign body in the stomach and intestines. The first 31 are from the records of cases observed on the surgical services of the Mount Sinai Hospital, New York, during a period of seven years. The 8 additional cases are from the experiences and contacts of the writer. In each case the patient applied for medical attention shortly after having swallowed the foreign body.

TABLE I.—ANALYSIS OF 39 CASES OF FOREIGN BODY IN THE STOMACH AND INTESTINES

Pins of various types	14
Open safety-pins	9
Tacks	4
Nails	4
Coins	3
Closed safety-pins	2
Clips	2
Staple	1

32 of the 39 were pointed.

36 of the 39 were passed, the other three were operated upon.

TABLE II.—ANALYSIS OF 39 CASES ACCORDING TO AGE. MALES, 22;
FEMALES, 17

Under 1 year	9
1 to 5 years	12
6 to 10 years	11
11 to 20 years	6
Over 20 years	1

Ages ranged between six weeks and thirty-six years.

32, or 82 per cent, were under ten years of age.

It is significant that 36 of the 39 foreign bodies were passed with the stool. The remaining 3 were removed from the stomach by surgeons. The fact that so many of the foreign bodies passed through the bowel tract without incident, even though 82 per cent were pointed, demonstrates that the presence of a foreign body need not be cause for alarm. It would indicate that the patient could be watched and that surgery need not be resorted to unless a positive indication should arise.

The following cases are mentioned:

CASE I, No. 21.—A baby boy, aged fifteen months, swallowed an open safety-pin. X-ray study demonstrated the presence of the pin in the stomach. Gastrotomy was performed shortly after admission to the hospital but the pin was not found in the stomach. The course of travel of the safety-pin through the bowel tract was watched daily. On the fourth day it could be seen in the sigmoid, on the following day the x-ray film failed to demonstrate the presence of the pin. In this case the operative findings or rather the lack of findings at operation, and the subsequent course, demonstrated that operation was not necessary.

On the other hand the following case demonstrates the proper handling by the surgeon of an infant with an open safety-pin in the stomach.

CASE II, No. 22.—A male infant, aged four months, was admitted to the hospital after an open safety-pin had dropped into its mouth from the mouth of its mother. During the second day of the pin's stay in the stomach, it was noticed that the baby was in distress. Gastrotomy was thereupon performed and the pin extracted. The infant made a complete recovery.

Both of these babies had a severe reaction following operation.

TABLE III.—SHOWING 39 CASES OF FOREIGN BODY IN THE STOMACH AND INTESTINES

Case.		Sex.	Age.	Foreign body.	Passed in	Remarks.
1	B. T.	M.	7 mos.	Open safety-pin	4 days.	
2	J. T.	F.	10½ mos.	Paper clip	36 hours.	
3	R. S.	F.	20 mos.	Open safety-pin	2 days.	
4	E. L.	F.	7 mos.	Straight pin	2 days.	
5	I. C. M.	M.	1½ mos.	Closed safety-pin	3 days.	
6	J. S.	M.	4 mos.	Nail	Not noted, last film taken too late.	
7	E. H.	F.	7½ mos.	Straight pin	3 days.	Stuck in throat first.
8	J. K.	M.	5 mos.	Paper clip	4 days.	
9	A. L.	M.	6½ mos.	Campaign button with pin	2 days.	
10	E. B.	F.	16 mos.	Closed safety-pin	4 days.	
11	J. B.	M.	7 mos.	Tack	2 days.	
12	M. M.	F.	19 mos.	Straight pin	3 days.	
13	R. M.	F.	2½ mos.	Tack	4 days.	
14	E. N.	M.	1 mos.	Nail	6 days.	
15	B. J.	F.	20 mos.	Straight pin	7 days.	
16	A. E.	F.	7 mos.	Shawl pin	2 days.	
17	L. E.	F.	9 mos.	Tack	4 days.	
18	A. D.	M.	4 mos.	Penny	5th day no x-ray evidence.	
19	B. F.	F.	7 mos.	Campaign button with pin	Not seen with x-ray on fourth day, expectorated blood immediately after swallowing.	
20	W. M.	M.	3 mos.	Iron staple	Time not known, watched with x-ray then missed.	
21	K. K.	M.	15 mos.	Open safety-pin	Operation performed, pin not in stomach, passed fifth day.	
22	J. K.	M.	4 mos.	Open safety-pin	Distress on second day. Gastro-tomy, removal of pin, recovery.	
23	M. K.	F.	3½ mos.	Shawl pin	5 days.	
24	M. S.	M.	7 mos.	Straight pin	3 days.	
25	G. S.	F.	9 mos.	Neck tie pin	1 day.	
26	A. T.	M.	3½ mos.	Tack	2 days.	
27	G. P.	F.	13 mos.	Nail	4 days.	
28	A. R.	F.	8 mos.	Red Cross button with pin	2 days.	
29	E. S.	F.	9 mos.	Open safety pin	Removed by gastrotomy, recovery.	
30	D. K.	M.	10 mos.	Shawl pin	Time not noted. Delayed in stomach.	
31	J. W.	M.	14 mos.	Straight pin	36 hours.	
32	B. W.	M.	6 mos.	Penny	2 days.	
33	N. P.	M.	2 mos.	Open safety pin	7 days, prepared for gastrotomy; operation avoided by timely x-ray.	
34	A. R.	M.	10 mos.	Open safety-pin	3 days.	
35	M. D.	M.	7 mos.	Nail	2 days.	
36	J. L.	M.	10 mos.	Two 25-cent pieces	Delayed in stomach 6 days, then passed in 24 hours.	
37	R. C.	M.	11 mos.	Shawl pin	2 days.	
38	F. M.	F.	6 wks.	Gastrotomy, Open safety-pin	Died 3 days postoperative.	
39	W. J.	M.	9 mos.	Gastrotomy, Open safety-pin	Pin not found, passed two months later.	

CASE III, No. 38.—A female baby, aged six weeks, was seen at a hospital in Brooklyn. She had swallowed an open safety-pin which was now at the lower end of the esophagus. I performed esophagoscopy and at the end of nine and a half minutes pushed the pin into the stomach. Despite my insistence that gastrotomy should not be performed, the infant was subjected to operation a few hours after esophagoscopy. The pin was removed but the baby died three days later. The infant did not seem to react after the operation.

TABLE IV.—SHOWING DETAILS OF NINE OPEN SAFETY-PIN CASES

Case.	Sex.	Age.	Remarks.
1 B. T.	M.	7 mos.	Passed in 4 days, no symptoms.
3 R. S.	F.	20 mos.	Passed in 2 days, no symptoms.
21 K. K.	M.	15 mos.	Gastrotomy performed, pin not found in stomach, passed in 5 days.
22 J. K.	M.	4 mos.	Distress on 2d day, gastrotomy, removal, recovery.
29 E. S.	F.	9 mos.	Large pin, removed by gastrotomy, recovery.
33 N. P.	M.	2 mos.	Prepared for gastrotomy, not performed, passed 7th day.
34 A. R.	M.	10 mos.	Passed in 3 days.
38 F. M.	F.	6 wks.	Gastrotomy, died 3 days later.
39 W. J.	M.	9 mos.	Gastrotomy, not found, passed 2 months later.

Ages ranged from 6 weeks to 2 years.

Males, 6; females, 3.

Gastrotomies, 5; deaths, 1.

Operation unsuccessful in 2 cases.

CASE IV, No. 39.—A baby boy, aged nine months, had swallowed an open safety-pin. Esophagoscopy was performed by the local endoscopist but the pin was not recovered. A gastrotomy was performed a few hours later because of the roentgen-ray findings after esophagoscopy. The operation did not disclose the presence of the pin in the stomach. The baby was very sick for a long time after the operation. In fact, the illness was so grave that the safety-pin was forgotten. At the end of two months the safety-pin could be demonstrated in the larger bowel. A film taken a few weeks later showed that the pin was no longer present.

CASE V.—A child, aged two years, swallowed an open safety-pin which was pushed down into the stomach. Preparation was made for gastrotomy on the second day, but the insistence of the attending physician that an x-ray film be made just before operation proved that the safety-pin was in the cecum. The pin passed through in seven days.

CASE VI, No. 36.—A boy, aged ten years, was referred because he had swallowed two twenty-five cent pieces six days before and they had lodged in his stomach. The family and the physician were concerned over the fact that the coins had been in the stomach so long and had not moved on. It was advised that we could safely wait. Within twenty-four hours the coins had passed through the bowel tract.

The value of such substances as corn-meal, thick cereals, mashed potatoes, bran and similar foods for encasing the pointed foreign bodies is questionable. The prevailing belief that a cathartic is harmful in the presence of a pointed foreign body is also open to question when we consider that 22 of the 39 patients received a cathartic and suffered no ill-effect. It would be well, however, to consider that a cathartic may not be harmless in such cases.

In conclusion, it is very important that those who come in contact with foreign body cases should be acquainted with the various phases of the subject. No surgeon would care to operate upon the stomach of an infant unnecessarily, yet many babies' stomachs are opened because of the desire of the family, and sometimes also of the physician, for a quick and visible result. It is well known to those who have seen these little patients operated upon, that babies under one year of age do not stand gastrotomy well.

It would be better to operate upon a more positive indication than the mere presence of a foreign body in the stomach for a short time. Gastrotomy would be indicated first where there are signs of perforation, and second where a large body will not pass the pylorus and the procedure of gastroscopy has been resorted to or found inadvisable. Gastroscopy for the removal of foreign bodies from the stomach has been performed by Jackson¹⁶ and others.

All patients who have swallowed foreign bodies which are sharp or foreign bodies whose passage appears to be delayed, should be kept under observation until the intruder has been evacuated or until its absence from the bowel tract has been demonstrated. Of course the prevention of the ingestion of foreign bodies should be our endeavor.

BIBLIOGRAPHY

1. Adams, Wilmot: Two Cases of Foreign Body in the Gastrointestinal Tract, *Brit. Jour. Surg.*, 1925, xiii, 189.
2. Allen, E. S.: Foreign Bodies Perforating the Intestinal Tract, *Kentucky Med. Jour.*, 1925, xxiii, 18.
3. Allison, S. F.: A Case of Foreign Body Inadvertently Swallowed, *Lancet*, 1927, ccxiii, 968.
4. Balfour, D. C.: Lesions of the Stomach and Duodenum, *Surg. Clin. North Am.*, 1926, vi, 1175.

5. Benjamin, A. E.: Report of a Case in which a Large Number of Foreign Bodies were Removed from the Stomach, *Ann. Surg.*, 1907, xlv, 238.
6. Brand, A. G.: Foreign Bodies in the Stomach Removed by Operation, *Brit. Med. Jour.*, 1923, i, 1018.
7. Carp, Louis: Foreign Body in the Intestine; Perforation, Recovery after Operation, *Internat. Clin.*, 1923, iv, 190.
8. Idem.: Foreign Bodies in the Intestine, *Ann. Surg.*, 1925, lxxxi, 575.
9. Eiselberg, A.: Foreign Bodies in the Stomach, *Internat. Clin.*, 1926, iv, 45.
10. Exner, A.: Wie Schuetzt sich der Verdauungstract vor Verletzungen durch Spitze Fremdkoerper, *Arch. f. d. ges Physical.*, 1902, lxxxix, 253.
11. Faber, Knud: Ueber Graeten als Fremckoerper im Darm and über Knochenverdauung, *Berlin Klin. Wehnschr.*, 1898, xxxv, 758.
12. Fowler, R. H.: Foreign Body Appendicitis, *Ann. Surg.*, 1912, lvi, 427.
13. Ginsburg, L. and Beller, A. J.: The Clinical Manifestations of Non-metallic Perforating Intestinal Foreign Bodies, *Ann. Surg.*, 1927, lxxxvi, 928.
14. Griffith, J. D.: Foreign Bodies in the Stomach, *Jour. Am. Med. Assn.*, 1924, lxxxii, 31.
15. Iglaue, S.: Open Safety Pin in the Stomach, then Point Downward in the Esophagus; Removed, *Ann. Otol. Rhin., Laryn.*, 1927, xxxvi, 1164.
16. Jackson, C. and Spenser, W. H.: Safety-pins in the Stomach, *Jour. Am. Med. Assn.*, vol. lxxvi, 9, 577.
17. Jackson, C.: Four Open Safety-pins in the Esophagus, *Jour. Am. Med. Assn.*, 1923, lxxxi, 1094.
18. Lupton, W. J. E.: Another Case of Foreign Body Inadvertently Swallowed, *Lancet*, 1927, cexiii, 1179.
19. Orton, H. B.: Auto-expulsion of Foreign Body, *Laryngoscope*, 1927, xxxvii, 838.
20. Smith, H.: A Needle in the Alimentary Canal, *Brit. Med. Jour.*, 1920, i, 81.
21. Taylor, J. M.: Ingested Foreign Body, *Arch. Ped.*, 1923, xl, 557.
22. Thorek, M.: Large Collection of Foreign Bodies in the Stomach, *Internat. Clin.*, 1924, iii, 282.

DISCUSSION

DR. CHEVALIER JACKSON, Philadelphia:

The presentation of Dr. Myerson represents the practically unanimous views of the esophagoscopists, those of us who see most of these cases and have to reach a decision as to what is to be done.

As to the question of gastroscopy, it arises in the case of every infant who is discovered to have a foreign body in its stomach. The question is raised, Shall we do a gastroscopy or not? We used to think it was better to wait. We discovered quite a number of cases in which we

were sorry we did wait. Our rule now is not to wait very long. We used to wait a month. Now we wait only a few days, or a week, to determine whether or not the foreign body is going to pass out of the stomach. The question as to whether or not it will be relatively safe to pass through the intestinal canal must be settled at once. One of the most important points to consider is whether it will make the turn of the duodenum. That is the most dangerous point for two reasons: First, the sharp turn is very likely to arrest the foreign body, especially if it is a safety pin or a long pin. The second reason is that if arrested and operation is required, the duodenum is a region in the abdomen where the surgeon hesitates to operate, especially on a baby.

Because of his study of the physiology of the intestinal canal, the roentgenologist is the best able to decide whether or not we had better do a gastroscopy. Over and over and over again Dr. Manges has said, "The foreign body will not pass out; if it should pass through the pylorus it will be dangerous; you had better take it out through the mouth." Dr. LeWald, of New York City, brought us a patient, a man, about in middle life, with a toothpaste cap in his stomach. This foreign body would have done no harm if it had passed through, but it would not pass out of the stomach. It had probably been there for two years. As discovered by Dr. LeWald the patient had a stenosis of the pylorus. The roentgenologist can usually tell us whether or not there is a stenosis of the pylorus. The foreign body was very readily removed through the mouth by gastroscopy.

Any foreign body, opaque to the ray, that has gone down through the mouth and esophagus into the stomach can be removed by the same route from the stomach, by gastroscopy. Gastroscopy, for the successful and prompt removal of small foreign bodies, requires the use of the fluoroscope. A large foreign body like a stomach tube may be found without a fluoroscope. If you wish to turn a safety-pin, do a version on a safety-pin, or if you wish to close it, the use of the double-plane fluoroscope is required. It is very dangerous to go into the stomach with a gastroscope and forceps and try to deal with a foreign body, working only in one plane. You may think you are working right at the foreign body when you may be 2 or 3 inches posterior to it.

The decision as to the advisability of removal of the foreign body by the gastroscope rests not only on the question as to whether or not the foreign body will pass through the intestine, but on whether it will involve great risk in passing through. For instance, two radium capsules were lost down in the stomach. It was unthinkable to allow those radium capsules to pass through the intestinal canal. Our statistics have shown that passage would involve an average of from

forty-eight to seventy-two hours, too long a time to leave radium capsules in the intestines. Therefore, Dr. Clerf took them out through the mouth. It was done very quickly. It involved no risk, and with Dr. Manges at the fluoroscope it was quite a simple procedure.

There is one point that I think it is important to emphasize. The ray examination should extend from the nasopharynx to the tuberosities of the ischia. If there is a foreign body discovered high up, there may be another one down in the intestines. Over and over again it has happened that had we gone ahead and removed only the foreign body noted in the esophagus or bronchus, and discharged the patient, the foreign body in the intestine would have been fatal if it had been overlooked. We always discover and keep watch on the intestinal foreign body because in our first ray examination of all patients the examination includes the whole region from the nasopharynx to the tuberosities of the ischia.

INTRINSIC CANCER OF THE LARYNX, OPERATED ON BY LARYNGO-FISSURE

IMMEDIATE AND ULTIMATE RESULTS

SIR ST. CLAIR THOMSON, M.D.
LONDON, ENGLAND

INTRODUCTION

To be your guest of honor on this important occasion—the fiftieth anniversary of the foundation of the first and most important society in America devoted to the specialty—is a pleasure and a dignity I deeply esteem. In preparing a communication for this Association I have done my best to make it worthy of your acceptance by seeing that it was comprehensive and complete. It includes every case of intrinsic cancer I have treated by laryngo-fissure; the after-history has, fortunately, been available in every instance, and nothing has been extenuated or set down in malice prepense. This record is the result of over twenty-eight years' experience in carrying on the pioneer work of Butlin and Semon.* It embraces my earliest efforts as well as the results of more mature knowledge and technique. It therefore, I hope, carries the lessons both of early anxieties and of increased experience. It is the largest personal record which has, so far as I know, been contributed to the subject. Although none of us is quite free from bias, I venture to claim that the work is sincere.

LARYNGO-FISSURE: A DEFINITION. Laryngo-fissure is an inadequate expression to describe the operation I practise. Fissure of the larynx, or splitting the thyroid cartilage, or thyrotomy, should only be a term employed to indicate the route of approach. I also employ this route for a simple exploratory examination of the larynx. We may continue with the term "laryngo-fissure" in this

* "For the cases recognized early and promptly operated upon by those best qualified to do so, the methods taught by Mr. Butlin have yielded results which may well be ranked among the chiefest triumphs of modern surgery." (D. Bryson Delavan, *Am. Laryn. Assn.*, 26th Meeting, 1904, p. 167.)

sense; but students will start with mistaken ideas if they think that it still means simply "splitting the thyroid cartilage and taking out a vocal cord." The operation I practise means excising a mass which contains in its center the whole cord, and includes the anterior commissure in front, part of the arytenoid behind, the ventricular band above, and the subglottic area below. This excision goes deeply enough to include the perichondrium lining the thyroid cartilage and, occasionally, that on the inner side of the cricoid ring. As the greater part of one thyroid ala is also excised (to obtain freer access and secure better healing) it will be seen that a so-called "fissure" really means a partial laryngectomy. Operations for malignant disease should be designed to meet variable conditions, the main object being to obtain a full-face view of the whole extent of the disease, so as to remove it with a satisfactory margin of healthy tissue in all directions, while securing the safety of the patient and avoiding unnecessary mutilation.

CLINICAL MATERIAL. I have operated through a laryngo-fissure on 70 cases of intrinsic cancer of the larynx.

TABLE I.—CASES OPERATED UPON BY LARYNGO-FISSURE (1900-1928)

	No. of cases.	Private cases.	Hospital cases.	Age limits.
Male	63	56	7	40-80
Female	7	4	3	35-58
Total	70	60	10	

Proportion of Male and Female Cases. Looking at Table I we notice the large preponderance of males and of cases in private practice. Hospital patients are only less numerous for the simple reason that the ignorant and uneducated do not present themselves early for what they regard as a trifling huskiness, or, if they do, will not accept advice until the lesion has so far advanced that complete laryngectomy is the only possibility.

Age Distribution. In Table II we note the incidence of my 70 cases according to sex and decade.

TABLE II.—INCIDENCE, ACCORDING TO AGE AND SEX, OF 70 CASES OF INTRINSIC CANCER OF THE LARYNX

Ages.	21-30.	31-40.	41-50.	51-60.	61-70.	Over 70.	Over 80.
Male	0	2	14	28	13	5	1
Female	0	3	2	2	0	0	0
Total (both sexes)	0	5	16	30	13	5	1

Here it is noticed that cancer of the larynx is not unknown between thirty and forty years of age (of course, cases at much earlier ages have been recorded); that, in men, it may occur in advanced life; and that it appears to be most frequent with them in the sixth decade of life. With regard to the females in my list (7) the numbers are, perhaps, too small to justify many conclusions; but it is at least noteworthy that, with them, cancer would appear to be met with earlier in life and to be rarer after sixty years. All these women were nonsmokers and abstainers.

TABLE III.—THIRTY-FOUR CASES OF INTRINSIC CANCER OF THE LARYNX ALIVE AND WELL, WITHOUT RECURRENCE, AFTER LARYNGO-FISSURE

Case No.	Age at operation.	Sex.	Present age.	Period since laryngo-fissure.	Case No.	Age at operation.	Sex.	Present age.	Period since laryngo-fissure.
6	59	M.	78	19 years	45	35	F.	42	7½ years.
11	48½	M.	64½	16 years	47	60	M.	67	7 years.
18	65	M.	78	13½ years	50	53	M.	59½	6½ years.
21	66½	M.	80	12½ years	52	40	M.	46	6 years.
22	59	M.	72	12¼ years; 11 since gland operation	53	58	M.	64	6 years.
26	46	F.	57½	11½ years since first cord; 4½ since second cord	54	58	M.	64	5¾ years.
27	57½	M.	69	11½ years	55	47	M.	55	5¾ years.
29	47½	M.	59	11½ years	56	80	M.	85½	5½ years.
31	50	M.	61	11 years	58	79	M.	84	5 years.
32	53	M.	64	11 years	59	52	M.	57	5 years.
33	67	M.	78	11 years	61	49¾	F.	55	4¾ years.
36	60	M.	70	10 years	62	58	M.	61	3¼ years.
38	40	F.	50	9½ years	63	56	M.	59½	3¼ years.
41	33	F.	41½	8½ years since laryngo-fissure; 7¼ years since partial laryngectomy	64	74	M.	77	3¼ years.
42	48	M.	56½	8½ years	65	54	M.	57	3 years.
44	58	M.	66	8½ years	66	62	M.	65	3 years.
					69	56	M.	56	4 months.
					70	62	M.	62	2 months.

Early Experiences. All these 70 cases were operated on through a laryngo-fissure. The first case was twenty-eight years ago, in 1900, when I followed the technique I had learned at first hand from Butlin and Semon. It included the injection of morphine, the insertion of Hahn's tube, the curetting of the wound after piecemeal removal of visible disease, the abandonment of the

tracheotomy tube at the conclusion of the operation, and the return of the patient to bed "with the head on a low pillow." As always happens when looking back on the road of surgical progress, one wonders at so many successes.

RESULTS. *Alive and Free from Disease.* My results are displayed in the following tables. The first shows that, of 34 patients alive to-day, 32 have survived periods varying from three to nineteen years from the date of operation.

Two cases are too recent to support any claim for prolonged cure, but their inclusion serves to illustrate other points.

Female Cases. In Table III the vitality of the females may be noted. Five out of 7 are alive at periods varying from four and a half to eleven and a half years afterward, although 2 of them have had to be treated for a recurrence. In Table IV it will be seen that the 2 other females in my collection (Nos. 12 and 35) survived fourteen and a half and nearly four years, to die, without any recurrence, of influenza and cerebral hemorrhage.

Healthy, Useful, and Prolonged After-history. Attention might be directed to the advanced age of many of the survivors, to their health and vigor, and to the social well-being secured by having conserved a useful voice. No. 11 is a Canadian, sent to me sixteen years ago by Dr. Birkett, whose diagnosis was confirmed by you, Mr. President, clinically, and by Dr. Jonathan Wright from the biopsy. No. 18 is an active shipbuilder in Scotland. No. 21, in his eightieth year, writes that he still cycles. No. 31 is an admiral; he is devoted to social work and can address meetings in the open air. Four are physicians in active practice (Nos. 52, 59, 63 and 66).* Two are lawyers who conduct large affairs (Nos. 47 and 55). A clergyman is able to preach twice on Sunday (No. 44). A schoolmaster retains his post (No. 50). A gentleman, aged sixty-seven years when operated on, is now seventy-eight years of age (No. 33). Three years ago he passed safely through the operation for enlarged prostate. This year he celebrated his golden wedding and made a speech which was audible at a dinner he gave to 120 of his employees. No. 56 is a retired judge who follows the

* Shown before the Royal Society of Medicine, November 5, 1927. See Proc. Roy. Soc. Med., December, 1927, Laryng. Sec., p. 1.

hounds on horseback, five and a half years after his operation and in his eighty-sixth year.

Deaths from Other Causes. Of the 70 patients 18 have died from other causes, without recurrence (Table IV). Of these, it will be noticed that 13 had lived a minimum period of three years without any recurrence, while 3 of them died ten or more years after operation. (The 2 "operative deaths" will be considered later.)

TABLE IV.—EIGHTEEN DEATHS FROM OTHER CAUSES, WITHOUT RECURRENCE

Case. No.	Age at operation.	Age at death.	Period after operation.	Cause of death when ascertainable.
2	49	50½	1½ years	Laryngitis.
3	48	58	10 years	Tubercle.
5	54	61	7 years	Unknown (hospital patient, inspected 2 years before death and found sound).
8	58	61½	3½ years	Aneurysm.
9	68	74	6 years	Bronchitis.
10	55	60-763	5-? 8 years	Pneumonia (an Indian subject).
12	53 (F.)	67½	14½ years	Influenza.
17	69	75	5½ years	Cerebral hemorrhage.
23	68	76½	8½ years	Urinary toxemia.
25	72	84	12 years	Heart failure.
28	48	49	11 months	Developed pleuropneumonia with fetid empyema 1 month later. Operation: good recovery.*
30	63	65	1½ years	Angina pectoris.
34	75	85½	10½ years	Heart failure.
35	58½ (F.)	62	3½ years	Cerebral hemorrhage.
36A	70	74	4 years	Unknown.
37	69½	78	9 years	Heart failure; arteriosclerosis.
40	56	56	50 hours	Operative (hemorrhage, morphine, pneumonia).
51	42	42	4 days	Operative (rupture of esophagus).

* No details obtainable, but Logan Turner found no signs of recurrence two months before death.

Deaths from Malignant Disease Elsewhere, Without Recurrence. If time permitted it would be interesting to study in detail the 7 cases in the next table—that of death from carcinoma elsewhere, without local return of the disease (Table V). In 2 of them (Nos. 15 and 57) the virulence of the cancer must have been very intense, for glands in the neck were invaded within four and six months,

and the patients were dead within seven and eleven months, although the larynx in each case was free from recurrence.

In contrast to these cases are Nos. 39 and 7, in which the glands did not develop until four and seven years after operation.

In Case 1 (the first I ever operated on) I watched the larynx remaining free, while a cancerous growth developed on the lingual tonsil on the opposite side.

Case 13 shows how a patient can remain free of disease, in excellent voice and vigor, for eleven years and then die of malignant disease so remote from the larynx as the gall-bladder and liver.

TABLE V.—SEVEN DEATHS FROM LATER DEVELOPMENT OF MALIGNANT DISEASE ELSEWHERE, THE LARYNX REMAINING FREE.

Case No.	Age at operation.	Time of onset after operation.	Age at death.	Time elapsed since operation until death.
1	47	Malignant disease at base of tongue opposite side, started 1½ years after	50	3 years.
7	43	Larynx filled up 3 to 7 months after operation. Laryngectomy after 9 months, but no cancer growth found in excised larynx (? syphilis). Diffuse malignant disease in glands of neck 7 years later	51	7½ years.
13	58	Death from malignant disease in abdomen, found at operation too extensive for removal	69	11 years.
15	52	Infiltration of glands of neck within 4 months	52½	7 months.
39	64	Glands in neck	68½	4½ years.
43	54	Mediastinal glands (x-ray findings)	57	3 years.
57	39	Glands in neck within 6 months	39½	11 months.

Deaths from Local Recurrence. We now come to the local recurrences. There were only 11, all males. It will be noticed in Table VI that in 8 of these the recurrence took place within the first year. This supports Semon's dictum that a recurrence generally takes place within the first twelve months. Personally I feel little anxiety if the third month passes without any suspicious symptoms.

TABLE VI.—ELEVEN DEATHS FROM LOCAL RECURRENCE

Case No.	Onset after fissure.	Period until death after fissure.
4	8 months	20 months and 12 months after total laryngectomy.
11A	? 4 to 6 months	? 9 months.
14	3 years	3 years (second laryngo-fissure; death from idiosyncrasy to heroin).
16	2 months	5 months.
19	3 years	4½ years.
20	3 months	1 year.
24	1 month suspicion, and certain in 4 months; tracheotomy at end of 5 months	15 months.
46	2 months (declined laryngectomy)	11 months.
48	3½ years	4¾ years.
49	2 months	7 months.
67	2 months	4 months.

These early relapses should not be regarded as a "recurrence of disease." We are more likely to advance the subject if we frankly regard them rather as "incomplete removals," and then investigate why the operation was a failure, or why the case was unsuitable for this type of operation.

The other 3 regrowths developed three years after the laryngo-fissure. Case 14 was in a very alcoholic subject. The lesion occupied the anterior two-thirds of the right cord, invaded the commissure, and descended into the subglottic space. Here I was a little doubtful of having secured sufficient margin, and the pathologist was unable to report a good circumference of healthy tissue. The patient returned to India (and to his alcohol and tobacco), was there inspected and passed from time to time, and returned exactly three years afterward with a recurrence at the anterior extremity of both cords and in the subglottic space below the anterior commissure. At the second laryngo-fissure it was seen that the regrowth had originated in this area. His death from heroin (recorded under "operative deaths") was particularly disappointing, as the pathologist's report encouraged the hope that the second removal had been complete.

No. 19 was a case of long-standing hoarseness, in which a large growth was almost entirely located in the subglottic region, and required the exposure of the inner surface of the cricoid. The pathologist reported on the removed mass that "the growth has reached to the line of excision at two margins." Yet three clear and active years passed before there was any suspicion of regrowth. This occurred so stealthily in the subglottic area that, when it declared itself, the disease was too advanced for further operation.

No. 48 was a similar case, but more promising. The disease left each extremity of the cord free, but descended on the inner surface to below the level of the cord. Excision, to eye and touch, appeared to be satisfactory, but the pathologist reported "there cannot be much margin of safety posteriorly." The patient was regularly inspected, and remained quite free for three years, when the disease returned on the same side. Laryngectomy was recommended, but declined; he had radium treatment elsewhere, and died one and a half years after the return had been diagnosed. He, like Case 14, indulged freely in whisky and tobacco, both before and after laryngo-fissure.

In all these 3 cases it was the subglottic situation which thwarted success.

Operative Deaths. Of the 74 laryngo-fissures performed on 70 patients (2 of the 70 having been operated on for a local recurrence and 2 requiring a supplementary laryngo-fissure) 2 have died within forty-eight hours of the operation. The first case, No. 14, has already been referred to in Table VI. He was successfully operated on in 1913. After three years' absence in India he returned with a local recurrence; a second laryngo-fissure passed off without untoward incident in 1916, but he died forty-eight hours later with drowsiness, contracted pupils, and complete suppression of urine. There was no unusual bleeding at the operation, but a small hemorrhage took place twenty-four hours after. During my absence he was given $\frac{1}{2}$ gr. of heroin, in three doses of $\frac{1}{6}$ gr., within twenty-four hours. One of these doses had not been ordered; yet $\frac{1}{2}$ gr. was not a large dose. A tracheotomy tube had, fortunately, been left in after operation. Death appeared to be due to an idiosyncrasy for heroin in a very alcoholic subject.

The second case, No. 40, had suffered from syphilis of the larynx

for four years before a subglottic intrinsic cancer developed. There was much bleeding at the operation and again within two hours. Through a misunderstanding more morphine was given than was intended—namely, $\frac{3}{4}$ gr.—and he died with symptoms of septic pneumonia within forty-eight hours of operation. A tracheotomy tube had been left *in situ*, on account of the free bleeding at the operation, the subglottic extension of the disease, and the syphilitic basis.

A third case, No. 51, died on the fourth day from rupture of the esophagus, due to postanesthetic vomiting.

The last was a very rare accident, not connected directly with the operation. The other 2 occurred in very unpromising subjects, 1 being certainly syphilitic and both of them alcoholic. Still, I think death would have been avoided if no soporific had been given. I now refuse to give an opiate of any kind before or after operation, and I forbid all “dopes” before anesthesia (mixed, local and general). Accepting these 3 cases as operative deaths, this would give a death-rate of 4 per cent—a very different figure from that recorded by the pioneers of this subject, and from that still existing in the few statistics which are rarely published.*

If permitted to delete case No. 51 (rupture of the esophagus) I have had no operative death since case No. 40. This sequence of 30 cases without a disaster encourages me to give it as my opinion that if a laryngo-fissure is carried out with the precautions and care I insist on, in regard to hemorrhage and the descent of blood into the bronchi, then it should be an operation free from any danger, except those incidental to all operations.

Lasting Cure. We need not revive barren discussions as to how long after operation a patient may be regarded as permanently cured of cancer.

With few exceptions, all patients are in middle or advanced life. To ensure a comfortable and a vocal existence for ten to twenty years to 12 men who have passed their forty-seventh to sixty-seventh year (as in the first 12 cases of Table III); to operate on men of seventy-nine and eighty years of age (Nos. 58 and 56), and to show them healthy and vigorous five years afterward; and to

* “The results of indiscriminate operation have been so bad that their records are unobtainable because suppressed.” (D. Bryson Delavan, loc. cit.)

restore doctors, lawyers, clergymen, and schoolmasters to their calling, are surely sufficient evidence to claim this method as securing permanent cures.

You, Mr. President, when addressing this Association on this same subject twenty-four years ago, said that "statistics based on alleged cures of less than three years' duration are worthless."*

A scrutiny of the tables I have submitted will show that 63 patients are eligible on this basis, and that 48 of them were alive and well and free from recurrence at the end of three years.† This lasting cure of 76 per cent has been obtained without restricting oneself to particularly promising cases. As the indications for laryngo-fissure have not yet been quite established—beyond that of being a suitable operation for many cases of intrinsic cancer—I thought it right to try it in various intralaryngeal manifestations of the disease. Although this may have impaired the statistical results, it has enabled me to form some clear conclusions as to the indications and limitations of the laryngo-fissure route for the eradication of intrinsic cancer of the larynx. These will be embodied in a forthcoming publication.

CONCLUSIONS. I trust that the evidence I have submitted justifies the conclusions I have now formulated for some years. This latest and largest record satisfies me that if intrinsic cancer of the larynx is diagnosed early it is best operated on by laryngo-fissure—an operation which should be free from danger to life and followed by an adequate voice and a lasting cure. The only necessities for this consummation are early diagnosis and meticulous care in operative precaution and procedure.‡ By educating

* D. Bryson Delavan: *Trans. Am. Laryng. Assn.*, 1904, xxvi, 155.

† These figures are arrived at by deducting from my 70 cases the 2 recent cases (69 and 70), the 3 who died of other diseases before the three years were completed (2, 28, and 30), and the 2 operative deaths (40 and 51). This leaves 63 cases on which to formulate results. On the other side of the balance sheet are the 32 three-year survivors in Table I; the 13 who died of other diseases after a lapse of three years (Table IV), and the 3 cases which succumbed to malignant disease in other parts of the body, four and a quarter, seven and a half, and eleven years, after laryngo-fissure (Table V). These, added together, show 48 who had passed the three-year limit.

‡ "Mistakes hardly short of criminal have occurred in laryngeal operations done by inexperienced men working with absolutely no trained helpers." (D. Bryson Delavan, *loc. cit.*)

the public to pay prompt regard to persistent hoarseness, and by teaching the profession to appreciate the niceties and necessities of early diagnosis, the number of laryngo-fissures and the proportion of lasting cures will steadily increase, while the need for laryngectomy will as progressively diminish.

In other regions of the body there may be better remedies than surgery can supply. In intrinsic cancer of the larynx other, simpler and surer, remedies no doubt will one day be discovered; but, at present, there is no better way than surgery and the laryngo-fissure route. By this we can secure results which have not been surpassed in the treatment of cancer in any other internal region of the body.

DISCUSSION

DR. D. BRYSON DELAVAN, New York City:

No greater compliment could be paid to the impressive presentation to which we have just listened than a review of the history of this operation in the past. Many years ago I published a series of statistics which today show so conclusively, by comparison, the advances made, particularly by our distinguished guest, that we must congratulate ourselves and humanity upon the attainment of them. The success of Sir St. Clair Thomson vindicates my suggestion, made many years ago, that the surgical importance of these cases demands so high a degree of experience and skill that they should never be entrusted to any but those best qualified to undertake them.

DR. CHEVALIER JACKSON, Philadelphia:

In such a classic presentation it seems rather invidious to pick out points for emphasis. Every point made by the speaker deserves emphasis. There are a few points, however, that I think should be brought particularly to the notice of the profession in this country.

The point made in regard to laryngo-fissure being not an end but a means toward an end, only a route, is of the utmost importance. To say that a laryngo-fissure has been done does not mean that a cancer has been adequately excised. Laryngo-fissure, as brought out by Sir St. Clair Thomson, is a means toward the end and not the end itself.

I had the good fortune, as the speaker mentioned, to see not only his operation but two patients on whom the operation had been done quite a long period before my examination of the larynx. In witnessing the

operation, it was very striking to have presented to me on a platter of gauze the entire mass of tissue removed. It was a desert of normal tissue with an oasis of cancer in the center. Every surgeon knows, every medical student knows, that it is fundamental in the removal of cancer anywhere to get a wide area of normal tissue with the island of cancer in the center; otherwise the operation is almost certainly doomed to fail.

What struck me most, in seeing Sir St. Clair Thomson operate, was the access that he obtained by that excision of the wing of the thyroid cartilage. I was simply amazed at the ease with which he could approach from the side. The great difficulty in spreading the alae of the thyroid cartilages apart after a central incision, of course, is known to all of us. We have to work down, in and around in order to make the excision. When Sir St. Clair Thomson's technic is followed, you get the advantage of approaching from the side. In making his final incision, when he got the ala of the thyroid cartilage out of the way, he went in for the final extirpation laterally. This sidewise approach, though, seems to me a large factor in the results that he has obtained. As to the after-results, I confess when I saw him excise that wing of the thyroid cartilage I had my misgivings. I was simply amazed, in examining two patients that had been operated upon quite a long period of time previously, to find that the entire laryngeal box was restored. I could not be sure that one side of the larynx was more firm than the other; but if there was any difference, I think, the side from which the thyroid cartilage had been excised was firmer than the one in which the cartilage was still present. I do not know the nature of the replacement tissue, but I do know that on compressing the wings of the thyroid cartilage I found a firmness that meant that the entire laryngeal box was restored.

Sir St. Clair Thomson said that the public should be educated. The profession in this country recognizes the fact that hoarseness may mean cancer. But I am sure that the general public does not recognize the frequency with which not only chronic but intermittent hoarseness is the first sign of cancer of the larynx. As Dr. Mackenty has said, the diagnosis in this country is usually late. Most of the cases of cancer that come to our clinic are extrinsic when they reach us, extrinsic by extension.

DR. JOHN F. BARNHILL, Indianapolis, Ind.:

I wish to express my great pleasure at hearing this paper.

Our best teaching heretofore has been that cancer, especially laryngeal cancer, in its incipency is local. Sir St. Clair Thomson and

Dr. Jackson have just confirmed and emphasized this view. If cancer is local, as at present believed by these authorities, and if it is removed widely, as we have been taught today to do, there seems no good reason why all operators should not get results similar to those reported here today. The whole thing, therefore, is to be alert to the point that has been emphasized and to remove the malignancy before it becomes extrinsic, if it is not extrinsic from the beginning.

In so far as I can see, there is no reason for taking out a whole larynx in the early stage of intrinsic laryngeal cancer. There is, of course, every reason for removing the cancer very widely, even when early and intrinsic. However, I have never excised one so widely as shown by the specimen excised and shown here by Sir St. Clair Thomson. I have never thought of taking it out so widely, and I have not seen it done, but I am glad to learn that the technique is easier when removing the cartilage. I fancy that Sir St. Clair Thomson does not remove the cartilage because he thinks it involved in the malignancy, but rather because it gives better access to the field of operation.

The essayist did not say much about his after-treatment, but in my experience, small as compared with his, I have believed that taking personal care of the patient for the first few days following, means much to his welfare. Earlier operators lost a great many cases, no doubt, because they starved their patients. They tried to feed them by rectum, which was insufficient, as we now know. So I wish, in closing, Sir St. Clair would tell us a little about his method of after-care during the few days following his operation.

DR. JOHN E. MACKENTY, New York City:

I cannot tell you how glad I am to hear directly from our distinguished English visitor of his own work in this very interesting field. You may read reports and papers, but you never get the same understanding of the subject that you do when you hear the description coming from the lips of the one who does the operation.

I have learned several things about Dr. Thomson's operation today, which pleases me very much. His operation amounts to almost a hemilaryngectomy. It is an extensive intrinsic operation, and it is the logical conclusion of the method which is known as laryngofissure. He carries the removal of tissue to a point as short of closing the larynx as it can be carried, leaving space through which the patient can carry on the functions of breathing and speaking. The subglottic extension is always greater than it appears and that is one reason why we never know how much of a cancer we have until we actually open the larynx or remove it.

I agree with the doctor in his conclusions about women. I have had three cancers in women under twenty-seven years of age—two at twenty-six and one at twenty. The one at twenty I shall report today. It is a very unusual age for cancer of the larynx. It would seem, from my own personal experience, that cancer of the larynx is more common early in life in women than it is in the later decades.

I think 11 recurrences out of 70 after an intralaryngeal operation is an excellent showing. I cannot imagine anything that has ever been done better than that in intrinsic surgery. Of course, we always feel that if the 11 had had the larynx removed at the time of the more conservative operation they would have probably survived. The 11 recurring within twelve months, or even when recurrence is within three years, go to prove that the operation did not eradicate the cancer.

A strange thing about cancer is that operation often retards the recurrence to a point where we feel that a cure has been accomplished. I have seen pretty extensive disease wait after removal two and three years before resuming activity.

I should like Dr. Thomson to tell us where he draws his line in deciding between laryngofissure and total laryngectomy. I am glad to see that he carries his excision beyond the center-line, because we found in very early cancers of the larynx, in which total removal of the larynx was done, subsurface lines of extension into the anterior commissure and back into the arytenoid region. I reported three such cases several years ago. The doctor, by going beyond his anterior commissure, in his operation, I think, has saved a great many of his cases.

In this country we have not been as radical as he is in intrinsic surgery, and I think that is perhaps why our laryngofissure statistics have not been as good. We have not removed the cartilage, for instance, though in hemilaryngectomies which I tried out some years ago the cartilage was removed. Half of the larynx was taken away, leaving just a framework to hold it on that side. The reason for removing the cartilage, it seems to me, is that that exposed cartilage heals badly and often produces granulation tissue. It seems to me the removal of the cartilage is a very important factor in the operation.

The indications for removal of the larynx in this country are a little more strict than they are in England. For instance, in the doctor's third case, we would have considered it a suitable case for laryngectomy, because the disease, according to the picture, extended right up to the anterior commissure. When any more than a third of a cord is involved, and that must be the middle third, we feel that it is rather risky to do anything but a total removal.

I should like to ask another question: How does he keep the secretion out of the lung after operation? Supposing a hemorrhage occurs, how does he keep the blood from the lungs? Does he do a preliminary tracheotomy or does he have some means by which the lung is blocked off for the danger period?

DR. PERRY G. GOLDSMITH, Toronto, Canada:

I hesitate to say anything, but Sir St. Clair mentioned the admiral. The operation was done with the idea that by thyrotomy he would be able to remove all of the growth, and he was humiliated indeed when the larynx was opened and he found the disease so much more extensive than the mirror showed him. He pointed out at the time that the operation might be considered as an exploratory operation, so that he could palpate, if necessary, as the palpation of a growth on a cord, if it is hard, will determine malignancy when the pathologist is in doubt.

I should like to ask Sir St. Clair a question as to biopsy before operation. There are many pathologists, but there are very few people familiar enough with the examination of these neoplasms to give an opinion on borderline cases, and I should like to ask Sir St. Clair his views on that matter.

SIR ST. CLAIR THOMSON (in closing):

I am gratified at having elicited such an interesting discussion, and I would be very glad, if time permitted, to enlarge upon the technique, but I can only touch on a few points that have been suggested.

As Dr. Chevalier Jackson has said, I am glad to point out that the fissure is only the route, and that the so-called "laryngofissure," as Dr. Mackenty says (and I am so glad to see that it strikes him at once), is really a partial laryngectomy.

We all know that hemilaryngectomies done in the old way were really much more fatal than complete laryngectomies, and I hope that this more full removal, from an endoscopic point of view, will supplant the former and generally dangerous and useless hemilaryngectomy.

This narrows our choice to what I call this extensive partial laryngectomy and a complete laryngectomy.

The removal of the ala is a point on which I continue to be very well satisfied. The *a priori* suggestion is that the larynx might collapse. But when we do a septum resection the nose does not fall down. If we have the thyroid ala on each side, we must remember that at the back we have the fixed arytenoid cartilage and in front the inner angle of the thyroid cartilage. If all of one ala is taken away we still have the perichondrium quite taut between two fixed points, and there really is

no physical reason why it should fall in. The perichondrium here forms tough fibrous tissue. As we all know, cartilage, in the human body, is never restored, but a fibrous tissue is thrown out by the preserved outer perichondrium which, stretching between those two fixed points, prevents any collapse.

In reply to Dr. Barnhill, I would say that I remove the ala for the following reasons: You have easier access; instead of squinting through a very narrow chink, you have a complete side taken away, so that you can view the field more completely; you check the bleeding easier; you get a smoother surface for healing, because the inside of the perichondrium is a better surface for granulations to creep along than a bare surface of cartilage. We all know how long a bare surface of cartilage takes to cover over, how apt it is to necrose either in large pieces or in small pieces. This method leaves a more vascular, smooth, healing surface.

I am also under the impression that I get a much better voice in this way, and I am quite convinced that I get a larger glottis. I also fancy, though it is not absolutely certain, that there are fewer reasons for those anxieties caused by suspicious granulations. There are fewer granulations when you take away the thyroid ala.

We should all insist, I think, upon teaching the public with regard to hoarseness. The way I put it to students and practitioners is to say that no human being, child or adult, should be continuously hoarse for three weeks without getting an expert opinion.

With regard to after-care, first of all, I operate under a local anesthesia (novocain), but in our country we also put them lightly under chloroform. We do not use ether for this operation, although ether is now the popular anesthetic. We use chloroform because it does not irritate and can be given just enough to benumb the patient's sensibility, and before he leaves the table his consciousness has returned. The patient is set up on the operating-table and we see that he coughs and is able to spit. He is put back to bed in a sitting position, so that he can easily spit out. I do a tracheotomy in all cases and leave the tube in until evening. There has never been any difficulty with swallowing in these cases. That is why I try not to take away too much of the arytenoid.

These patients are operated on at about nine o'clock in the morning. They are given lots of water to drink before I come, and they touch nothing for nine hours. When I call at the hospital at six o'clock in the evening, the first thing I do is to give them some sterilized water, and, with very rare exceptions, they swallow it quite well. With lots of them it is mental, it is fear; they are encouraged to swallow, putting

their heads down at each motion of swallowing, which makes it go better. If that swallowing goes well, the tracheotomy tube is taken out and is never replaced. So they only have the tube for the first seven hours, which in my experience covers the danger period for hemorrhage.

During these hours, and all through the operation after-treatment, the windows are kept widely open, very freely open. The patient has water for all that first night and the next day he begins ordinary food. He is out of bed always within twenty-four hours, sitting up, and in many cases the patient goes out for a walk at the end of three or four days, and a great number of them have traveled from London to Birmingham, Manchester, Glasgow or Edinburgh, to their homes, which is an eight hours' railway run, at the end of ten days. I have never had a patient in the hospital more than three weeks. There is no special dressing. There is a little bit of gauze outside, and the wound heals up like a shaving cut. There is sometimes a little sinus left for the first fortnight where the tracheotomy tube was.

The patients are encouraged to talk at the end of three weeks. I used to keep them absolutely silent for a month or six weeks, until Dr. Chevalier Jackson pointed out that the sooner you allowed a little functional use the better. I then realized that my patients with the poorest voices were the women, because the women were the most obedient and the most enthusiastic, and maintained silence so strictly that they remained silent for six weeks, and as a result they had the poorest voices, while the drunken old boozers who would not stop talking and began to swear at the nurses quite early with one vocal cord developed quite good voices! These are the compensations of virtue.

It is very interesting to me to hear Dr. Mackenty say that women get it earlier in life than men. That is a very interesting study, and for those that lay themselves out for the study of cancer generally, I think this point might be borne in mind.

I also quite agree with him that why some cases recur rapidly, and others that you fear do not recur, is a mystery. Several of us who work at this have the same thought. It is a mystery why cancer recurs rapidly and unsuspectingly in some cases, and in others, where you are in dread of it, it either recurs not at all or very slowly.

As to the indications, I would rather, as I said this morning, put that down in writing. Without going over my records, it is like doing something without consulting your lawyer. It is rather difficult to lay down, and one dreads being wrongly quoted, but I would say that an intrinsic cancer limited to a vocal cord, which is mobile, with both the

anterior and the posterior commissures quite free, is the most suitable case of all for operation by the laryngofissure route, and that every such case ought, in the first instance, to have this operation I have described. If the cancer has extended to the arytenoid, I would not touch it with this method. If it has extended to the anterior commissure I might risk it. If it has extended into the subglottic region, it is a little doubtful. The "admiral" is a case in point, alive, as you see, eleven years afterward, although you saw in the picture how subglottic the growth was. These cases are on the borderline.

So that all cases limited to a mobile cord should have the operation. Cases extending into the arytenoid should not have it. Cases extending to the anterior commissure or in to the subglottic might have it; but when a cord is fixed and the disease has extended to both extremities, it is hopeless to try it. In borderline cases if patients would like to try it, I feel sure that if they will come every month for a year there would still, in the event of a recurrence, be time for a complete laryngectomy.

The secretion of the lungs is kept out by doing a tracheotomy and plugging on the top of the tube during the operation, and then seeing that hemorrhage is checked before the patient leaves the operating table. Afterward there is little fear except for some bleeding, which may come on in the afternoon. I have only had once, I think, in all these cases, or twice at most, to open the wound and, having left the tube in, to plug it for a short time.

Biopsy is a very, very difficult subject. If you could rely on the biopsy, good and well, but in the first case I showed, an imbedded growth, you could hardly get a sufficient piece on which to expect a pathologist to commit himself. If he gives a positive report, all is well; but if there is a negative report, what is to happen? There is the possible fear, though I do not believe in it myself, that the biopsy stimulates the cancer growth. I do not think that happens, because I have watched cases that I have operated on two or three months afterward, and they have been among my successful cases.

I do not think there is so much fear of stirring up the disease as there is fear that the patient is lulled into a false security and that you have so mauled about the surface that you can no longer form an opinion. When the growth is projecting distinctly, or when you are in doubt as to whether a soft-looking tissue is tuberculous tissue, which is the thing most often confused with cancer (tuberculosis in the middle-aged and elderly without any symptoms in the chest or elsewhere often causes confusion), you can punch a good bit out of a soft tuberculous cord, and that is a help. We are a more patient people than you are, and many

of my patients are quite willing to come and be inspected once a month for two or three months. If there is a suspicion of tuberculosis, I send them to a sanatorium. I have watched cases for six months without a biopsy before I could make up my mind, and yet operated on them successfully. If it is malignant you will see the malignant disease very slowly and steadily develop, and the patient will not be improved by quitting tobacco or alcohol, or by having his teeth removed or his tonsils removed. If it is tuberculosis, within two or three months the tuberculosis symptoms generally come to the front. So the biopsy is a rather difficult point to explain in a few moments, but I think it is all the more urgent that we should teach our students that they must train their eyes to recognize these things.

SEVERAL UNUSUAL CASES OF CANCER OF THE LARYNX

JOHN EDMUND MACKENTY, M.D.

INTRINSIC BASAL-CELLED EPITHELIOMA OF THE LARYNX. K. H., female, aged twenty years—referred by Dr. H. Edwin Lewis.

Points in Past History Prior to Subsequent Development of Cancer:

- (a) The patient was an anemic, sickly child.
- (b) She had much trouble in childhood with inflamed glands of the neck.
- (c) She had many attacks of tonsillitis.
- (d) She had sinusitis since childhood.
- (e) Hoarseness began in 1924 following an acute laryngitis. It was remittent ever since—never entirely absent.
- (f) In November, 1926, the hoarseness deepened and became constant and progressive.

Examination. June 29, 1927.

- (a) Chronic pansinusitis.
- (b) Badly infected tonsils.
- (c) Chronic laryngitis.
- (d) Neoplasm of the anterior half of the left vocal cord.
- (e) No change in mobility.

Biopsy Done Just Prior to My First Examination—reported on by Dr. F. M. Jeffries. He states: "In my opinion the growth on the vocal cord is papillary cancer. This type is slow-growing and not prone to invade the lymph glands. It is often mistaken for sarcoma. It is undoubtedly malignant and I would advise radiation."

At St. Luke's Hospital, in Dr. Francis Carter Wood's department, roentgen-ray in large doses was applied for over three months.

Examination, October 4, 1927. External. The whole larynx was tender, enlarged, rounded out and bulbous looking; the anatomical outlines blurred; the skin tanned and thickened; the subcutaneous tissues adherent to the larynx.

Internal. The larynx was filled with neoplasm on both sides, more on the left. The left arytenoid seemed to be now involved. The arytenoids were edematous. The breathing was obstructed. The patient was sent to Dr. Jackson to determine the condition of the hypopharynx and the esophageal mouth.

Dr. Jackson reported, October 6, 1927: "This is an acute edematous laryngitis and chondritis, with fungations in larynx. The anterior wall of the hypopharynx is extremely inflamed and edematous, but the mucous membrane is still intact."

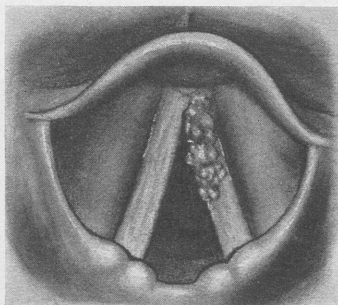


FIG. 1.—K. H. Larynx at time of first examination, June 28, 1927.

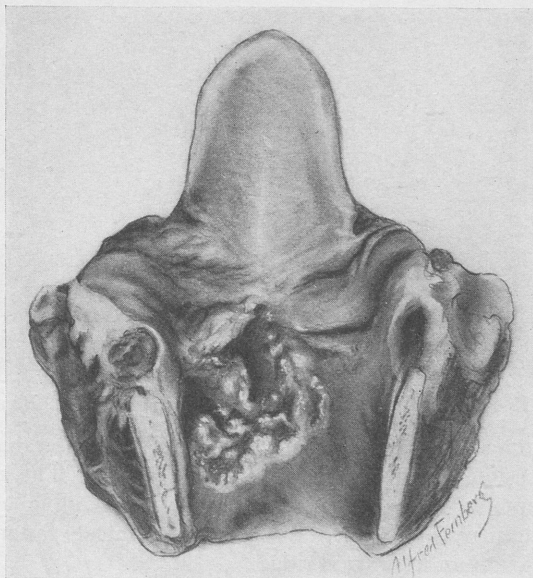


FIG. 2.—K. H. Larynx removed October 22, 1927. Tremendous increase in growth in spite of intensive roentgen-ray treatment.

The operation was delayed until October 22, 1927, on account of radiation reaction.

Operation, October 22, 1927. Under scopolamine-morphine, novocaine-ether, we found dense adhesions binding the larynx to its surroundings. The thyroid gland was large, covering two-thirds of the larynx. There was a fibrous mass surrounding the larynx, suspicious of cancer. Frozen sections, done at several points during the operation, were negative. The larynx, epiglottis and about one-half of the thyroid gland were removed. The skin flaps were almost bloodless



FIG. 3.—K. H. Photograph of patient, aged twenty years. Final result.

and their immediate retraction at the time of operation made closure nearly impossible (the usual result after radiation). The growth was found to involve both sides of the larynx, extending around the anterior commissure; its center ulcerating, almost gangrenous; its edges raised into an indurated ridge.

The postoperative microscopic diagnosis was epithelioma, mostly of the basal-celled type.

Convalescence. Uneventful, healing very slow. In thirty-three days the wound closed with an unhealthy-looking scar. Two weeks later

the scar broke down in the center, just under the chin. On December 27, the record states: "Wound open and leaking and plastic operation seems inevitable." The wound was strapped, the edges freshened by shaving with a sharp knife. We were desperately afraid of a plastic and temporized. The wound finally closed, January 5, 1928 (two and a half months).

Comments. It seems to me that as the years go by cancer is attacking younger and younger subjects. I am no longer surprised to find cancer of the larynx in the thirties. This is the youngest case seen. In spite of the apparent (microscopic) benignity of the growth, it grew with amazing rapidity and clinically seemed to be highly malignant. Roentgen-ray was useless; in fact, it not only nearly cost the child her life in delaying the operation but it all but prevented the closure of the wound. The more I see of radium-burned tissue the less I think of radium. A thorough radiation of the neck for laryngeal cancer bears almost a positive assurance that the neck wound (after operation) can never be closed. So far as I have observed the roentgen-ray is just as lethal to tissue as the radium ray.

We note here also an antecedent chronic laryngeal pathology.

TUBERCULOSIS AND SQUAMOUS-CELLED CARCINOMA OF THE LARYNX. D.C., male, aged sixty-six years—referred by Dr. Joseph Greene, of Asheville.

Past History. (a) Pulmonary tuberculosis for six years with severe exacerbations and four pulmonary hemorrhages during this period. Roentgen-ray shows extensive disease in both lungs with cavity formation. Sputum always loaded with tubercle bacilli.

(b) Chronic parenchymatous nephritis.

(c) Occasional glycosuria, with blood-sugar 180 to 190.

(d) Blood-pressure 172 systolic; 100 diastolic.

(e) Several years ago, two gall-bladder operations; the last at Mayos' (cholelithiasis, adhesions).

(f) Morphine and heroin habit acquired during this gall-bladder period and more or less persisted in ever since. When first seen (June, 1927) he was taking about 4 gr. of morphine a day to relieve the pain in his larynx, which was extreme.

(g) At Mayos', prior to the gall-bladder operation, a 2 + Wassermann was found but not confirmed elsewhere excepting that in Dr.

Dunn's laboratory in Asheville spirochætæ were said to be found in secretion from a laryngeal pustule. It is very doubtful, in my opinion, that he ever had syphilis.

(h) He was a liberal drinker of alcohol, though he was never known to show its effects, having an abnormally high alcoholic threshold.

(i) Chronic hoarseness for several years—cause unknown. In January, 1927, he developed an acute laryngitis, with pain and

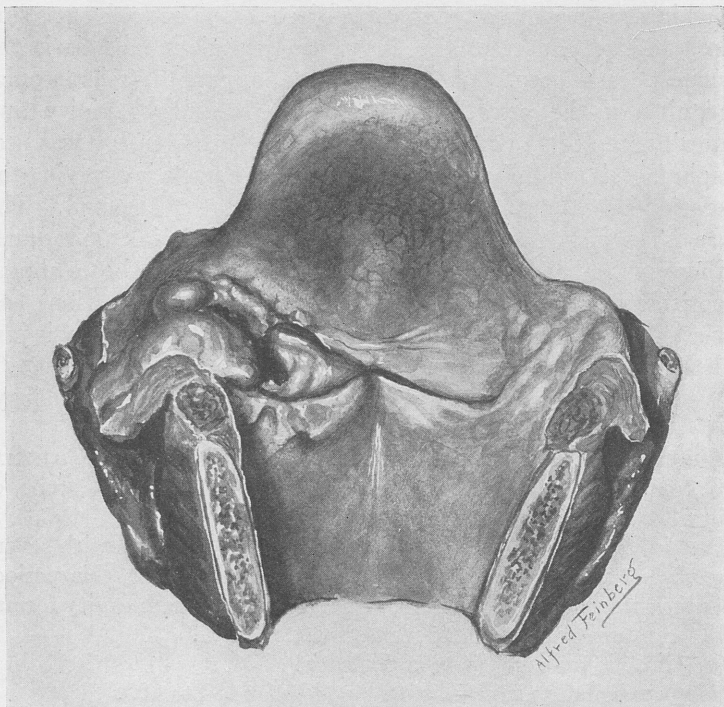


FIG. 4.—D. C. Postero-anterior view of larynx. Cancer, tuberculosis and syphilis (?) Cancer has grown around tuberculous fistula. (See lateral view.)

tenderness over the left lateral wall of the larynx and dysphagia. These symptoms persisted up to the time of operation (laryngectomy) in October, 1927. The pain was severe enough to require morphine (2 to 4 gr. a day).

History of Present Illness. My first examination was made on June 3, 1927. The patient was moderately hoarse and complained of constant laryngeal pain on the left side and of dysphagia.

Examination. The left wall of the larynx was displaced inward by a deep-seated growth or inflammatory swelling. The mucous membrane of the larynx was congested, smooth and unbroken, excepting over the arytenoids where were seen two grayish spots like blisters

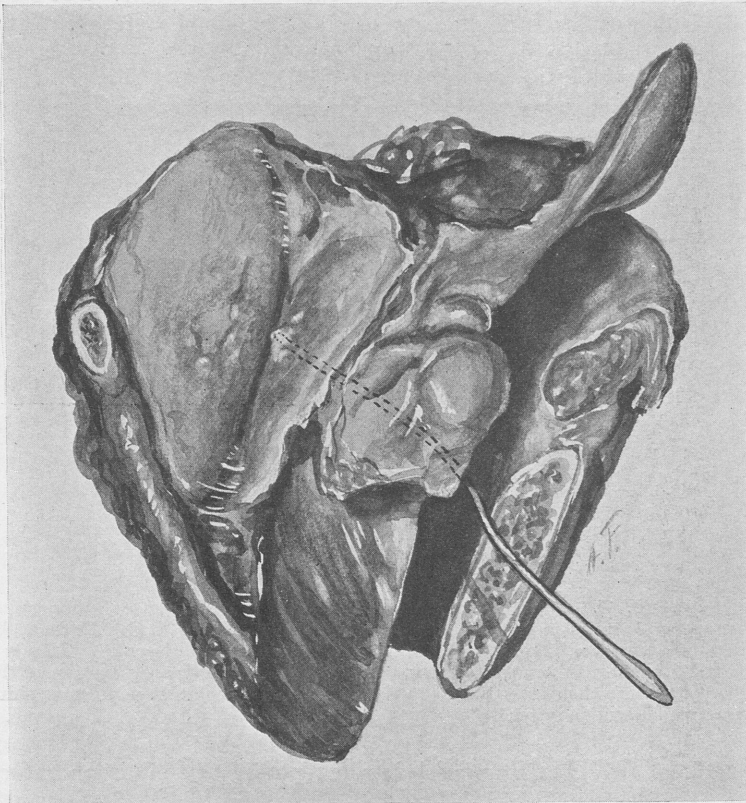


FIG. 5.—D. C. Lateral view of larynx. Cancer, tuberculosis and syphilis (?). Tuberculosis involving perichondrium and cartilage. Probe in fistula. Cancer in lumen of larynx around fistula.

from which by puncture Dr. Greene had evacuated pus. The interarytenoid space and the right side of the larynx were normal excepting for congestion. There was complete fixation of the left side of the larynx and tenderness and some swelling over the external aspect of the thyroid cartilage on the left side. Here at one point, about as large as the end of the index finger, the tenderness was very acute.

Biopsy, June 3. Two good-sized pieces were taken from the area of greatest thickening just in front of the left arytenoid.

Dr. Francis Carter Wood's Examination. "The laryngeal tissue shows only a chronic productive lesion of the connective tissue with large dilated bloodvessels and highly cellular fibrous tissue. The diagnosis is doubtful. It might be well to give iodide of mercury. If no response, the lesion is probably tuberculous."

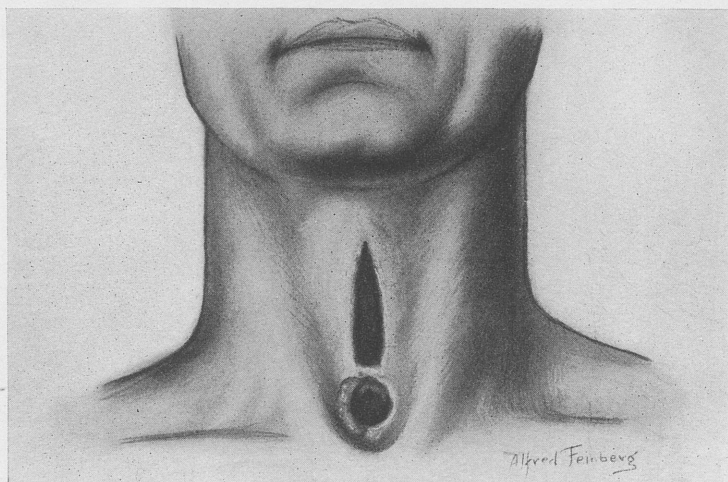


FIG. 6.—D. C. Appearance of opening in esophagus and tracheal opening about May 1, seven months after operation. Notice the raised edge on the right side of the tracheal opening and the ulceration on the posterior wall. This is a gradually healing tubercular process. Occasionally there is an extension of the tuberculosis into the deeper tissues to the extent of an inch or more, forming sinus tracts which gradually heal.

In July, 1927, Dr. Dunn of Asheville reported that in his laboratory the *Spirochaeta pallida* was found in a small pustule in the patient's larynx.

The patient was not seen by me from June 3, 1927, until September 27, 1927.

Dr. Greene Reports, August 4, 1927. "The patient has been given six doses of neosalvarsan. The growth seems to be reduced in size about one-third. Unfortunately, he still requires morphine and codeine for pain. The swelling on the left side of the thyroid externally has almost disappeared, although there is still some tenderness which makes me fear chondritis or perichondritis."

September 10, 1927, *Dr. Greene Again Reports*. "The arytenoid swelling has been greatly reduced although the swelling of the left vocal cord is still very prominent. The pain is persistent. The tender spot on the neck is the same, but there is no swelling. I have punctured several pustules which were visible through the mucous membrane."

My Examination, September 27, 1927, was as follows: The laryngeal picture is quite different to that seen in June (my last examination). In the center of the laryngeal lesion there is a depression surrounded by a proliferating edge. From this crater-like opening a

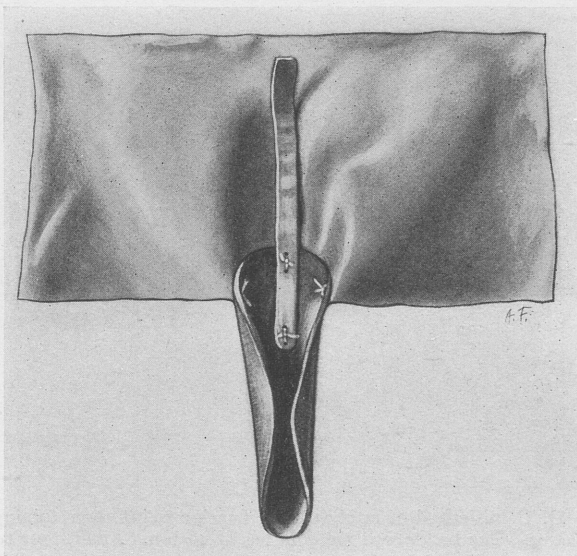


FIG. 7.—D. C. Artificial esophagus made of rubber tubing, rubber dam, and block tin. In placing this in the esophagus the slit goes backward and the rounded upper end projects just about $\frac{1}{2}$ inch out of the opening in the neck.

drop of pus was observed to exude, especially if pressure was made over the tender area on the left outer wall of the thyroid cartilage. In size the growth or inflammatory mass was about the same as it was in June. The inflammatory edema extended farther upward into the region of the aryepiglottic fold. Malignancy now seemed, on the appearance, to be a certainty. The patient was expectorating daily about $\frac{1}{2}$ pint of tubercular pus, looked fairly well and weighed 210 pounds. The pain in the larynx was acute and very distressing.

Second biopsy done October 4, 1927, by Dr. Jackson who concurred in the diagnosis of cancer.

Dr. Francis Carter Wood's Examination of Tissue. "The sections show unquestionably squamous-cell epithelioma with undoubted tuberculosis in the deeper layers. The epithelioma is rapidly growing, showing a large number of mitoses in the cells and is penetrating the deeper layers. The tuberculosis lies in the subepithelial layers. There are numerous typical tubercles with well-formed Langhans' giant-cells, which is a totally different picture from the sections which I first saw and illustrates the difficulty of diagnosis."

Dr. James Ewing, Department of Pathology, Cornell University, gives a more hopeful report. After stating that the growth is a "true epi-

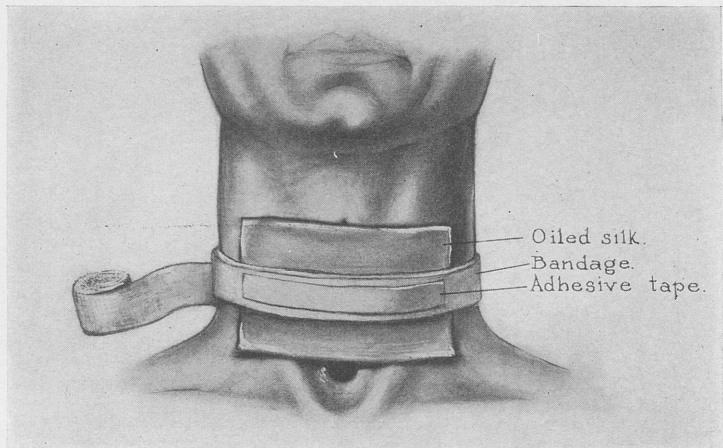


FIG. 8.—D. C. Method of applying the fixation point for retaining the artificial esophagus. The bandage is made of heavy cotton. About four turns, fortified by adhesive plaster at each turn, are used.

dermoid carcinoma of adult, squamous type," he goes on to say that "the degree of cell anaplasia is slight and if one were to grade the case in order of malignancy one would class it as Grade 1 among the true carcinomas. Therefore, we have to deal with a squamous carcinoma of the larynx, papillary in type, of moderate malignancy and apparently of limited extent."

Operation, October 10, 1927. Total laryngectomy, under scopolamine, morphine, novocaine, ethylene anesthesia. With the larynx were removed the epiglottis, part of mouth of esophagus and a liberal section of tissue lateral to the aryepiglottic fold on the left side.

The complications which arose seemed endless and covered a period of seven months. Nine days after operation the patient developed a toxic delirium of pronounced degree. For two weeks restraint had to be used, excepting when under the influence of morphine. Following this two weeks' active period the mental condition was not entirely normal for several weeks. During this time the wound showed no signs of healing—a common result in postoperative toxic psychosis. The wound fell apart, the tracheal stump sloughed and infection extended along the facial planes of the neck in various directions. These pockets seemed

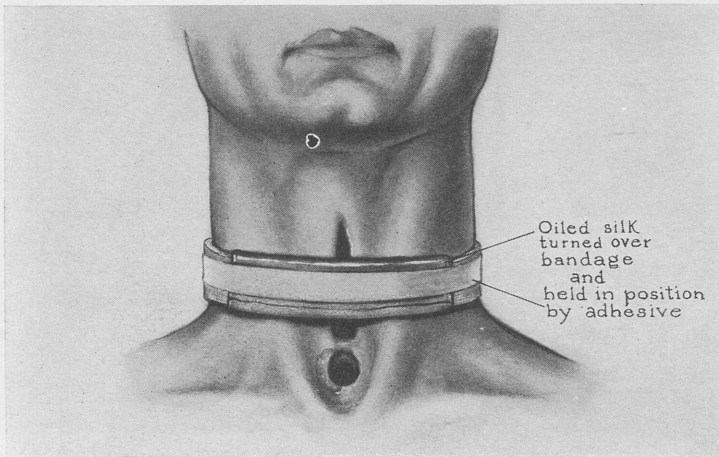


FIG. 9.—D. C. Fixation bandage completed: Oiled silk, folded over and held in place by adhesive plaster. The object of the oiled silk is to keep the bandage dry.

to be scarcely inflammatory since the surrounding parts showed none of the signs of a septic inflammation. The fibrous planes of the neck melted, leaving fingerlike extensions lined with a grayish slough. A curious phenomenon, and one never before observed, was that at no time during the healing process did a single granulation appear on the raw surfaces of the wound. The wound sloughed for several weeks, then turned a dirty-gray color, slowly contracted until at the present writing we have the condition shown in the drawing. The skin is united to the mucous membrane along a slit opening into the esophagus about $1\frac{1}{2}$ inches in length. The tracheal opening appears at the lower end of the slit and is separated from it by the esophageal wall. The rim of the trachea and the tracheal inner surface for $\frac{1}{2}$ inch down has

never cicatrized. On them there have been constantly present irregular, very superficial, serpiginous ulcerations. These have a grayish base and are tender to the touch. I have taken them to be tuberculous ulcers. At times they would all but disappear, only to break out again, depending upon the patient's general nutrition.

Three weeks after the operation hiccough appeared and in a few days increased to an alarming degree. Spasm of the cardia and regurgitation of most of the food taken, complicated the hiccough.

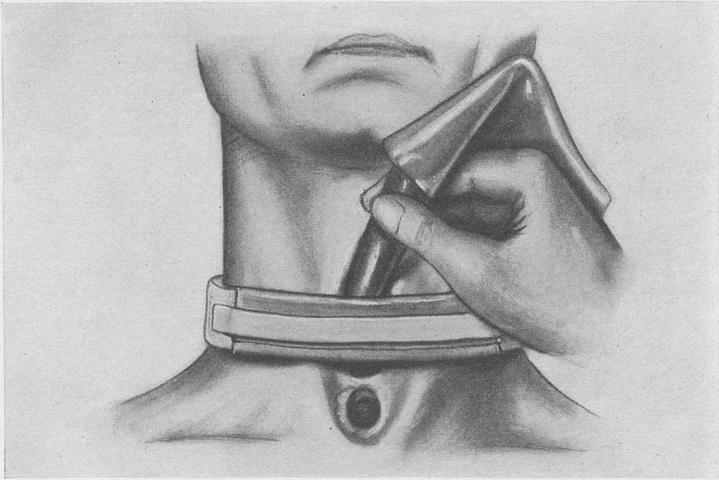


FIG. 10.—D. C. Insertion of artificial esophagus into esophageal opening. It is pushed down until the upper rounded part of the apparatus lies behind the bandage. Then the rubber is spread out and tucked under the bandage and the block tin is bent acutely downward and fastened to the fixation point or bandage. The upper part of this bend is grasped by the finger and thumb and bent slightly forward.

This spasm was so severe that the feeding-tube at times could not be passed through it. This condition lasted about three weeks. At its maximum the patient was at times unconscious and looked profoundly toxic. These hiccoughs continued off and on for five months, in about two-week periods with about ten-day intervals.

During the active hiccough periods, the urine would sink to 7 or 8 ounces in twenty-four hours. During the intervals it would rise to 15 or 18 ounces. At last large daily doses of castor oil were found to control the hiccough, which in the final opinion of his doctors was believed to be due to a chronic colitis.

The patient dropped from 211 to 147 pounds in weight. He now weighs 158 and is slowly gaining (May 1).

Morphine was gradually reduced beginning about six weeks after operation until $\frac{1}{12}$ gr. was given hypodermically three times a day. Then we had to face total withdrawal or an inevitable increase. The patient was constantly fighting for more. A psychiatrist was called in, and after two weeks of strenuous misery the habit was broken.

The blood-sugar, which untreated ranged between 170 and 190, had to be controlled with insulin for weeks. It is now normal.

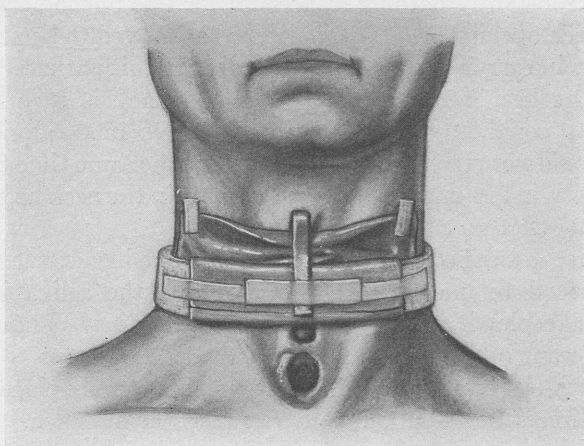


FIG. 11.—D. C. Apparatus in position. Note that the rubber is tucked under the bandage and fastened with adhesive tape to the neck; also that the block tin is turned down at an acute angle and fastened to the fixed point or bandage.

The urine for months was seldom over 15 ounces in twenty-four hours. It has now risen to 22 ounces. It still shows kidney pathology.

On April 15 he had a pulmonary hemorrhage from a tuberculous cavity in the right apex and lost a quart of blood. He rapidly rallied from this and we are now waiting and wondering what next?

Comments. Tuberculosis, cancer and maybe syphilis were present in this larynx. There was an antecedent pathology in the larynx for years, shown by hoarseness. Pain and dysphagia were present from the onset, pointing strongly to the probability that tuberculosis antedated this cancer by several months. The

tuberculosis probably started in the deep structure of the larynx near the perichondrium.

In this patient, just as in another in this series, the first biopsy was negative. The second was positive, but by that time the clinical evidence was unmistakable.

I cannot account for this patient's very extraordinary tissue reaction. It cannot be entirely explained on his poor general condition. His was the first wound I had ever seen which at no time showed even a single granulation. Could the tubercular sputum, constantly bathing it, account for this phenomenon?

The neck opening into the esophagus has proved to be a tremendous help in carrying out scientific feeding in this patient. All his life he has been a scant eater. His obstinacy is such that no persuasion could have forced his intake above 1500 calories. On this he could not reconstruct himself and at the same time fight the tuberculosis in his lungs. With the opening in the neck he has been given from 2500 to 3000 calories.

A device, described below, placed in his esophagus, enables him to take food by mouth. It also conducts the saliva into the stomach, keeping it away from the tracheal opening. I have called this, for want of a better name, an artificial esophagus.

The artificial esophagus is a device which, properly placed in the defect, directs the food and saliva toward the stomach. It is of inestimable value in this case in keeping saliva out of the lungs, since on account of the incessant cough a tracheal cannula could not be used.

A specially-shaped contrivance, made of rubber tubing, rubber dam and block tin (Fig. 7) is placed in the defect and is secured to a fixed point on the neck (Figs. 8, 9, 10 and 11). The column of air, which precedes each bolus of food, escapes through the opening just above the rubber apparatus, allowing the food to fall without hindrance against its spoutlike projection and directing it into the lower esophagus. The diverting of the air bolus, preceding the food, is the chief principle on which this device works, since it does away with air compression at the point of leakage.

October 1: The patient has improved very much since this report was written. His weight is now 184 pounds. The tubercular process around the esophagus has practically healed. His tubercle

bacilli have diminished in the sputum and he is able to be about. On account of the tuberculous character of the infection around the trachea and lower part of the esophageal opening, it seems to me that it will be very difficult to do a plastic, since any traumatism in this tissue would inevitably stir up a fresh attack of local tuberculosis. If a plastic is attempted, it should be delayed for at least a year.

INTRINSIC SQUAMOUS-CELLED CARCINOMA OF THE LARYNX. R. E. G., male, aged sixty-seven years—referred by Dr. A. Richard Stern.

The patient was under observation for peculiar pathological changes in the larynx from October 14, 1922, until December 27, 1927, when he was operated upon for cancer.

Points in Past History Bearing Upon Subsequent Development of Cancer. (a) For eight years prior to 1922 he had frequent attacks of coryza with hoarseness and at times aphonia.

(b) Six months before the first visit in 1922 the hoarseness became worse. A very much inflamed larynx was the opinion of the consultants.

(c) Dr. Jackson saw him in June, 1922, and said that malignancy could not be eliminated without a biopsy. He advised a section. This was refused.

(d) Tuberculosis and syphilis were excluded.

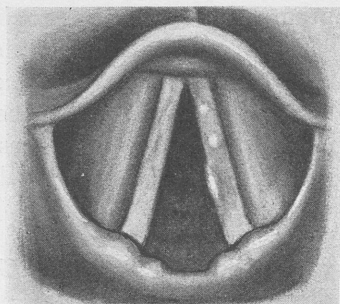
(e) When I saw him in October, 1922, his voice was almost normal. The pathology was only on the left cord: Two small round spots on the upper surface of the left cord (superficial ulcers); thickening on the edge of the left cord at the middle and posterior thirds and congestion of the cord. The mouth was badly infected from pyorrheal teeth.

(f) The following pictures show the changes which took place in the larynx up to November, 1924 (two years), at which date his larynx was normal. It remained so for two years, up to November, 1926.

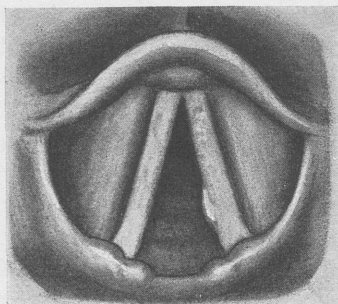
(g) He was taking off and on during this time small doses of sodium iodide, about 5 gr. a day.

(h) In November, 1926, the hoarseness returned and a white raised spot appeared on the surface of the left cord, about its center. I made the note that it looked like hyperkeratosis. From now to the end, the pathological changes on the cord were single, not multiple, as in the earlier stages.

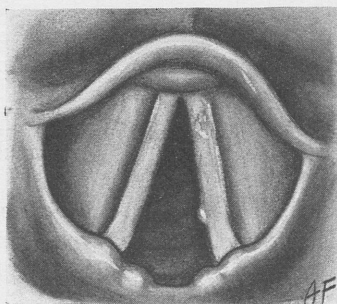
(i) In March, 1927, the appearance was highly suspicious of incipient cancer and the patient was sent to Dr. Jackson for an opinion.



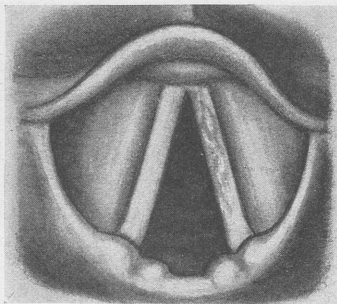
October 14, 1922



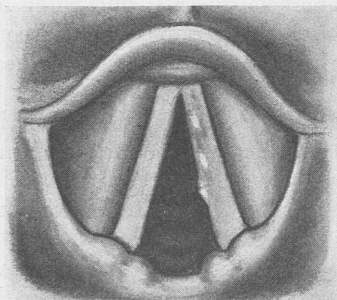
October 28, 1922



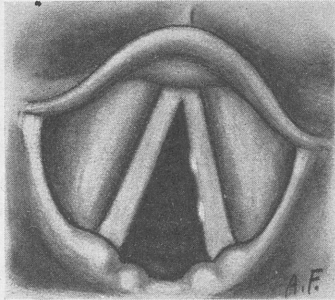
November 11, 1922



November 25, 1922

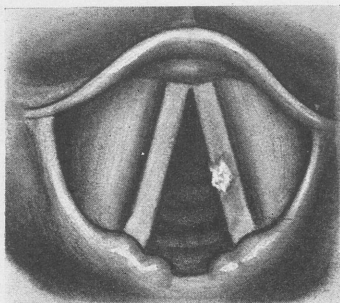


January 24, 1923

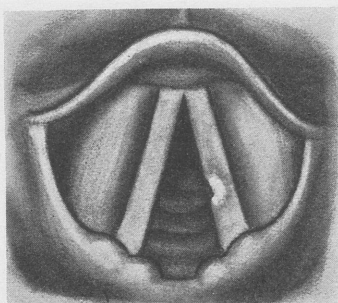


March 3, 1923

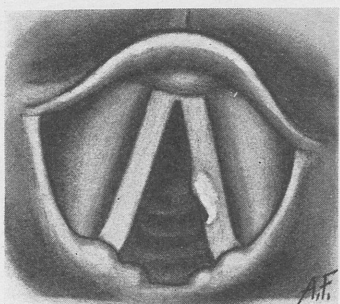
FIG. 12.—R. E. G. Drawings showing the peculiar changes in the larynx during the period indicated. The entire left cord seemed to be involved at various times, with a predilection for the junction of the middle and posterior thirds. The appearance was as represented, white, raised, recurring, keratotic areas.



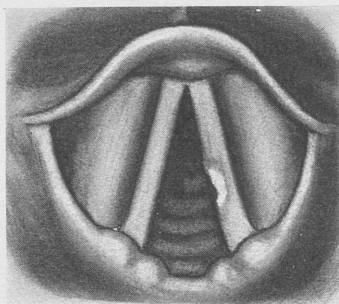
February 26, 1927



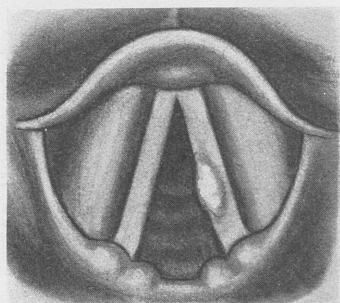
March 4, 1927



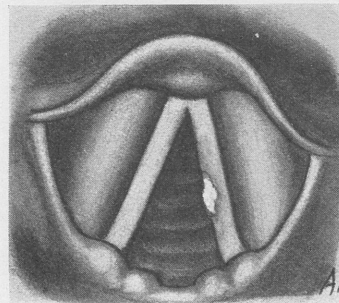
March 21, 1927



April 1, 1927

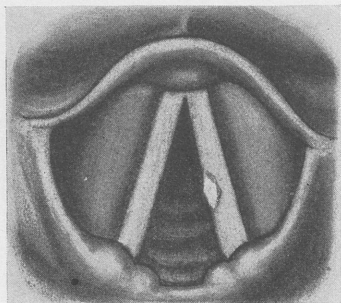


April 8, 1927

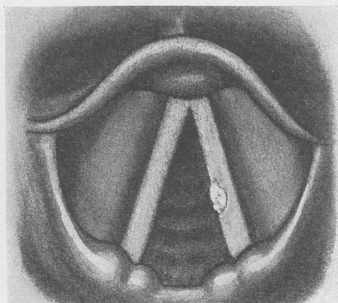


April 29, 1927

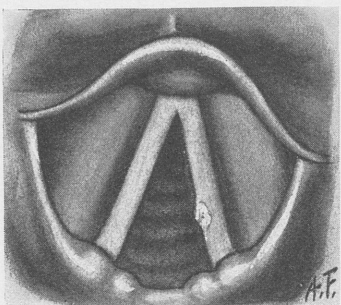
FIG. 13.—R. E. G. Drawings showing the changes during the period indicated. Observe that the disease now seems to center entirely around the middle third of the cord.



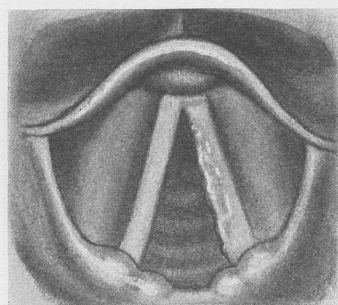
May 6, 1927



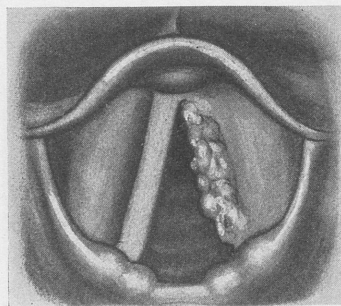
May 13, 1927



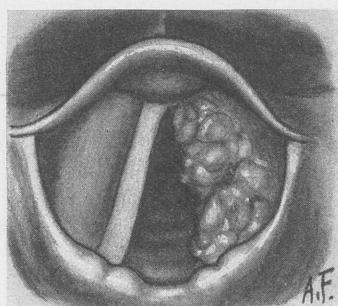
May 20, 1927



July 22, 1927



November 11, 1927



December 17, 1927

FIG. 14.—R. E. G. Drawings showing the appearance of the cord during the time indicated. Biopsy was done by Dr. Chevalier Jackson about June 25. Negative. On July 22, the cord seemed to be normal. The record shows that Dr. Jackson saw the cord on August 20 when it was normal. Observe the tremendous rapidity of the growth of cancer between November and December.

We agreed on the probability of malignancy. A biopsy was advised. The patient deferred it.

(j) In April and May, 1927, the ulcer had shrunk to one-quarter its former size; it had filled in but had not closed. In its center appeared bright red punctate points. His voice was better. In June the condition was worse and a biopsy insisted upon. He was sent again to Dr. Jackson. The mobility was normal.

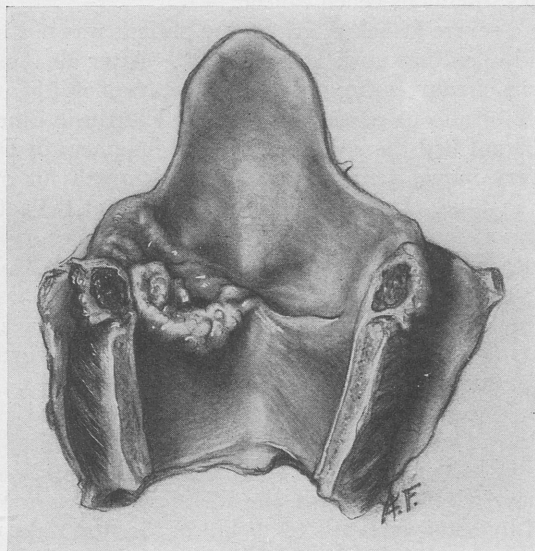


FIG. 15.—R. E. G. Larynx after removal, showing extensive carcinoma growing downward and forward.

(k) On June 25, 1927, Dr. Jackson reported: "I feel confident from the sensation transmitted to the forceps, as well as from the direct laryngoscopic appearance, that the growth is benign. Therefore, I deem it best to remove the entire growth. My diagnosis is chronic inflammatory lesion."

(l) My associate, Dr. Brandon, had the case under observation from July 1 to August 6. He reports August 6: "The left cord is much improved. There is still a slight thickening. The mucous membrane looks quite normal."

(m) Dr. Jackson saw him on August 20, 1927, and reported: "Taking the histological findings together with the appearance of mirror laryn-

gосcopy the conditions in the larynx do not seem to me to call for any surgical procedure."

The patient was not seen from August 20 to November 11.

(n) About two and a half months later, on November 11, the larynx presented all the typical appearances of a fulminating cancer. The entire left cord was involved in a proliferating mass and mobility was impaired.

(o) The patient was sent to Dr. Jackson for a second biopsy. The diagnosis was squamous-celled cancer.

Owing to a severe attack of grippe the patient was not in fit shape to withstand operation until December 21. After all these years of watching and circumventing every possible avenue of error, we now had, in spite of all our efforts, an advanced intrinsic cancer to deal with. Had I not had the unerring skill and judgment of Dr. Jackson covering every move, I might have blamed myself for overlooking malignancy in June. I am confident, however, that the actual malignancy, that is so far as our present clinical and laboratory experience can orient us, did not set in until after Dr. Jackson's last observation in August. Yet potentially the condition was malignant long before.

Here we have another example of the premalignant stage of cancer. I believe that this stage is invariably present but opportunities for observing it come to us rarely.

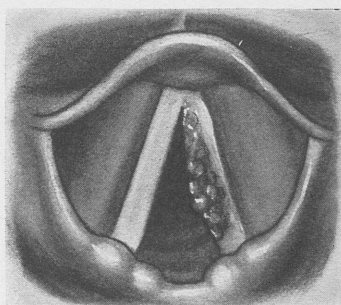
Operation, December 21, 1927. The growth extended close to the aryepiglottic fold. The left side of the larynx was entirely involved. The tissues in the vicinity of the aryepiglottic fold on the lateral wall were extensively removed with the epiglottis. The recovery was complicated by osteoperiostitis (embolic) of the first right metatarsal bone. His temperature was 106° F. for several days. Eventually the toe and part of the metatarsal bone had to be removed. In spite of this the wound closed and the patient was able to swallow fourteen days after the operation. The toe healed three months later.

Comments. Here under our observation an apparently benign growth becomes malignant. Or, in our abysmal ignorance of this disease, was the larynx cancerous from the start? When we know more about cancer will we be able to differentiate between the truly benign never becoming malignant and the apparently benign always becoming malignant?

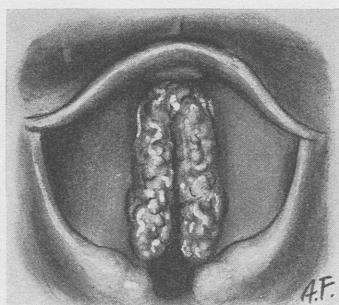
I felt for years that this larynx would some day present the typical picture of cancer. It is undeniable that certain appearances in the larynx suggest malignancy to the experienced clinician long before the disease can be demonstrated clinically or biologically.

The rapidity of the growth was phenomenal—almost defeating our very painstaking efforts to head it off. Just a few weeks before the larynx was half filled with cancer, Dr. Brandon and Dr. Jackson pronounced the condition practically normal. The first biopsy by Dr. Jackson was frankly negative.

We note here an embolic infection. Embolus and thrombosis I believe are complications of the operation of laryngectomy to be reckoned with. I have observed 4 cases of emboli in the brain in old people causing slow death like dementia. In 1 case the terminal stage was meningitis three months after operation. One case of phlebitis occurred in my series this year; also a case of embolus into the radial artery in a man, aged seventy-six years, with recovery.



June 15, 1295



August, 1927

FIG. 16.—W. C. Carcinoma of the larynx, showing the slow growth extending over two years, at first intrinsic, later becoming extrinsic. The anterior angle of the thyroid cartilage was perforated by the disease.

SQUAMOUS-CELLED CARCINOMA OF THE LARYNX. W.C., male, aged sixty years—referred by Dr. Harmon Smith.

Patient consulted me June 15, 1925. Operation, total laryngectomy, December 17, 1927, two years later. During the interval the patient was under constant radium treatment.

Points in Past History Antedating Development of Cancer. (a) Syphilis thirty-five years ago. Several blood examinations negative in recent years.

(b) Hoarseness, varying in degree, for past five years, said to be due to papilloma of the left vocal cord.

(c) For one year prior to consulting me the hoarseness was growing deeper and was constant.

Examination, June, 1925. Typical malignant growth involving three-quarters of the left cord. Partial fixation of left cord. Extension downward, subglottic. Biopsy report brought by patient was squamous-celled cancer. Total laryngectomy advised and refused.

The patient was next seen on November 23, 1927, two years later.

Examination—External, 1927. The skin and subcutaneous tissues, front and lateral aspects of neck, were badly damaged by radium. The skin was glazed, smooth, covered with minute bloodvessels, and

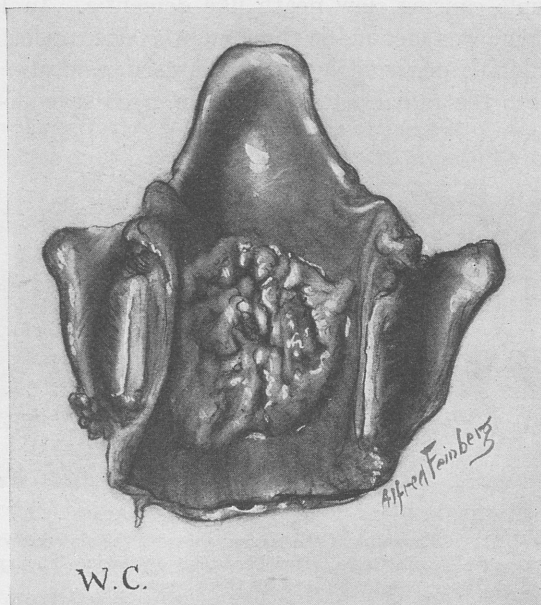


FIG. 17.—W. C. Larynx after removal, showing bilateral involvement well forward. Perforation of cartilage anterior angle.

tightly stretched around the neck. All tissue elasticity was destroyed. The larynx was an enlarged, rounded mass without anatomical outlines. There was softening of the cartilage over the front of the larynx.

Internal. The larynx was filled with cancer, both sides seemingly equally involved. There was complete double fixation of cords. The arytenoids were free from disease on their superior and posterior aspects. The hypopharynx was free. The patient was emaciated, weak and cachectic. His breathing was difficult and had for weeks prevented him from sleeping. He was taking scarcely any food.

Procedure. Tracheotomy, November 29, 1927. Under local anesthesia an incision 2 cm. long was made into the trachea and a tube inserted. It seemed advisable to traumatize this radium-burned tissue as little as possible; hence the small incision. He was then handed over to a metabolist for preparation for operation. He reported low blood-pressure, dilated aorta, emaciation from starvation, cancer toxemia, urea nitrogen and uric-acid retention, and kidney insuffi-

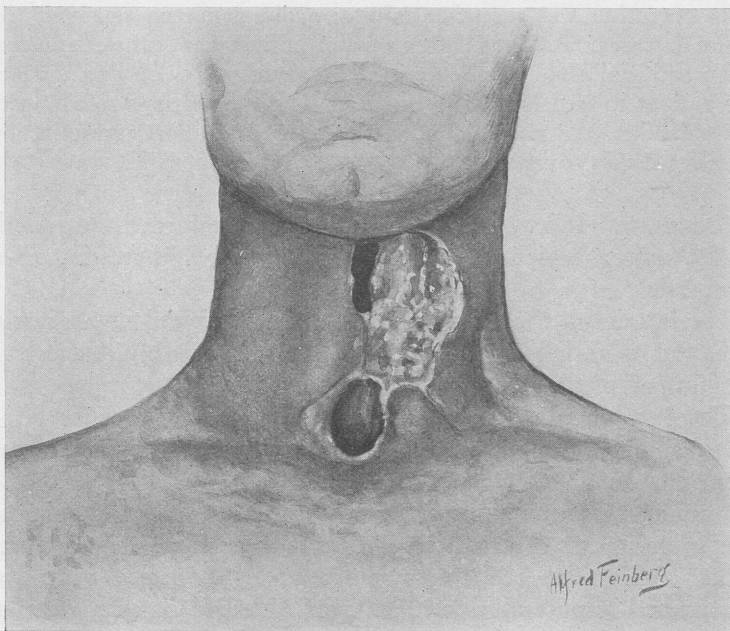


FIG. 18.—W. C. Radium-burned neck, two months after plastic failed to close esophagus.

ciency. Two weeks on rest, forced feeding and metabolic correction put 15 pounds on the patient and he went through laryngectomy normally.

Operation, December 17, 1927. The larynx, pretracheal muscles and skin, part of the thyroid gland and the tracheotomy opening with a short section of the trachea were removed *en masse*. All anatomical landmarks were obliterated, even the muscles being converted into fibrous tissue by radium. When cut, the skin flaps receded like cut rubber and were practically bloodless.

Dry gangrene attacked the wound at once, commencing at the edges of the cuts and extending outward until the whole front of the neck was involved.

Then a mild erysipeloid skin infection began at the wound site and extended over the torso as far down as the waist.

Operation, February 8, 1928 (plastic). The wound being clean and a large dehiscence being present in the esophagus, a plastic was attempted. The skin from the sides of the neck was brought forward. This operation was an utter failure; again gangrene removed the entire flap area. A 2-inch defect remains in the front of the esophagus.

An artificial esophagus, described previously, is worn and enables the patient to feed himself by mouth. This apparatus also conducts the saliva into the stomach and obviates the discomfort and irritation of saliva flowing over the neck.

Comments. It is possible that the radiation retarded the growth of the cancer, which, nevertheless, was slowly progressing to a fatal end.

The interior of the larynx, macroscopically viewed immediately after the operation, was almost gangrenous, probably due to the shutting off of the blood supply by radiation.

There was here a distinct cancer, plus a radiation cachexia or toxemia, which disappeared rapidly after the offending mass was removed.

Radium treatment converted this condition from an almost benign, easily curable condition in 1925 to a practically hopeless one in 1927. If cancer fails to complete its cycle, the patient must live a more or less miserable and handicapped existence with an open esophagus.

It makes one feel that extensively radiated cases had better be given over to the disease and no attempt be made to save them.

We note here antecedent chronic laryngeal pathology.

A TWO-STAGE LARYNGECTOMY

GORDON B. NEW, M.D.

If it becomes necessary to remove the larynx because of malignant growth it is of first importance to remove the growth completely. The patient should be guarded against reaction, and the result should be a tracheal opening without the use of a tube. In the old two-stage operation of Crile the patient usually was obliged to wear a tracheotomy tube. The one-stage operation of Mackenty, while overcoming this disadvantage and being technically more simple, requires a great deal of postoperative care from surgeon and nurses. The two-stage operation I am now using seems to combine the advantages of both of these operations without the disadvantages of constant close postoperative care, drainage tubes and frequent irrigations necessary in the one-stage operation, and the occurrence of tracheal stricture in the old two-stage operation.

Thyrotomy and excision is performed without the removal of cartilage in cases of carcinoma involving the anterior two-thirds of the vocal cords without fixation, the grade of malignancy, the age and general condition of the patient being taken into consideration. Laryngectomy is performed in the more advanced cases with fixation. During the three-year period from 1925 to 1927 inclusive 171 patients suffering from carcinoma of the larynx have been examined in the Mayo Clinic. Sixty-four of these were operated on. In 17 instances thyrotomy and excision was carried out, and in 42 laryngectomy was necessary. This group includes certain extrinsic cases but not the epiglottic or postericoid cases in which lateral pharyngotomy, following the method of Trotter, might be performed. There were 5 explorations. Tissue obtained at biopsy was examined the day previous to the operation in all cases in which laryngectomy was to be performed.

The operation I am now performing has been a gradual evolution from the old two-stage laryngectomy. Before the first stage is performed, a Rehfuess tube is passed into the esophagus through the

nose for the purpose of feeding. Local infiltration of 0.5 per cent solution of procaine is injected in the median line of the neck from the chin to the manubrium, laterally to the trachea and larynx, and deeply in the region of the hyoid bone. A median-line incision is made extending from just below the symphysis of the lower jaw to just above the manubrium (Fig. 1). Sharp retractors are placed in the upper part of the wound and the hyoid bone exposed and

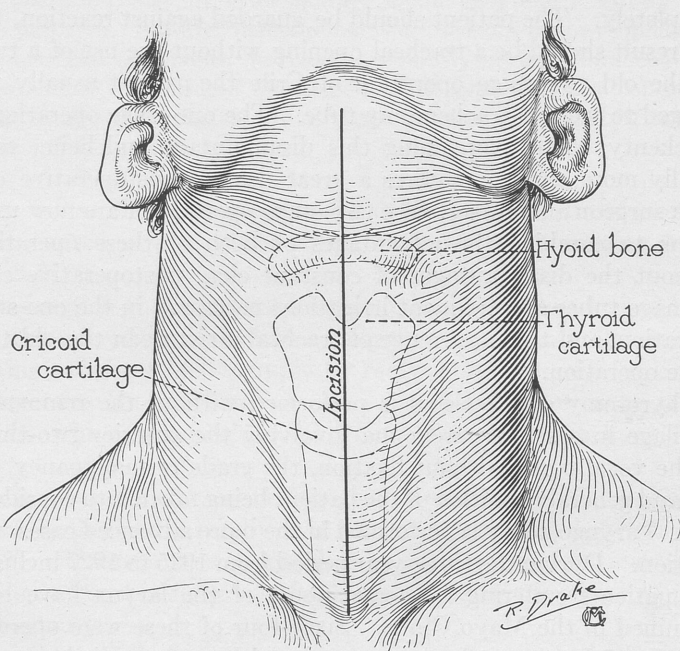


FIG. 1.—Median-line incision.

divided in the median line by means of bone forceps (Fig. 2). Sharp retractors then pick up the ends of the divided bone on both sides and retract them laterally. This allows the larynx to come up into the wound and simplifies the completion of the dissection. Blunt retractors are placed in the lower portion of the wound, the muscles are separated, and the isthmus of the thyroid gland divided. The larynx and the upper two tracheal rings are skeletonized anteriorly and laterally (Fig. 3). The skin on both sides

is sutured to the areolar tissue anterior to the second tracheal ring. The wound in the skin is then closed with dermal sutures, leaving the upper portion of the trachea exposed. The trachea is not opened. A split rubber tube is placed at the lower extremity of the wound, which completes the first stage of the operation (Fig. 4).

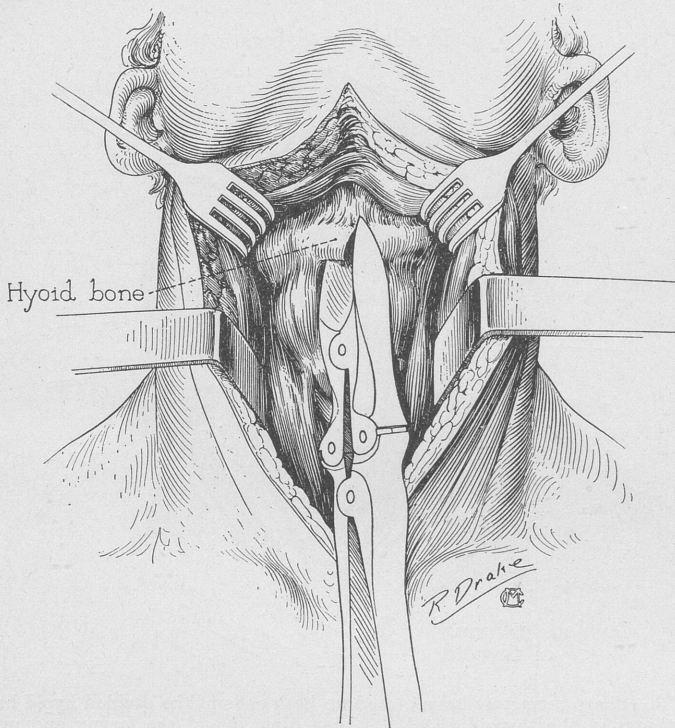


FIG. 2.—Forceps dividing the hyoid bone in the median line.

The reaction is much more severe from the first stage than from the second although the wound is clean and the trachea has not been opened. The temperature usually rises to 101° F. the first night and gradually drops to normal about the fourth day. A barrier to the soft tissues of the neck is created, thus preventing later infection of the neck and mediastinum from the tracheal or pharyngeal secretions. The day the temperature reaches normal the

trachea is anesthetized by injecting 10 per cent cocaine between the tracheal rings into the trachea, and a disk of cartilage is removed from the lower margin of the cricoid cartilage to allow the tracheal secretions to infect the wound. This opening may vary in position, upward or downward, depending on the site and extent of the growth. If it is possible to save the cricoid cartilage, an opening

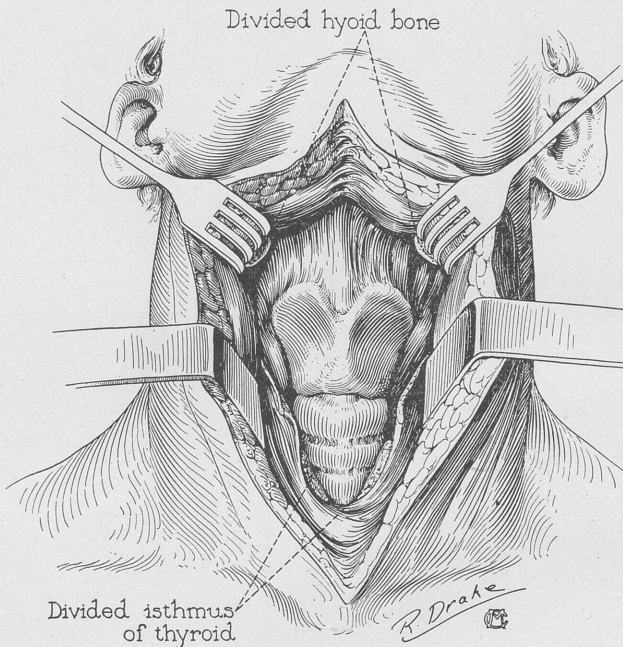


FIG. 3.—Sharp retractors have picked up both ends of the divided hyoid bone. The isthmus of the thyroid gland has been divided and the larynx and upper trachea have been skeletonized anteriorly and laterally.

is made in the cricothyroid membrane. If the growth extends well down in the larynx, the tracheal opening may be made below this point. The patient becomes immunized to this type of infection from the trachea and at the same time the trachea becomes accustomed to the air passing directly into it. Four days after the trachea has been opened the larynx may be removed without the usual reaction.

The second stage of the operation is performed by means of paravertebral block anesthesia together with superficial cervical block.¹ A small amount of the anesthetic agent is infiltrated on both sides of the wound in the median line. The wound in the neck is freed, usually by means of the index finger, following the outline of the larynx and trachea. The cut ends of the hyoid bone are

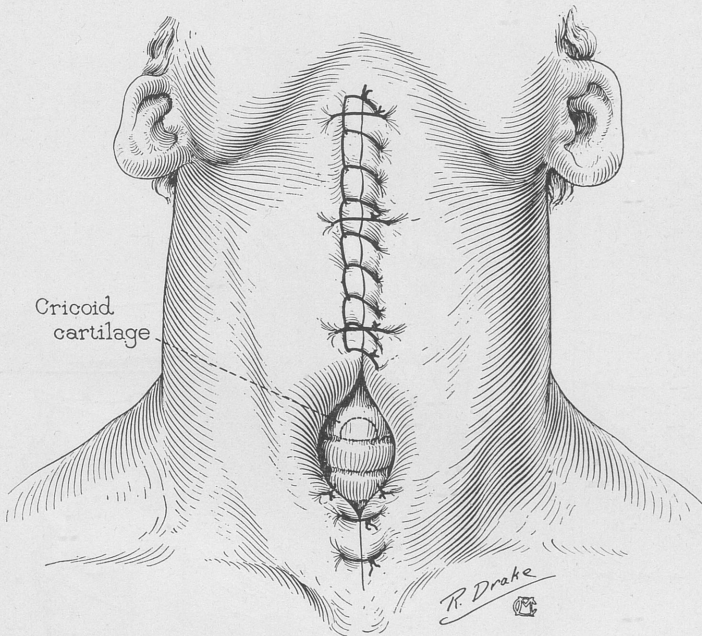


FIG. 4.—Closure following first stage. The dotted line indicates where the disk of cartilage is removed about four days following the first stage.

retracted by sharp retractors. Blunt retractors are placed in the lower portion of the wound and the neck is freed as at the completion of the first stage. The mucous membrane of the upper part of the trachea is anesthetized through the tracheal opening by swabs soaked in 10 per cent cocaine. A small tenaculum picks up the cricoid cartilage and lifts the larynx into the wound. The trachea is then cut across, usually above the first tracheal ring. If it is believed to be possible, the lower two-thirds of the cricoid

cartilage may be saved, thus affording a much larger cartilaginous ring to which the skin may be sutured (Fig. 5). As soon as the trachea is cut across, 0.5 per cent procaine is infiltrated back of the larynx. This controls oozing and anesthetizes the pharynx at the point difficult to control by block anesthesia. The larynx is

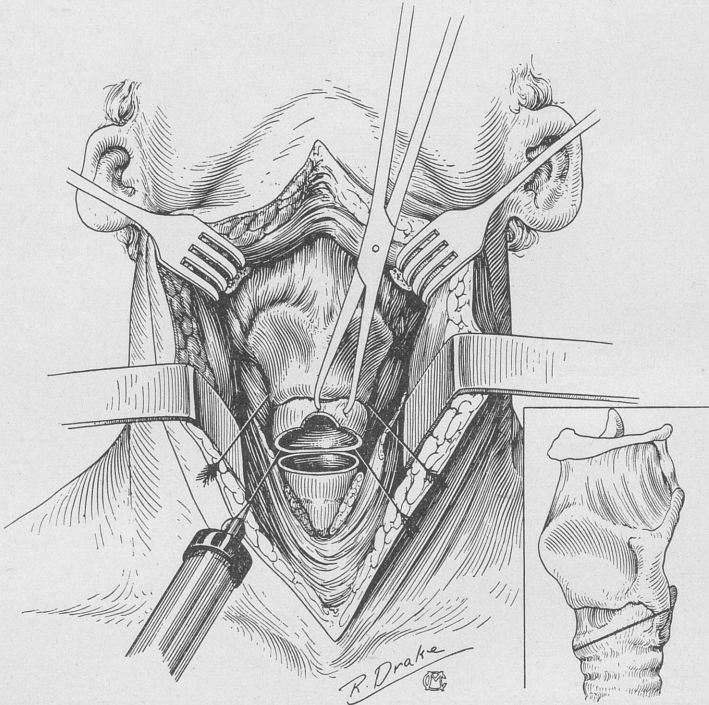


FIG. 5.—Second stage. The wound has been freed as at the completion of the first stage. The trachea is cut across. The arrows and syringe indicate the infiltration of procaine back of the larynx for anesthesia and hemostasis. The insert indicates the possible conservative removal of the larynx, leaving the lower portion to be sutured to the skin.

dissected free posteriorly by means of Mayo dissecting scissors almost to the region of the arytenoids. If the growth extends posteriorly and there is any question as to its extent at this point, the thyrohyoid membrane is cut across and this part of the larynx inspected, as suggested by Mackenty, to make sure that the

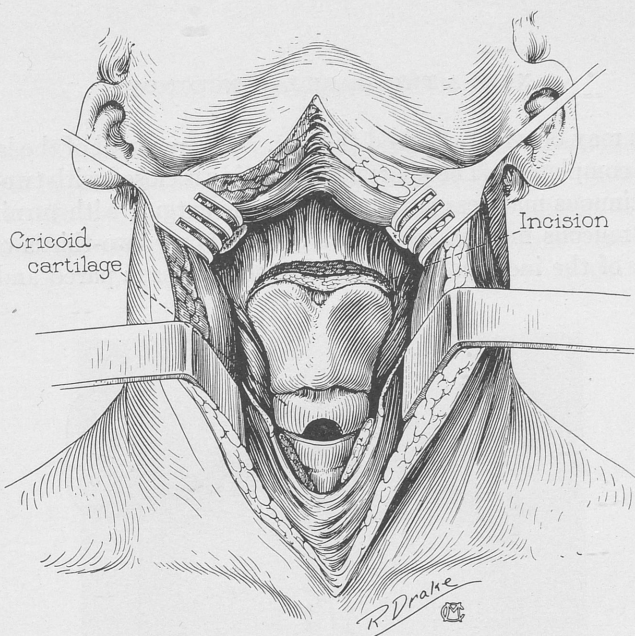


FIG. 6.—The incision above the larynx to obtain a view of the growth from above before it is completely removed.

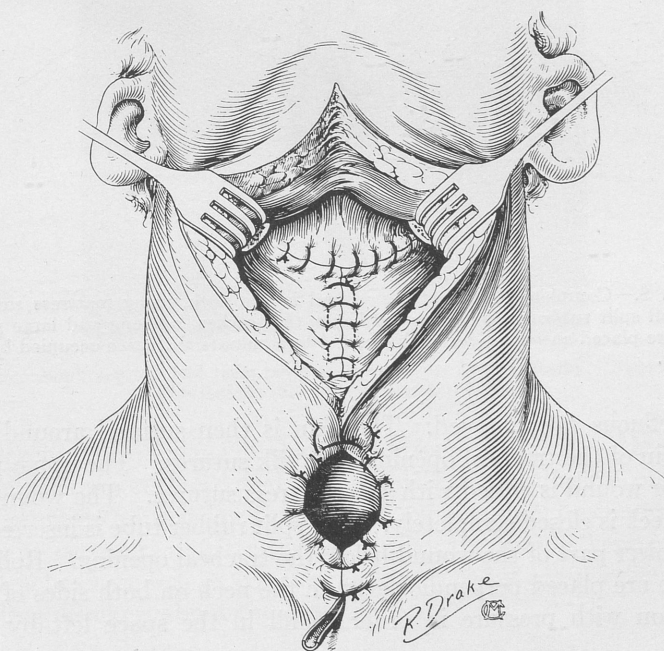


FIG. 7.—Continuous mattress suture closing the pharynx. The trachea is sutured to the skin with silk.

growth may be widely excised (Fig. 6). The removal of the larynx is then completed. The pharyngeal opening is closed with two rows of continuous mattress sutures of chromic catgut, with turning in of the mucous membrane (Fig. 7). The lower two-thirds of the margin of the incision in the skin on both sides is pared and any

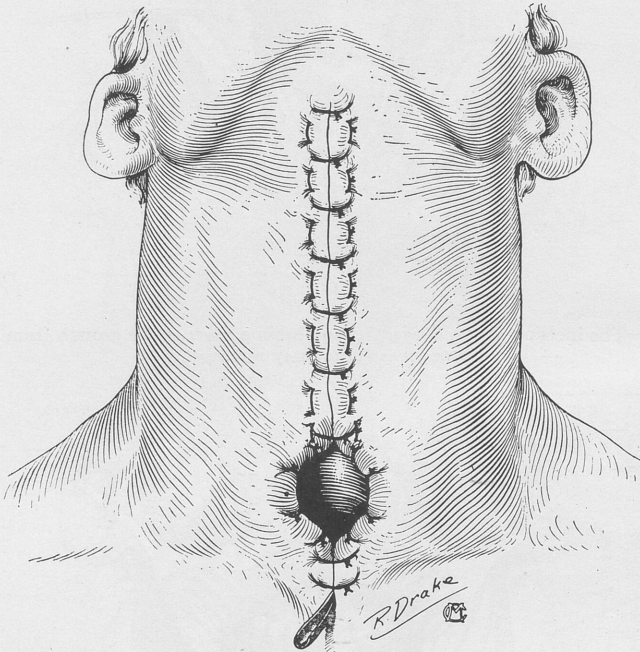


FIG. 8.—Complete closure of the wound in the neck, using mattress sutures. A small split rubber tube is inserted below the tracheal opening and large gauze rolls are placed on both sides of the wound to eliminate the space occupied by the larynx.

superfluous fat removed. The skin is then sutured around the margin of the tracheal opening with silk sutures. The upper part of the wound is closed with silk mattress sutures. The wound in the neck is closed completely. One split rubber tube is inserted at the lower part of the wound below the tracheal opening. Rolls of gauze are placed perpendicularly on the neck on both sides of the incision with pressure in order to fill in the space left by the

removal of the larynx and to support the pharyngeal wound; they are held in place by means of adhesive plaster (Fig. 8). A tracheal tube is inserted. Following this stage, there is usually a slight reaction; the temperature returns to normal in from four to five days (Figs. 9 to 12). The dressing of the part of the wound above



FIG. 9.—Nephrectomy had been performed following laryngectomy. Photograph taken before the patient returned home.

the tracheal opening is not changed for four or five days, then the gauze rolls are replaced and held in place with adhesive plaster. The gauze dressing below the tracheal opening may be changed as often as necessary. After the fourth day the tube is kept out of the trachea as much as possible; it is replaced if any tendency to swelling develops about the opening.

COMMENT. The wound above the tracheal opening as a rule heals nicely. With this method the chance of a primary healing between the skin and trachea should be the same as in the one-stage operation. There may be some drainage at the lower extremity just above the trachea. The use of silk mattress sutures to close

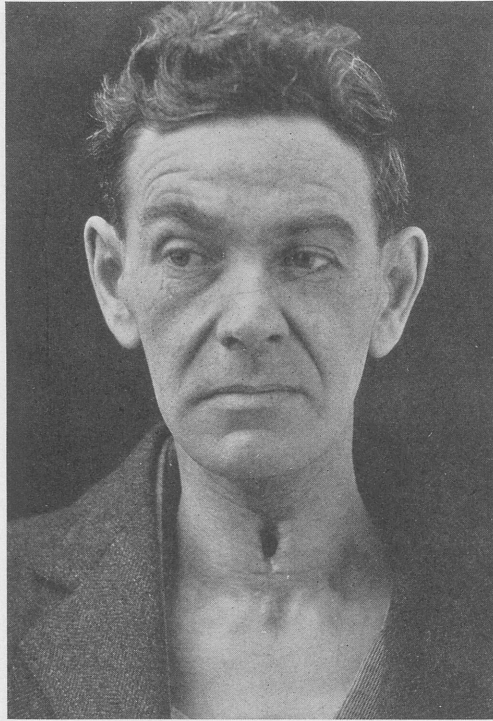


FIG. 10.—Large tracheal opening. The site of the growth made it possible to save the lower two-thirds of the cricoid cartilage.

the skin at this point has been of great advantage. Pharyngeal fistula following this method is very unusual. Although there is often a little leakage from the lower end of the wound, the sinus tends to close gradually. If a pharyngeal fistula does occur following the procedure, it is usually small and obliterates itself on account of the median-line incision. Occasionally a few secondary

stitches are placed in the lower part of the wound in order to shorten the period of convalescence. I have not seen the serious infections of the neck with sloughing and secondary hemorrhage or the large

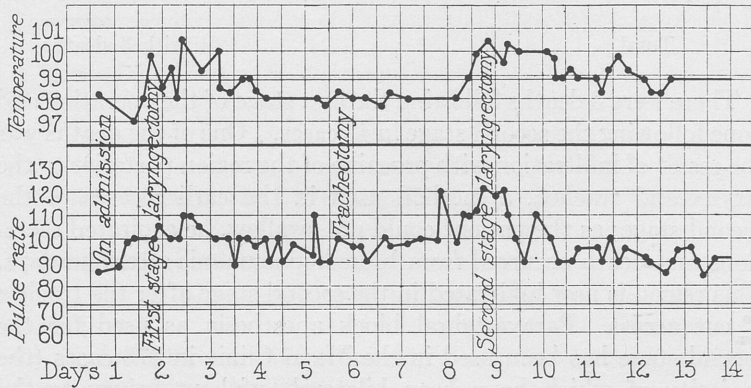


FIG. 11.—Temperature chart of patient shown in Fig. 9 indicating the slight reaction from the laryngectomy.

pharyngeal fistulas that require flaps from the neck for closure, such as are described following the one-stage operation. The two-stage operation is used in cases in which the trachea has not been

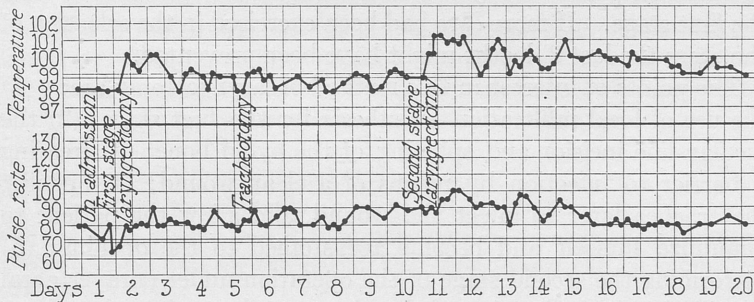


FIG. 12.—Temperature chart of the patient shown in Fig. 10. Slight reaction from operation is shown.

opened or obstructed. If it is necessary to perform preliminary tracheotomy, it is made as high as possible so as not to injure the tracheal ring to which the skin is sutured later.

OPERATIVE MORTALITY FROM CARCINOMA OF THE LARYNX, 1925-1927

Thyrotomy and excision	17 with 0 deaths
Laryngectomy	42 with 3 deaths
Exploration	5 with 0 deaths
<hr/>	
Total	64 with 3 deaths

There were 3 deaths following the first stage of the operation and none following the second stage in 42 cases. One of the deaths was the result of infiltration with procaine of the region posterior to the larynx and trachea, a method used in the earlier cases in the second stage; as the patient could not swallow, he aspirated secretions and death occurred from bronchopneumonia after four days. This region is now infiltrated in the second stage after the trachea is cut across. Paravertebral block anesthesia as used for the second stage has been used in the Mayo Clinic in 876 cases (the majority of which have been bilateral) without injury to the pneumogastric nerves or other untoward results. The second patient who died was a man aged seventy years with cardiovascular disease; the systolic blood-pressure was 240 and the diastolic 120. Death resulted from bronchopneumonia following the first stage. The third patient had a cough and slight bronchiectasis; the surgical risk was poor. Death occurred from bronchopneumonia after the first stage. If more care had been exercised in the selection of the cases the last 2 deaths might have been prevented.

The points of interest in this method of laryngectomy are: (1) the use of local infiltration anesthesia for the first stage; (2) the median-line incision and splitting of the hyoid bone; (3) creating a barrier to infection by means of a clean wound; (4) opening the trachea later to infect the wound, and allow the patient to immunize himself and become accustomed to the opening; (5) performing the second stage of the operation under paravertebral anesthesia and infiltration of the pharynx, about eight days after the first stage; (6) complete primary closure of the wound of the neck without the usual drains or tubes, inserting the split tube below the tracheal opening; (7) applying gauze rolls laterally on the neck with pressure to eliminate the space previously occupied by the larynx and to support the pharynx; (8) primary healing of the greater part of the wound of the neck and a tracheal opening without the use of a cannula in most cases.

BIBLIOGRAPHY

1. Lundy, J. S.: *Balanced Anesthesia*, Minn. Med., 1926, ix, 399.
2. Mackenty, J. E.: *Cancer of the Larynx*, Arch. Otolaryngol., 1926, iii, 205, 305.
3. Meeker, W. R.: *The Use of Paravertebral Nerve Block Anesthesia in General Surgery*, Minn. Med., 1923, vi, 138.
4. Trotter, W.: *Surgery of Malignant Disease of Pharynx*, Brit. Med. Jour., 1926, i, 269.

DISCUSSION ON THE PAPERS OF DRS. MACKENTY AND NEW

DR. CLEMENT F. THEISEN, Albany, N. Y.:

There are several questions I want to ask Dr. New and Dr. Mackenty.

In the first place, I want to ask Dr. New what he means by the patient "immunizing himself?"

Then I should like to ask Dr. Mackenty how long after laryngectomy he has seen aspiration pneumonias? We have had several as late as the fourteenth day after operation. We could not quite explain why that was.

I was particularly interested in Dr. Mackenty's case with regard to the premalignant stage. We have been able to watch a number of cases in which both tuberculosis and syphilis preceded the malignant condition in the larynx. In the last case we had there was a broken-down tubercle in the interarytenoid fold; following that a rapid extension—first, intrinsic cancer; then extension to the ala of the thyroid; what you might call an explosive condition.

SIR ST. CLAIR THOMSON, London, England:

I should like to arise only to congratulate American vitality on so well resisting cancer that it may only develop so slowly! I think it speaks a great deal for the nation that this record can be submitted to us.

As I hinted in my paper, I am in entire agreement with Dr. Mackenty against the use of radium for anything connected with the larynx which is operable.

I should like to express agreement on another point Dr. Mackenty has brought out. That is, when malignant disease starts on one cord, to your surprise you may find it has got around to the other cord entirely in the subglottic region. From the first cord it seems to

descend into the subglottic area, and then cross the anterior commissure to the subglottic region on the opposite side, and then come up into the second cord.

Mixed tuberculous and malignant disease is not very easily recognized, specially since it is now known that all of us have had tuberculosis at some time of our lives.

The premalignant stage is interesting, and Dr. Chevalier Jackson's paper is a classic on that point. There will always be some doubtful cases in these intriguing conditions of the larynx. If I had a lesion of one cord which was a suspected malignant disease and was not tuberculosis, I would have my whole cord out, and I would not bear any enmity toward the man who removed it if, afterward, he told me it was proved to be absolutely innocent. I think it would be better to remove a cord in two patients and find the condition innocent than to wait in another case and let one cord get so far gone that laryngectomy is necessary.

Dr. New has not quite persuaded me as to the cause of death in these three patients. People should not die from having an incision made over the laryngotracheal region, no matter how old and feeble and bronchitic they may be. Is he not perhaps withholding a criticism of this local anesthesia and its possible dangers, particularly in the hands of those who are not expert? I ask that in pure innocence, because local anesthesia, which I see is increasingly common here and is increasingly common and getting more so on the Continent of Europe, is still making very little progress in England. There are people there who claim that the deaths or the complications and secondary deaths due to local anesthesia have not been brought forward with as much detail as they might be. I should like to ask Dr. New if he feels that this local anesthesia and the benumbing of the larynx in these three cases, or some of them, cannot be blamed for the unfortunate results?

DR. CHEVALIER JACKSON, Philadelphia:

I was very much pleased to hear Dr. Mackenty corroborate my observation, made a good many years ago, that there is antecedent nonmalignant disease in many of the cases of cancer. About twenty years ago I made the statement that it was relatively rare that we saw cancer develop in a previously normal larynx. Sir Felix Semon questioned the statement and said that certainly had not been his experience. I should like to ask Sir St. Clair Thomson to state his observations on that point.

Another matter is the succession of cancer in benign growths. I reported several such cases, to which Sir St. Clair did me the honor to

refer, and one very striking case has come in since. One of the cases to which he referred was that of a nurse who, thirty years before, had a papilloma in the larynx removed by Dr. Thomas R. French, whom we all know and esteem so highly. He showed me a beautiful drawing made at that time, thirty years previously. When she came in to see me she certainly had a cancer of the larynx. It was verified by biopsy and later by her death from very extensive malignant disease. It is inconceivable that that primary growth thirty years before could have been in any sense malignant. When did the transition take place? The case to which I refer that has come in since was seen in consultation with Dr. Fielding O. Lewis. He asked me to look at the larynx of a woman who had what he thought must be cancer. I looked at it and I also thought it was cancer. The appearances were so typical that there would have been little doubt were it not for the fact that eight years before she had had a papilloma removed from the larynx by Dr. Sewall, of San Francisco. The growth was submitted in its entirety at that time to Dr. Ophuls. He could find no evidence of cancer, and clinically it was not cancer then, yet when she came to us undoubtedly cancer had developed at the same site. Dr. Lewis took out the entire larynx. She is alive and well today and has a splendid voice; but the question is, when did the succession of malignancy to benignancy occur?

SIR ST. CLAIR THOMSON:

Well, sir, I do not think that a frank papilloma or fibroma becomes malignant, but the manifestation of malignant disease is in a certain number of cases foreshadowed for years, sometimes, by some vocal defect. A gentleman consulted me for what I diagnosed as paresis of the internal tensor on one side—it was, of course, a very rare condition to be functional—and he came back two years afterward with a small subglottic malignant condition which explained his weak voice of two years previously.

Malignant disease in the endolarynx sometimes comes as an absolute bolt from the blue. Some of the four doctors I operated on reported that in the course of their practice they caught a little cold and were husky and it never cleared up. They were not people given to laryngitis. But there are others that have had these varying conditions. In some of Dr. Mackenty's most interesting drawings there are conditions that some people, without experience, might think were either faked or impossible. There are little white spots sometimes on one cord; he shows you the drawing a few months afterward, and they are gone and something else has appeared. But that does occur and

the diagnosis is not made up always from seeing a case only once or twice. That is, as I said, one of the reasons for delaying and watching them.

The tremendous variety in the virulence of cancer infection, whatever it is, is inexplicable, and when we know more about it I do not think it will be a change from one condition to another condition. The gestation of this disease is not fixed. It varies.

DR. D. BRYSON DELAVAN, New York City:

In closing this discussion, let me recall that Dr. J. Solis-Cohen many years ago operated upon a case of extensive carcinoma of the larynx, the first in this country in which the trachea was brought out at the base of the neck and fastened to the walls of the incision. Dr. Solis-Cohen did not transfer the case to hospital assistants or interns, but cared for the patient himself, personally tending him day and night throughout the days following operation. He dismissed him from the hospital cured. In course of time he encouraged him in the development of the pharyngeal voice, the first, I believe, ever developed in this country, and one of the best.

With this patient, Dr. Solis-Cohen introduced innovations of supreme value, extensively followed since by those who have operated most successfully.

Sir St. Clair Thomson informs me this patient was, within a few years ago, still living and well.

Although minor improvements of value have been suggested by others, the radically important methods which are in use today were those so strikingly demonstrated by Dr. Solis-Cohen in the case just quoted and widely published then. We often hear one after another relate his successes under the use of similar methods, with no reference to the credit due to Dr. Solis-Cohen, the brilliant instructor of us all.

The longest surviving case of partial laryngectomy, as far as I can learn, is one of my own, operated on by Dr. Farquhar Curtis thirty-one years ago (1897), and recently shown to Sir St. Clair Thomson and others, alive, well, vigorous and energetically carrying on the laborious work of a traveling salesman.

Some of us are trying to maintain an open mind on the subject of radium. There are few occasions such as this in which some warning is not advanced suggesting its dangers and the possible evils which it may work. It is true that radium is capable of doing harm, especially where ignorantly and improperly applied. But it must be remembered that our knowledge of its application in the larynx is still in its infancy.

Let me call attention to the fact that in the early days of laryngectomy the greatest exponent of that operation—von Bergmann, of Berlin—reported 20 total extirpations of the larynx, of which 6 died on the table and but 3 were apparently well at the end of two years. Kocher reported 7 cases; 1 died on the table and none were well at the end of two years. Of partial extirpation of the larynx, von Bergmann reported 19 cases; 5 died on the table and 4 were “well” at the end of two years.

No greater tribute could be paid to the operative statistics of Sir St. Clair Thomson and Dr. Mackenty than the evidence of progress which they indicate since the work of the early operators. To these gentlemen, more than to others of the present day, belongs the credit of having furthered the improvements which have brought about substantial betterment. But, if advances have taken place in the surgery of the larynx, why may we not hope that the occasional unsuccessful use of radium, due to evident ignorance in its application and control, may be overcome, and that, with more skill and more experience, better results may be gained, as has been the case with surgery?

A growing improvement in the application of radium has been the history observed at the Memorial Hospital in New York during the last seven or eight years. We have there a record of over 30 laryngeal cases so treated which show that in the course of that time there has been a distinct and steady advance in the success attending its employment. Of the total number of cases of intrinsic cancer of the larynx treated between 1918 and 1927, the majority were advanced, many hopelessly so. Eighteen of the entire group, fully verified by histological section, are now clinically free from evidence of the disease. Of the 18 cases, 8 were considered surgically operable by laryngectomy; 10 cases, including 1 recurrence, were inoperable. The methods of radiation employed have varied with the years and in keeping with the increased experience with radiation in other fields of cancer.

Relative to the duration of treatment, in nearly every instance the results were obtained by a single treatment or cycle of treatments. The present status of each case tabulated has been checked to date, showing all clinically free from evidence of the disease.

Judgment has frequently been passed against radium where wrong dosage and faulty technical procedures have been carried out by those unfamiliar with the physical problems attendant upon its use in general. The employment of radium in any field of cancer is a highly technical procedure and should be undertaken only by those whom wide observation and experience have rendered thoroughly competent.

Fully recognizing the value of surgery, the verdict as to radium is still far from settled. Already, with present-day methods, much has been accomplished.

DR. MACKENTY (in closing):

With regard to Dr. Theisen's question about aspiration pneumonia, I have only seen 1 case of aspiration pneumonia in my series, numbering more than 200. That was late in the disease. The man was practically well six weeks after operation; he lingered along awhile, and then died of bronchopneumonia.

We prevent aspiration pneumonia by not allowing any blood to get into the lungs at the time of the operation, not even a drop if we can help it. Then, later, we prevent wound secretion from passing the barrier.

I wanted to ask Dr. New whether they use the tracheal plug in the two-stage operation or not, or whether they just put a loose tracheal tube into the trachea?

I am glad to get a little corroboration on radium. What I know about radium I do not like. In squamous cancer it is worse than useless. The radium men say, "Give us something less malignant, something like the basal-celled carcinoma, to handle." I have, and the result is just the same—more cancer plus a radium burn.

I was going to describe the history of a girl with a basal-celled carcinoma of the larynx in which radio-active energy was used for three months. X-ray was given in Wood's Clinic in New York (St. Luke's Hospital). He is expert in that work. The radio-active energy seemed to stimulate the cancer into tremendous activity, so that it grew all over her larynx in three months, and she came pretty near to getting beyond the operative stage, and we had a great deal of trouble healing her neck up on account of the x-ray burned tissues. She was twenty years old, a beautiful child, and it would have been a calamity if we could not have closed her neck. We had to take the whole larynx out, which was also a calamity. I have the pictures of that larynx here, if anyone wants to see them.

I agree with Dr. Thomson that it is very curious how cancer will grow along a cord, then dip down under the commissure and appear on the other side. There must be some resistance about the tissues of the commissure which prevents cancer from crossing right on the line of the cord.

I have but once seen malignant disease and a true tuberculosis together in the same larynx.

SIR ST. CLAIR THOMSON:

I should like to make this quite clear: I have never seen them combined in the larynx. I have seen them follow one another. I only meant I have seen cancer in tubercular subjects, but I have never seen the two together.

DR. MACKENTY:

I believe if we had had the courage, as Sir St. Clair points out, to remove E. G'S. larynx (that is one of the cases I reported here) before he got the cancer, we could have done a thyrotomy on him, and he would have had a good voice, and we would have avoided much trouble. I was quite confident all the time that this man was going on toward a malignant condition. But such surgery would not in all probability be permitted by the patient and I doubt if it could be justified.

The device to which Dr. Delavan refers is the artificial larynx with which you are all now acquainted as it has been in use about four years. I had another device today to show you which is just as useful but not as often needed as the artificial larynx—this I have called an artificial esophagus. It was the outcome of operating on radium-burned necks where closure of the esophagus is often impossible. The artificial esophagus fills this dehiscence in the esophagus, directs saliva and food into the stomach and relieves a very distressing situation. I shall at some future date present it again. I shall be glad to explain it to any one interested after the meeting.

DR. NEW (in closing):

The word "immunization," as I have used it, is not a good one, but I was unable to find a better term. What I mean is that opening the trachea and allowing the secretion of the trachea to infect the wound in the neck, which has been present for four days, protects the patient from the reaction, local and general, that usually occurs when the tracheal secretion infects the tissues of the neck, as following tracheotomy, laryngeal-fissure or a one-stage laryngectomy.

Regarding the cause of deaths in the first stage in the three cases: The first case was undoubtedly the result of infiltration anesthesia back of the larynx and aspiration pneumonia. By mistake the infiltration was made back of the larynx by the anesthetist. In the other 2 cases the general condition of the patients rather than the operation was undoubtedly the cause of death. Bronchopneumonia developed in both cases and death occurred in a few days.

LOOKING BACKWARD ON AMERICAN OTOLARYNGOLOGY IN THE WORLD WAR

HARRIS P. MOSHER, M.D.

THE final title of this paper is "Looking Backward on American Otolaryngology in the World War." It contains a little history, much atmosphere, some foolishness, a bit of reflection and a few deductions. It will delay your golf game or your lunch about forty minutes.

It is hard to realize that ten years have passed since the close of the World War, and when you do fully sense it you feel as if Time has struck you a blow. It seems but yesterday, but ten years of yesterdays lie between. A new generation which never heard of the war has lived half way to the voting age since it came to an end.

As this is a day given up to things historical, your Council has asked me to write about the part played by the American laryngologist in the World War. I had to combine the otologist with the laryngologist, as laryngology pure and simple did not exist in the army. The time at my disposal, I obtained release from other duties only on the first of this month, has been too short to attempt a complete historical narrative.

While in the Service I wrote two articles, "A Summary of the Activities of the Section of Otolaryngology." This was read at Oglethorpe before the Association of Military Surgeons. The second article was "Observations on Otolaryngology in the War." I read this after the Armistice in Philadelphia before the College of Physicians. These two articles have furnished such historical data as is contained in the present paper.

In the ten years since the end of the war the wireless has blossomed into the radio and driven us from our living rooms with crude advertizing and jazz, Lindbergh has flown the Atlantic, Ford has remodelled his car and taken the romance out of it, and four-million-share days have appeared in the stock market. Edison alone is working at the same unsolved prewar problem, the storage battery. Did the war solve any medical problems? If so,

what were they and what part did the otolaryngologist play in solving them?

When it became evident that the United States was about to enter the World War, Lt. Colonel T. C. Lyster was delegated by the Surgeon-General to visit certain of the eastern cities, among them Boston, for the purpose of enlisting ophthalmologists and otolaryngologists in the Medical Corps. Colonel Lyster had more or less specialized in ophthalmology during his service in the Army so that it was a natural thing for him to be selected for this duty. No promise was made but there was a gentlemen's understanding that specialists would be assigned to work in their specialties as far as the exigencies of the occasion permitted. As it turned out fully 95 per cent were so placed. From the standpoint of efficiency it was the commonsense thing to do. It was characteristic of the broad-mindedness of Surgeon-General Gorgas that he sanctioned it. It was, however, a radical departure from the usual Army procedure.

Colonel Lyster was assigned also the recruiting of ophthalmologists and otolaryngologists for the special examinations used in the selection of aviators. This was new work again because aviators were new to our Army. England and France, of course, had carried on an examination of aviators for the three years of the war which had already elapsed, but in neither of these countries was it ever as elaborate as with us. There was a third innovation and this also was due to Colonel Lyster. It consisted in grouping ophthalmology, otolaryngology, brain surgery and maxillo-facial surgery—all surgical specialties dealing with the head—into the Division of Surgery of the Head. It was soon felt that the Division of the Surgery of the Head could function better if it was independent of the Division of Surgery. This again was a new idea and a revolutionary one. At once there was strong, I almost said bitter, opposition. To make a long story short, and I assure you it seemed a long story to us in the Surgeon-General's Office, it was finally "so ordered." The Division of Surgery, however, was never fully reconciled to this innovation. To the end of the war at Base Hospitals which were far enough away from Washington, remarks were passed between Commanding Officers and the Chiefs of the Section of Surgery of the Head on this point.

During the organizing period of the Medical Corps of the Army Colonel Lyster ranked in my mind as one of the men of vision. I still feel the same about him.

He had the good fortune and the bad fortune to be the nephew of the Surgeon-General. It was good fortune in that he had quick access to General Gorgas and was sure at all times of a sympathetic hearing. The Section of Surgery of the Head, of course, shared in this good fortune of Colonel Lyster. You can imagine for yourselves from what follows the drawback of his relationship. The Army Register, and every Regular Army Officer sleeps with this under his pillow, showed that General Gorgas was due to retire in about a year unless he became a candidate for reappointment. He finally did become a candidate. Four months after our entry into the war Colonel Lyster, now General Lyster, Majors deSchweinitz, Jones and Mosher, were ordered overseas on an inspection trip of our hospitals and those of the French and English. As we stepped afoot in France the campaign for a new Surgeon-General was actively under way and the shadow of forthcoming events was plainly evident wherever we went. You know the result. A new Surgeon-General was chosen. When this came about the war was over medically. The change, therefore, made little or no difference to us who were serving in the Division of Surgery of the Head. In justice, it should be said that it did not appear to hasten our departure from the army. I am quite sure that it did not delay nor hinder it.

Looked at in the waning perspective of ten years was this assigning in the Army Medical Corps of the specialist to his specialty worth while? Was all the struggle and the atmosphere which centered about the Division of Surgery of the Head a tempest in a tea-pot? In spite of the fact that the Division of Surgery of the Head disappeared overnight when its personnel left the Surgeon-General's office I am still convinced that it was more than worth while and should be done over again. In answer to my other question I will say "yes" to that also, and most decidedly. To use the specialist as a specialist was economically sound, as they say in business. It was of the greatest help in recruiting medical men and led to immediate efficiency. Even

with its aid there never were enough adequately trained specialists in the army to make the service what it ought to have been. Where we should have been without the help of this gentlemen's agreement, as I like to call it, between the Surgeon-General and the medical profession I hate to speculate upon.

Naturally there were some disadvantages to this specialist business. There was one which was always in the offing. It seemed as if the specialist was picking his job instead of doing what he was told to do like any other medical man. Such a thing, of course, was a fundamental upset of army discipline and without discipline there can be no army. However, in practice this difficulty proved to be more theoretical than real. It was true that in certain instances specialists tried to make stipulations with the government before enlisting. Also in a few instances men used the fact that they were specialists to bargain for rank. But worst of all, not a few men, especially after the forced draft, claimed to be specialists when they were not, doing this to shield themselves from general medical service. These were not pleasant happenings; nevertheless, another time I feel that these disadvantages could be foreseen and in a large measure obviated.

In thinking back to the beginning days of the war the first thing which stands out in my memory is the vigil of sixteen hours which Mrs. Mosher and I spent in the House of Representatives in Washington waiting to be present when war was declared, only to miss it by an hour. The legislators by political instinct had sensed the inevitable and all wished to put themselves on record. All kinds of speeches were made, good and bad, short and long. One of the longest and most flowery poured from Representative Heflin. As you know, he is talking yet.

Next I remember the meetings of the Council of National Defense. They were most impressive. To me they were also exhilarating. The American Medical Association was as usual to the fore. I can still see the Dante-like face and the white pompadour hair of Franklin Martin everywhere at once. Now and then you saw one of the Mayos silently come or go. There was much handshaking of the known by the unknown.

Within ten days I had said "Good Bye" to Mrs. Mosher and the

garden at Marblehead and found myself in Washington for good, working under Colonel Lyster's direction from nine in the morning to twelve at night in the Mills Building, once a proud office structure next door to the Army and Navy Building but on the Navy side. Greenwood of Boston was with me. We had served together in the English Medical Corps in France as members of the first Harvard Unit, and felt a bit like old campaigners. Later the Surgeon-General's office moved to new and more roomy quarters in a building put up on land near the Smithsonian. Parker was with us long before this. Silently he began to make himself felt as a leader. Later he became our actual leader when Colonel Lyster gave all his time to the medical affairs of aviation. Bordley of Baltimore, Bordley of the overhanging brow and silent, mysterious manner, also was with us from the start. So was Richardson. Black, the optimist, fortunately came early. It was a long-awaited and a memorable day when deSchweinitz, the prince, walked in in his most impressive manner. Brown and Ivy came. Then little Bagley, of the melting brown eyes, appeared to take charge of brain surgery. Barnes, of Boston, was assigned to help me. No one in our group enjoyed his uniform more. He appeared his first morning with his puttees upside down. Later I went him one better by going down to breakfast in Paris without any. Finally loose-jointed Blair ambled in. In connection with our stay in the new Surgeon-General's office I seem to recall most vividly the conferences on the lawn back of it under the mulberry trees. Here we could talk and plot unseen by our neighbors and rivals, the members of the Division of Surgery. This meeting place, however, had its drawbacks. Sitting on ripe mulberries was ruinous to uniforms and the doves flew overhead like crows. But I am reminiscing acutely and becoming undignified. I must get back to my ordered narrative before our President and the Council frown upon me.

The first activity of the Section of the Surgery of the Head was to list the ophthalmologists and the otolaryngologists of the country; then, as their papers came in, to help grade them and finally to assign them to the various hospitals. There was no full list of the accredited specialists to work by, so we had to make one.

I feel to this day the keen disappointment which soon came to us from the letters of recommendation sent by the confrères of men applying for enlistment. I soon made up my mind that such letters were worthless and that the only way to really grade a man was to know him personally. When I went into the army the word personnel meant little to me; when I left, its letters were burned into my brain. I soon became a sort of Father Confessor. Joining the Army Medical Corps was easy for me; for very many it was not, and meant great sacrifice. In my mind I have a catalogue of many near heroes and two full heroes. I am looking into the eyes of one as I speak.

The next duty was to assemble equipment, first for the hospitals in this country and then for our special departments over seas. Even now I am a bit tender on this subject. I know the equipment with which the English specialists worked uncomplainingly. I know also how little the French had. Few of our small civil hospitals today have as complete special equipment as was ordered for our army hospitals. When the war stopped, the storehouses of France were bursting with our supplies. Transportation broke down somewhere. There was no transportation by air then. Even now, ten years later, there is but little.

Together with the task of assembling special equipment there was the planning of the special departments for a 2000-bed hospital, a hospital of 1000 beds and one for 500.

Colonel Parker and I worked at this problem together with the architects who specialized in hospital construction and who were assigned to the Surgeon-General's Office. I know that Colonel Parker enjoyed this work very much and I am sure that I did. These plans we left behind us. What has become of them I do not know. The classified list of specialists was also left behind. Before we left, all records were assembled together for safe keeping. What has become of them is up to the peace-time administrators of the army. The classified list of specialists I consider important. In my opinion it should be brought up to date periodically. Not only in working at such problems as these buildings presented, but also in dealing with instruments and supplies generally, you were thrilled at the amounts and figures involved, figures which stag-

gered even a calculating machine. Often, of course, you were both thrilled and appalled. Then, again, a sense of power seemed to radiate from the tasks, and you felt as if you held Aladdin's lamp.

The section of otolaryngology was at first the busiest of all the surgical sections and at one time did 27.5 per cent of all the operating. The number of beds for ear, nose and throat patients in the usual 2000-bed hospital varied from 35 to 200. It was not uncommon to have a daily out-patient clinic of 75 patients in busy times. At such times also the treatments averaged over 2000 a month and the operations 200 or more. The department of otolaryngology certainly earned its keep.

The following tabulation gives an idea of the amount of work done in one of the most active base hospitals, namely, Camp Sherman:

Number of new cases treated in the ear, nose and throat department	7210
Number of operations performed in the ear, nose and throat department	2227
Number of treatments given in the ear, nose and throat department	35,261
Number of deaths	10

From the nature of things only necessary operations were permitted in the surgery of the army. The stock operations in the section of otolaryngology, therefore, were mastoidectomy, submucous section of the septum, tonsillectomy, and the incision and drainage of peritonsillar abscess.

There were 14,042 cases of tonsillectomy with 4 deaths; 2 presumably from cocaine, 1 from embolism which occurred under anesthesia and 1 from tonsillar hemorrhage. The number of enucleations per month varied in the base hospitals from 25 to 350. The latter number was the return from Camp Lee, where there was a campaign of enucleation. Most tonsillectomies were done under local anesthesia. The war popularized the use of local anesthesia tremendously. Orten and Porter used it for mastoidectomies.

The number of peritonsillar abscesses was very striking. Camp Devens reported 50 in a month, and Colonel McKernon states that overseas one medical officer opened 24 in a week.

The following table of operations is for all base hospitals in this country. It is, of course, only approximate:

TABLE OF OPERATIONS

Mastoidectomy (simple)	2,175
Mastoidectomy (complete exenteration or radical) 3.6 per cent	72
Meningitis (complicating mastoid disease), deaths	22
Brain abscess (number of cases)	15
Tonsillectomy	11,646
Tonsillectomy and adenoidectomy	2,396
Adenoidectomy	584
Submucous resection	3,246
Peritonsillar abscess	1,199

Thrombosis of the lateral sinus was not very common. Mastoiditis following measles took a fulminating course and was characterized by early, painless and severe destruction of the cellular structure of the mastoid process. More than one observer felt that the involvement of the mastoid was often a part of a bloodstream infection.

Holmes reported the cure of 16 diphtheria carriers by the removal of the tonsils and the adenoids and 1 cured by a Killian operation. He reported also 11 cases in which nonvirulent diphtheria bacilli were found mixed with streptococci and pneumococci in the aural discharge of acute otitis media. Freidberg also reported a series of cases of chronic diphtheria carriers cured by operation.

Operations for the replacement of the fracture of the nose, usually from mule kicks, the removal of nasal polypi and drainage of the antrum were next in frequency. A few instances of nearly all the standard operations of otolaryngology are represented in the reports from the camps. In the early days there were 2 foreign bodies in the trachea, a dental broach and a peanut; these were sent to Philadelphia to Dr. Jackson. Tracheotomy was done a few times for edema of the larynx, probably caused by deep infection. At times rather too many secondary mastoid operations were necessary. In one series of 158 mastoid operations 28 reoperations were reported and 8 cases of facial paralysis, 6 of which were permanent. This is not a good record. In a few

places there was a suspicion of overoperating. The reports from the camps show that there was very little diphtheria. Almost no erysipelas was reported in connection with mastoid operations in spite of the fact that the streptococcus was the reigning organism.

AIR AND SPUTUM-BORNE INFECTIONS. The war showed that the greatest health asset for a soldier is a normal nose and throat. Never before was it demonstrated so graphically that the nose and throat and the accessory sinuses are the primary lodging places for the bacteria responsible for the infectious diseases and those which are sputum borne. The detection of the carrier became a vital problem which taxed to the limit of endurance the staff of bacteriologists at the various base hospitals. The treatment of the carrier became another problem. It was soon found that nurses and orderlies were often carriers. I find this sentence in one of my reports: "When we get back to civil life it would be a good plan to culture regularly the noses and throats of all the hospital personnel, including the physicians." The problem of droplet infection was attacked through isolation, the use of cubicles and of substantial gauze masks.

From the military standpoint we were at war with the Germans, from the medical with the streptococcus. Air-borne and droplet infections became the paramount medical problem.

Personally I came in close touch with the problem of air-borne infection while on a transport which carried 5000 troops overseas. It is no exaggeration to say that the majority of the men became ill with tonsillitis, pharyngitis, or acute bronchitis during the voyage or within a few weeks after landing. We were told at Blake's Hospital in Paris, Red Cross Hospital No. 2, that the most prevalent disease among the Americans was influenza and its complication, pneumonia. Practically everyone came down with influenza during the first six months. I returned home fully convinced that the prevention of respiratory infections was one of the pressing problems of the war. I was especially uneasy about the transports.

While in France I found Major McKernon, of the New York Graduate Hospital, busy allaying the paroxysmal cough which accompanied an epidemic of influenza, which at that time was crowding his hospital with patients, by improvising a spray room

in a corner of a ward by putting up sheets cubicle fashion and by vaporizing over oil stoves, which were kept continually burning, watery solutions of eucalyptus and thymol. Before leaving England on the return trip I had the good fortune to visit the barracks of the Coldstream Guards. I went there to see in action a steam spray hut which was used for clearing up meningococcus carriers. It had been proved that the vault of the pharynx and the adenoid remains, so often present there, were the lodging places of the bacteria. For once the tonsils had proved innocent. In clearing up the carriers the problem was to disinfect the vault. In the beginning the men were required to sniff through the nose from the palm of the hand various alkaline solutions, and to gargle. Finally came the steam spray hut and the use of a 1 per cent solution of sulphate of zinc. In arriving at this special solution the medical officers had run the gamut of available germicides. Careful bacteriological tests had shown that the zinc sulphate solution gave the best results. The men were treated wholesale, and this is what appealed to me strongly, by marching 120 of them into the hut at once and exposing them to the spray for ten minutes. After this they dried off in another hut for another ten minutes. This was repeated every day for six days.

My enthusiasm was aroused at once. There was cerebrospinal meningitis in the camps at home, and respiratory infections and influenza were common. I pictured one such hut in every cantonment and one ward at least so equipped. There was to be a hut at the port of embarkation for the men about to be herded on the ships and one such spray room in each large transport. My imagination inaugurated a similar system of huts in France.

I found on my return that there was one report on the steam-spray hut duly catalogued and filed in the Surgeon-General's Office. I was pleased, however, to find that the problem of air-borne infections had been recognized in some of the cantonments and that steps had been taken to solve it. At Camp Lee, for instance, Major Day had established a gargle brigade, had weathered the derision it caused, and had obtained favorable results. Further, Major Capps at Camp Grant had vigorously pushed the use of isolation by the cubicle plan and had introduced the use of gauze masks. Later an order was issued from the Surgeon-

General's Office making the use of the mask compulsory in all cases of infectious diseases in which the respiratory tract was involved.

Dichloramine-T. Martin and Furness, at Oglethorpe, obtained very suggestive results during the influenza epidemic by spraying all the hospital staff with dichloramin-T and by enforcing the universal use of a substantial gauze mask. It was very significant that those of the personnel in his hospital who contracted influenza, and 2 did and died, either refused treatment with the spray or contracted the influenza before the routine use of the spray and the mask was instituted. Dudham, the man who freed Bar Harbor of flies and who headed the empyema commission, further added to his fame by devising a gang spray for use with troops. He demonstrated that 1000 men could be sprayed in an hour and that spraying with dichloramine-T markedly reduced the bacterial flora of the nose and throat. The armistice put an end to his work. It seems a heartless thing to say, but from the medical standpoint the war came to an end too soon.

There is something uncanny about the way certain bacteria remain for a time harmless and then suddenly acquire an astonishing virulence. We now appreciate that overcrowding, fatigue, and chilling of the human body are important factors in bringing about this result; further than this the process is a mystery. When it is solved preventive medicine will take a great leap forward.

Immunity. I feel strongly that locked up in this problem is the problem of immunity. As immunity is better understood our infectious hospitals will need fewer and fewer beds and acute respiratory infections will no longer pay the rent of the general practitioner. Diphtheria and typhoid were conquered before the war, scarlet fever and measles have bowed their heads since. We have now the Schick and the Dick tests. It is possible to produce a special immunity. Is not this special immunity broader than we think it is? Cowpox is not smallpox, yet it protects from smallpox. It should be the aim of workers in this field to produce an immunity to the whole evil brood of streptococci. I feel that medicine is on the verge of accomplishing this. Workers should have the broader view in mind when working in any special field. Within common-sense limits the degree of general immunity possessed by a soldier is of more importance for his welfare and efficiency than outward

robustness. This is where the city recruit outshone the farmer boy of rosy cheeks and stalwart frame. The city recruit had had most of the common ills and was immune to the rest. The farmer boy had had few or none and was susceptible to all. How to get the recruit broadly immune is the first big problem of the Medical Corps of the Army. How to measure immunity and how to keep it come next. The blood has a long memory.

THE INFLUENZA EPIDEMIC. The influenza epidemic, which reached the proportions of a plague or as near a plague as this generation of physicians has ever seen, spent its virulence upon the lungs.

The following account of the epidemic from the otolaryngological point of view is from Shambaugh and duplicates the reports sent in from most of the base hospitals:

"About September 21, 1928, an epidemic (influenza) broke out in Camp Grant. The number of patients in the hospital increased from normal 500 to 3600, with a daily admission rate running up to 800. The consultation work of this department was enormous. There were over 600 cases observed with otitis media acuta suppurativa. In most cases there was a spontaneous rupture of the membrana tympani within a few hours of the onset of ear symptoms. The discharge, as a rule, appeared thick and purulent from onset, and did not have the initial stage of serosanguineous discharge so frequently met with in the ordinary case of acute otitis media. Many of these cases were complicated by a diffuse otitis externa and very few showed any mastoid reaction. Most of the cases recovered rapidly, that is, in about a week.

"There were, relatively, a small number of cases which showed distinct symptoms of acute sinusitis. Most of the sinus cases proceeded to spontaneous recovery. It seems probable that not a few cases of acute sinus infection passed undiagnosed. Not a single case of sinus trouble required operation."

The initial epistaxis was a striking feature. Green found that it almost always came from a single vessel located at the customary bleeding point, the mucous membrane over the anterior-inferior part of the quadrangular cartilage, but Buff believed that it came from the turbinates.

Emerson had the distinction of being made commanding officer

of a special influenza hospital of 1500 beds at Camp Lee, and made a striking success of it.

Eagleton experimented with suction for removing the secretion from the trachea of pneumonia patients just after death, his idea being to use it in the living if he obtained results. He found that the secretion was too thick to respond to suction.

The tragedy of the epidemic still awaits a full description. Patients were struck down with the suddenness of lightning. To say that the morgues of the hospitals were overflowing with dead sounds commonplace. It was, however, literally true. In the camps military funerals were taking place all day long and the hospital flag stayed at half-mast throughout the epidemic. At the railroad stations the coffins which were being slowly wheeled along or lay about waiting for a place in the baggage cars kept the scourge before the eyes of every traveler.

I remember the impression which the blue patients made on me as I went about the crowded wards at Oglethorpe. The virulence of the disease struck me like a blow when the medical officer who accompanied me said, "This man will be dead tomorrow, that one the day after," and none of the patients seemed to me so desperately ill. The fathers and mothers, the wives and brothers and sisters sitting by the bedsides, singly or in groups, added to the tragedy and to the general hopelessness.

Only a few doctors died, but enough to show that they were not immune. At least two wives of doctors, who either lived in the camp with their husbands or came to visit, were victims. One very sad case of this kind occurred at Oglethorpe. The wife of the pathologist died. After talking it over with his commanding officer he decided to remain at his post and carry on his work in the autopsy room, assembling material for scientific purposes while it was still available. On the day of his wife's funeral one of the visiting physicians happened to be in the morgue at noon and found him crowded with work. The physician asked if he could be of any help. The answer was: "It would help if you could stay a little while. At this hour in New York my wife is being buried." That was lonely devotion to duty which words of mine cannot adequately appraise.

THE LOW MEDICAL STANDARD. A few years before the war our medical schools were rated; during it the whole medical profession of the country for the first time had its measure taken. The result awakened the most complacent among us. The training of the average medical man was found to be very meager. It was a painful surprise to discover that a good many medical officers were using this war as an opportunity to take postgraduate courses or to break into a specialty. Self-styled specialists seemed to spring from the ground everywhere. The facts which have just been stated show the great usefulness of a school like that at Oglethorpe. Without it, it was impossible to rate many men. Lieutenant Colonel deSchweinitz, when he was establishing the Section of Ophthalmology at Oglethorpe, once said to a candidate, in righteous exasperation: "Sir, by what process of effrontery did you arrive at the conclusion that you were a qualified specialist?" Oglethorpe was designed to protect the soldier of the war from such conscienceless individuals.

TEACHING. The Section of Ophthalmology and Otolaryngology did not feel that specialists could be manufactured during the war. However, they used various base hospitals for instructing men who already had some knowledge of their specialties and for rating these men. Sherman, Dix and, while Major Todd was alive, Camp Dodge were so used. Then the Officers' Training Camp at Oglethorpe came into flower. The two specialties are proud of the men they had at Oglethorpe. It was here that Harris shone, and not by reflected light either. Hill was a close second. Before the teaching and rating were concentrated at Oglethorpe it was very convenient to have the teaching centers at the base hospitals mentioned above, because it was soon found that if medical officers who were specialists were sent to the various Officers' Training Camps they often did not return to the fold. They seemed to prove unusually good material for instructors. This we tried to look at as a compliment to our men.

The low standard of attainment of many specialists sent for rating to Oglethorpe was first published by the Division of Surgery of the Head. Consequently the otolaryngologists were soon cited as a horrible example. As a matter of fact the indictment applied

equally well to all the other special branches of medicine and to the level of medical attainment as a whole. In discussing this matter it became the popular game to hide under the skirts of otolaryngology. What I have just said is scant treatment of Oglethorpe. I hope, however, that I have said enough to make you feel as I do that it was one of the great medical achievements of the war. The knowledge which came out there had far-reaching effects, in fact it is one of the few medical happenings of the war the influence of which is still felt today. In my opinion Oglethorpe made the American Board of Otolaryngology possible. Before the war there had been a committee from the various special societies whose business it was to formulate an approved plan for the education of the otolaryngologist. The committee languished for some four or five years. I was a member; this made no difference. A few years after the war and almost overnight the American Board, fathered by Shambaugh, was born. It is now in its fifth year and no longer has to bend the knee to any one. As I look back, and much of this paper is looking backward, the American Board would have been a God-send had its list of qualified specialists been available when war was declared. In event of another war this Board should be drafted as a body and set at work at once rating specialists and weeding out the self-styled specialist. The medical officers of the peace-time army who are responsible for the work in otolaryngology in our postwar hospitals, especially in those connected with the Veterans' Bureau, should be certified men. I know of some sad instances where they are not. Oglethorpe is perpetuated in the American Board.

As I see the end of this review approaching I cannot refrain from quoting a little from the two war articles mentioned at the beginning of this paper, hoping to bring back a little of the old-time glow. In this war we all lived deeply. In a paragraph with the heading "Fitting into the Service" the following occurs: The men of the better class come in with a glow of patriotism, thankful that for them the decision is over and the change to army life accomplished. They ask nothing about rank, nothing about where they are to go. Their one idea is to be of service, and in the service. They are happy to be a part of the great military machine whose purpose so thrills them. They receive their assignment to duty,

and nothing is heard from them during the few months in which they are fitting into the new life. Two things usually happen after this: the work slackens and they at times have little to do, and they notice that men of less clinical experience and lower hospital or school position at home have higher rank than their own. The glow of enthusiasm with which they entered the service has become somewhat dim, and their medical work is now a matter of daily routine. This is the critical stage in a medical officer's army career. All have to pass through it and most of men do so successfully. A few, however, remain in the state of mind which goes with this stage and from now on are really unfit for military service. Those that are pushing write letters asking for a change of service or for a change in rank. The others keep what enthusiasm they can and work on, waiting for the war to be over.

Sitting round at a Base Hospital as a member of an overseas unit and waiting for overseas orders, tried the souls of many men. Few developed hidden resources after the fashion of Skillern, who surprised himself and everybody else by organizing and running an orchestra, which from his account must have rivalled the Boston Symphony or the Philadelphia Philharmonic.

THE MILITARY POINT OF VIEW. The efficiency and the happiness of a medical officer in the army depend upon the quickness and thoroughness with which he acquires the military point of view. The end and aim of military medicine is to keep a soldier well or to get him quickly well and quickly to the front. The ideal military hospital which deals with recruits should have few, if any, patients and these patients should stay but a short time. This means, as a rule, that operations of choice are not encouraged and that, in this country at least, a very bare operative menu is set before the surgeon. This of course is as it should be, but it takes the civilian medical man a little time to acquire the new point of view, and until he does he is continually running counter to the military machine. I should have more sympathy for a medical officer with his restricted operative list were it not for the fact that, if he is not busy operating, he can engage in the problems of preventive medicine, of bacteriology or of sanitation, or can turn to the ever-increasing administrative problems and learn how to deal with them.

I find another paragraph with the heading "What Will We Carry Back to Civil Life?" In this I attempted prophecy. It reads:

"Never before have thousands of medical men entered on a completely ordered life and a life with a single ideal. Such is the life which we who are in the Army now lead. Not since medical school days have we lived the whole day through for medicine alone. The old happy days of internship have come back. We live in the hospital again, we mess with our fellows, we work and play together—and there are no bills to get ready at the end of the month. When we learn how to make out our pay vouchers correctly a regular stipend awaits us on the first of the month. We have learned to write letters with the subject at the top so that those who receive them know at least what we started to write about. We have learned the value of words because we have been held responsible for them, and we have learned how to say "yes" and "no" without circumlocution. We find many of the polite conventions of speech or writing dispensed with, but our feelings are no longer hurt. We have learned to avoid the unessential and the trivial. We have become familiar with some of the fundamentals of civil law and how to give every man a fair trial. Some of us have learned how to buy, to sell, to look ahead and to provide. Our army camps are units of modern civilization in miniature; no one can isolate himself from their activities, but must play his part. This ordered and full life cannot but make better physicians and better medicine itself. Think what army discipline will do for our civil hospitals when we get back, that is, if we have our way. There will be a respect for authority that there never has been before. As I see it, this war should prove the greatest tonic that the practice of medicine has had in our day." I saw wrong.

SPECIAL HOSPITALS. The Division of Surgery of the Head established two special hospitals, the first at Cape May in this country and the second at Vichy, France. No. 115, as the hospital at Vichy was familiarly known to us in the Surgeon-General's Office, could not function at first as a special hospital as the Château-Thierry drive filled its beds, as well as those of all the other American hospitals, with general surgical cases.

Base Hospital No. 36, recruited and outfitted by the Detroit College of Medicine and Surgery under the supervision of Shurley

and commanded by him, was the first Unit of the 1000-bed type to be dispatched overseas. It became established at Vittel during the fall of 1917. It shares with the special head hospital at Vichy the distinction of having cared for the largest amount of head surgery.

Speaking of specialists turning to and doing general surgery, reminds me of the following story which drifted back to the States: An ophthalmologist of No. 115, who had been swamped like everybody else with fracture dressings, said to a friend higher up, "Can you not send me something besides legs? I don't know anything about them and never look at them except in society."

Before No. 115 was demobilized the section of maxillo-facial surgery was the busiest of all the sections at its special work. In four months ending January 18, 1919, 305 cases had been treated. It was a great disappointment to all concerned that the special equipment which was planned for this hospital never reached it. On paper it was something to be proud of.

Major Pierce was in charge of otolaryngology. Later he was made Surgical Chief for the District and made a good one. I was always proud of the way Pierce played his part in the war game. I still feel that he was treated rather shabbily about his orders home.

Speaking of special hospitals, the Face and Jaw Hospital at Sidcup, England, surpassed anything I saw during the war.

CAPE MAY. Cape May was the special hospital in this country. Its capacity was 700 beds. The number of cases booked to return to it from overseas was roughly as follows: peripheral nerves, 500; maxillo-facial, 300; blind, 250 to 300; ear, 300 to 500; cases for instruction and lip-reading, 100.

Major C. H. Frazier was the star acquisition at Cape May. He, of course, was in charge of brain and nerve surgery. Then came Ingersoll and Berry.

The lip-reading school was an impressive and most important part of the hospital. The devotion of the teachers merited the fullest praise. Col. Richardson was the mainspring of this department. After a day of official visiting at Cape May I came away very proud of it.

MAXILLO-FACIAL SURGERY. The dental surgeons had the opportunity of a life-time in the war and made good use of it. They worked mostly in conjunction with the maxillo-facial surgeons. The latter made the greatest advances of any group of surgeons associated with the war, their greatest advance being in the treatment of fractures of the jaws. In the use of bone and cartilage transplants and of tubular skin flaps they also made striking advances. The knowledge and experience which they gained they have been able to turn to good use in civilian life, thanks to the automobile.

SUMMARY. In the beginning the Section of Otolaryngology was the busiest of all the surgical specialties. It always remained moderately active, but the Section of Plastic and Oral Surgery, now called maxillo-facial surgery, and the Section of Neurological Surgery, later received from overseas more of their special cases than the Section of Otolaryngology. The Section of Neurological Surgery received by far the most cases, the majority of them being injuries of the peripheral nerves.

In the United States, the two great medical problems of the war were the control of sputum-borne diseases and the detection and cure of the carrier. The bacteria responsible for sputum-borne diseases gain their entrance to the body, in most instances, through the tonsils or the accessory sinuses. Experience showed that the best method of curing a carrier was to remove the tonsils and the adenoid. The war showed also the supreme importance of accepting in the army only recruits who have a normal nose and throat.

The war showed further the importance not only of discovering carriers, but of segregating contacts. It brought out the significant fact that the hospital personnel often act as carriers. In dealing with air or sputum-borne diseases the great value of isolation and the use of substantial gauze masks was proved. The probable efficiency of the routine spraying of the nose and throat with dichloramine-T was shown. The opinion finally prevailed that every recruit and every hospital patient should be looked upon as a possible carrier.

In the United States the dominant bacteria during the War were the pneumococcus and the *Streptococcus hemolyticus*, the latter being by far the more important. The following fact became more

and more evident, namely, that assembling men in barracks, especially exposing them to cold, and drilling them to the point of over-fatigue had the power to change harmless bacteria into virulent strains.

In head surgery America's greatest contribution was in the surgery of the jaw. Bridge splinting, the use of bone-grafts, the implantation of cartilage to give form to plastic flaps, and the use of the skin-graft folded over a plate of modeling compound greatly advanced maxillo-facial surgery.

The fact that so many tonsillectomies were performed with so few deaths from any cause, and only 1 death from tonsillar hemorrhage, spoke well for the skill of the operators and the type of operation employed. The striking number of peritonsillar abscesses would seem to show that even a larger number of tonsillectomies could have been performed with advantage.

The influenza epidemic was a dramatic and deadly scourge, but the complications produced in the line of otolaryngology were not serious. It emphasized the fact, however, that a normal nose and throat is a great protection.

The otolaryngologists faithfully and enthusiastically used their specialty for the prevention of disease as well as its alleviation. Their first aim was preventive surgery, and they largely realized it.

In looking backward over our war experience things are seen which could have been done better. The following are some of them. Recording them may help another time, if there ever is another time:

The draft examination should have been more thorough. Too many cases of chronic running ears were overlooked.

There could have been closer coöperation between the camp and the base hospital. There was no provision for an automatic interchange of special personnel.

Special instruments and supplies were late in getting to the hospitals.

Instruments, medical supplies and literature were late in getting overseas.

The hospitals at the port of embarkation should be thoroughly equipped and staffed. Soldiers destined for overseas often arrived at the port of embarkation seriously ill.

In the United States the power to act as consultant should have been given to the chiefs of the sections earlier.

Each medical and surgical section should have a medical officer to act regularly as courier between the home base and the base of operations.

Allow me in closing a few reflections:

The army is self-sufficient only in peace time. In war it functions only through the help of the civilian. The professional army man often forgets this or is irritated by it. At times he has an inferiority complex on this point.

The civilian medical man must get the army viewpoint before he can be of full use.

The Division of Surgery of the Head functioned most fully in this country. Its best work was in preparing the men for overseas and then in receiving them back for its special forms of surgery.

The specialty business can easily be overdone, especially near the front where general traumatic surgery must play the big part.

The two sections of the Division of Surgery of the Head which were of most value at the front were maxillo-facial surgery and ophthalmology.

Air- and sputum-borne diseases were the outstanding medical problem of the war, and the problem remains today unsolved.

When it is discovered how to produce a general instead of a specialized immunity, preventive medicine (and army medicine should be chiefly preventive), will make one of its greatest advances.

When I left the army I felt that my advice and that of my confrères might on occasion be of use in peace time. I joined the Medical Reserve Corps. I confess that I have not been faithful to its duties. Nevertheless, I could have answered a question now and then had it been asked. I am curious to learn what has been the experience of the other senior men who are in this audience.

Finally, I recommend the use of the facilities of the American Board of Otolaryngology to the peace-time Medical Corps of the Army. I have more than a suspicion that its services are needed.

DISCUSSION

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

I should like to say that Colonel Mosher is much too modest. He has omitted one of the memorable meetings that was held here in Washington, when the American Laryngological Society appointed a committee of three, who spent an evening session here with the representative of the Surgeon-General of the Army, Major Noble, and the representative of the Surgeon-General of the Navy. At that meeting, Dr. Mosher contributed to the establishment that unknown creation in the Army and Navy, the specialist. This came directly from the American Laryngological Association. Dr. Richardson was the chairman of the committee.

DENTAL CARIES IN PARANASAL SINUS INFECTIONS

GORDON BERRY, M.D.

ABLE and careful authorities have taught us that 20 per cent of maxillary sinus infections were of dental origin. Since then our *x*-ray apparatus has been much perfected; the World War has come and gone, where medical units were established with team work between dentist, oral surgeon, roentgenologist and rhinologist; modern medicine has entered upon what might be termed a prophylactic era and among other efforts there has been a concerted drive against so-called infected foci; the internist, the obstetrician, the urologist and the surgeon have joined us in the hue and cry against our innocent grinders. The writer too has partaken of this mob psychology, for he is proposing to the members of the American Laryngological Association that 60 to 80 per cent, rather than 20 per cent, would be a more accurate estimate for dental complications in maxillary sinus infections.

I have been impressed with the frequency of dead or abscessed teeth in patients with paranasal sinus infections, and I have had it rather forcibly demonstrated that a dentist can step in and remove a tooth for quite other reasons, and my patient proceed to get well. A study of the relation of the teeth to the maxillary sinuses both in the anatomical specimen and in the *x*-ray film, and a review of my routine private records back to the arbitrary date of January 1, 1926, in an attempt to find all the cases with a diagnosis of some form of sinus trouble, are the basis of this report. Many can show a more impressive series than the 152 cases thus found, but I hope these can give us tentative conclusions which will serve as a basis for argument and stimulate further investigation.

ANATOMY AND PATHOLOGY. Through Dr. Mosher's courtesy I have had access to the anatomical specimens in the Harvard laboratories. First, we notice that there are two main classifications in the maxillary sinus specimens, those with small cavities and thick floors, and those with large cavities and thin floors, the latter group being much the greater. In the specimens where

the teeth are still present, we find the roots of these teeth at some distance from the cavity in the small antrum type, while the dental roots mount up into or straddle the floor of the large antrum type. Where the teeth have been lost sufficiently long before death, the alveolar process is atrophied and the bony floor of the antrum may be as thin as $\frac{1}{16}$ inch. In some specimens a small tooth root remains which shows immediately beneath the antral floor. In the large type maxillary sinus we discover two general shapes: the triangular, and the square or quadrilateral. The triangular usually dips its lowest in the second and third molar regions, while the square type with its partitions has a fairly horizontal floor which extends forward to near the root of the first bicuspid and at times to the cuspid. Any dental *x*-ray film which is taken high enough to show the floor of the antrum will demonstrate this relationship. Another interesting point is the arrangement of the roots of these particular teeth. The canine or cuspid shows one root, extending high. The first bicuspid usually has two roots, somewhat spread, while the second bicuspid usually shows but one. The third molar's roots are frequently united, while the first and second molars show three spreading roots which straddle the floor of the large type antrum, two roots being on the buccal side and one on the palatal. *X*-ray films of such roots will show differing relations to this antral floor, depending upon the angle of taking. The usual film shows the palatal root reaching high beyond the antral floor and the two fore-shortened buccal roots appear below in what might be called the foreground. One other observation in these relationships is very relevant. In a typical film of a dental abscess the infection has progressed through the dental canal and seeping out through its apex has gradually eaten away sufficient bony tissue to show this rarefaction in the film. Failing to find such a budding or saccular dark area in the film, a negative report may be made. In the region we are considering, however, if the root reaches nearly to the antrum, by its very nature there is little or no bony absorption before the infection reaches the antrum itself. With the establishment of a bony fistula into the antrum, there is little or no more bony destruction and the film of this region does not show the typical abscess formation the reader of the film is seeking. We are told that the dental *x*-ray findings are negative; that chapter in our investiga-

tions seems closed. It is my observation that it is this type of case which we have been missing and I am respectfully submitting for your consideration the crux of my whole argument: that a dead tooth which in the film reaches or extends near to the floor of an antrum is an active menace which must be carefully watched and seriously considered. The trouble will often not be apparent in the dental film. This infection may be escaping slowly but surely into the antrum, and thence, if the ostium is free, into the middle meatus of the nose, or by an accessory ostium behind the middle turbinate into the posterior nares. Such infection may apparently do no more harm than a dental cavity that is feeding its infection into the mouth. But it is my conviction that we may look to this source for a considerable portion of those nasal difficulties which we have included under such inclusive terms as chronic rhinitis, nasal polypi, chronic anterior ethmoiditis, and some vasomotor forms. The rhinologist thus becomes better able to determine whether this suspicious tooth is doing harm than the dentist. This general position impresses me as having both a logical and an anatomical basis. A reference to a quite general experience in tonsil surgery will argue as to its logic. It is not infrequent that a post-tonsillectomy case will remark on his freer breathing though nothing was done to his nose or nasopharynx; we can sometimes stop a recurring otorrhea of long standing which would not yield to local treatment, simply by the removal of infected tonsils. It is fair to presume that this relief in turbinal or Eustachian-tube congestion was obtained by the removal of the chronic tonsillar infection. If the above anatomical observations are accepted, an infected root of an upper back tooth may be in closer relationship to the nose than were these tonsils. Some have perhaps had the personal experience of an increasing nasal or antral trouble when a large tooth cavity was filled, and of an improvement in these symptoms when the filling worked loose and fell out. I think of this filling as a plug which directs the dental canal drainage back up through the antrum. The only exit is, then, through the nose or by the antral lymphatics.

TECHNIQUE EMPLOYED. These 152 cases were not examined with especial reference to this investigation but received a routine examination such as is probably quite generally employed, with

this possible important exception that I had secured a transilluminator such as dentists have for lighting up alveolar processes and was using this as a part of my routine throughout this series. By increasing the current, the same lamp has proved the best transilluminator for parnasal sinus shadows that I have found. This light rarely fails to find what the sinus *x*-ray will later show (it does not of course help with the posterior sinuses) and it is surprising how surely and accurately it will pick out the dead or devitalized teeth. I can with comparative safety tell the patient which teeth to have *x*-rayed and which are beyond suspicion. Where the root reaches the floor of the antrum or where the reading is in doubt and the peridental lamina line is not clear, an electric vitality test gives further evidence. It has been proven in my experience that two tooth roots may be alive and the third one dead, so that the tooth is reported alive and yet the third root shows an abscess on the end at the time of its extraction. But usually such a tooth will show a diminished vitality in the test and indicate a dying condition.

ILLUSTRATIVE CASES. In order to review this series, let us study the general types encountered. The first type selected is the common cold.

Mr. F. E. B., aged sixty-six years, lives on his dry, healthy, moderately elevated country estate in northern Connecticut. He consulted me last fall for a chronic pharyngitis. There had been no tooth pain or trouble and he was in the habit of seeing his dentist regularly. In the course of the examination, I discovered a shadow over each upper second bicuspid, both left and right. Further examination by several dentists corroborated my suspicion that these two teeth, which reached each antral floor, were dead and abscessed. He had them removed. A few weeks ago he came to the office to volunteer the information that circumstance had made him spend the winter in Boston where he supposed the damp raw climate would aggravate his usual troublesome winter colds. To his surprise he went through this experience without any cold whatsoever and he felt that the removal of these teeth was directly responsible.

My conclusion is that the infection from these teeth gradually worked up from the antra into the nose and furnished the basis

for his colds. We may object to considering this a case of sinus infection, but it may surely be called the initial stage.

The next type is a step in advance of the previous type. We have chronic colds with recurring acute exacerbations in which the same antrum always becomes involved and there may or may not be an anatomical narrowing of the middle meatus which could impede drainage.

Mrs. L. B. H., aged thirty-three years, a laryngologist's wife, had been under his observation for such a trouble. I found an acute exacerbation of a suppurative right antrum, and an abscessed upper right second bicuspid. The tooth was removed. There was no fistula up into the antrum. Because of the frank thick pus with accompanying pain and at the doctor's request, I irrigated this case twice through the inferior meatal wall. For over a year, there has been no trouble and the doctor husband ascribes it to the removal of this tooth.

A similar case was that of Mrs. J. E. McK., aged thirty-five years, who had had minor rumbling antral pains from time to time with finally an acute exacerbation brought on during the exposure of a rather long automobile ride. Both antra showed an acute suppurative process. The upper right second bicuspid and upper left first molar, which were giving no discomfort, were found to be abscessed and were removed. Shrinking nasal sprays gave adequate drainage. She returned two years later to tell me there had been no recurrence.

Mrs. M. D., aged thirty-two years, gives a longer story. Clinically the antral pains were mild and recurred with her colds. Even when she was free, I could often detect a little congestion or even a little thin pus, in the right middle meatus after shrinking back the tissues. There was an accompanying sense of prostration which much concerned her as she was an active, busy, healthy mother. The upper right first molar and the lower right second bicuspid were dark on transillumination. One of our cleverest local dentists had treated and completely filled the canals as shown in the x-ray. As no abscess showed and there was no pain, the dentist advised against extraction. Finally, under my urging, the upper right first molar was removed. The nose and antrum cleared. Later the tired condition and a sciatic rheumatism returned, following a tonsil flare-up. A tonsillectomy was done. Her general condition bettered but did not quite clear. I insisted on the removal of the dead but apparently negative lower bicuspid. The rheumatism and tired feeling left, not to return.

Here were three different septic foci. The antrum cleared with the extraction of the dead tooth in its floor; the general trouble did not finally clear until the other foci were taken care of.

The next case shows a yet more advanced stage.

Mrs. L. O. McG. was also a doctor's wife. Her trouble began eight years previously with a history of nasal polypi and increasing sinus pains. One of our best men, a professor in a leading medical school, did a bilateral radical ethmoid and sphenoid exenteration by the external route. Six months later he did a radical left antrum operation. She then moved to another medical center where a specialist in such therapy administered vaccines for an asthmatic condition which was becoming increasingly serious. Finally she went to Italy in search of a better climate, and spent two years in comparative comfort. Returning to this country, she began to get worse again. She chanced to be residing in Worcester at the time and her husband asked for some suggestion that might help. The asthma was becoming severe and he was administering adrenalin subcutaneously for her relief. Transillumination and x-rays showed the sinuses all cloudy. The operative work was well done but granulation tissue had sprung up as would be expected. I was skeptical about any permanent gain from a secondary operation. The husband not only gave me this careful history but added that the teeth had been x-rayed and examined and that he knew them to be in good shape. The transilluminator gave a shadow over the upper right and the upper left first molar areas, just the regions I wanted to find trouble in. I insisted on her consulting Dr. Frank Dean whose courtesy permits me to show the lantern slides of the teeth we are discussing. He became convinced that the upper right second bicuspid and first molar and the upper left second bicuspid, not the molar, were dead and abscessed. We recommended their removal. I did no operating and have not seen her since. I have however heard from her husband. The teeth were removed and conditions began promptly to mend. A year later she was able to live on the Atlantic sea-board in comfort and I understand there has been no recurrence.

One more case, again a doctor's wife, will complete this type.

Mrs. B. McC., aged fifty-two years, had a dark right antrum and pus was escaping from her right middle meatus. She said her teeth were all out. I requested her to remove her dental plate and under it was a small sinus, leading to what proved to be a tooth root remnant of the

upper first molar. Her dentist removed this sequestrum and with only an occasional cleansing spray for home treatment, she returned a month later with the nose free of pus, the congestion about the middle turbinate gone, the gums healing and the antrum shadow much less.

The next type is the classical one of an acute or chronic alveolar fistula into the antrum, the result of a tooth extraction. In some, no antrum trouble had been suspected until the dentist obtained foul pus through the broken antral floor. Some claim that this is a superimposed infection from the mouth but I have seen these fistulas clear and close without treatment other than occasional cleansing by the patient himself, provided the surrounding necrosis is removed or any other possible offending tooth gotten rid of. The first operative approach to the antrum was by this avenue. I am beginning to doubt the dangers from the entrance of food infections, and am wondering whether in selected cases where the dental origin is certain, this should not be the chosen approach. Detailed reference to this type is not necessary for they are so frequent.

It may be fitting however to cite the case of Miss J. (not in this series) who had been referred to me by an ophthalmologist for the removal of some nasal polypi. This was done two or three times. They recurred. I did not see her for several years until a dentist sent her to me after he had removed a bad tooth and with it so much of the antral floor that she could almost put her finger up through. I was at first very solicitous to keep it clean, but soon noticed that it drained itself. I also discovered that the nasal granulations about the middle turbinate which had kept recurring were shrivelling and going without any help from me. I gave her the choice between a plastic flap operation to close this alveolar gap, and a postponement to see how things turned out. She was a high school teacher, intelligent and careful. She elected the waiting policy and in about six months the wound bridged across with very little help from me. The nose and the antrum have cleared and give no more trouble, all because of that tooth extraction which I should have advised but did not.

I wish to refer to one more general type: that of the cases of chronic antrum trouble where lesser measures fail, where diseased teeth may be found and be removed without relief, or where diseased teeth may have been present and have been removed years

before we see the case. I picture these, in the light of these experiences, as cases that started with a dental infection which caused bony necrosis in the floor of the antrum, which was not removed with the extracted tooth. I have done two radical antrum operations lately, Mr. E. S. and Miss A. P., with this point in mind. Each had had diseased teeth removed long since, which could have infected the antral floor. Working from above, I found the polypoid tissue and granulations most abundant in that part of the cavity just above the areas where the teeth had been removed. As we think back over our radical antrum operations, I think we will recall an excess of granulation tissue attached to the floor in most of the cases. We have cured such perhaps without extracting any teeth. Possibly the teeth had been already extracted; or possibly they continue to give trouble in a little chronic seepage which drains right out because of the large permanent opening. I venture to assert that as we perfect our technique there will not be as many radical antrotomies done, and those that are done will give less postoperative trouble.

SUMMARY OF CASES. With these illustrations of the more frequent types we encounter, I wish to give a brief summary of the 152 cases. I have divided them into four main groups of acute and of chronic maxillary sinusitis, of chronic ethmoiditis, and of nasal polypi, where these complications seemed to be the more outstanding feature. I have tried to interpret my findings in terms of a possible dental cause. My four headings are: (1) "no dental cause" found. (2) A "possible" dental cause by reason of the history of an extracted diseased tooth or the presence of a tooth just under the involved antrum that gave a shadow on transillumination or was known to be dead. Many of these cases were seen but once or twice. They were sent to their dentists and lost track of. The "possible" group could be pushed up into the "probable" group in many instances, were more known of them. (3) The "probable" group is where an abscessed tooth was known to reach the floor of the diseased antrum, or the removal of this tooth and the tonsils is known to have cleared the trouble. (4) The "proven" group includes those cases where recovery followed directly on the extraction of a known dead or abscessed tooth.

RELATION BETWEEN DENTAL CARIES AND PARANASAL SINUS INFECTIONS
SERIES OF 152 CASES

Of dental origin.	None.	Possible.	Probable.	Proven.	Total.
Acute maxillary	4	17	8	1	30
Chronic maxillary	6	32	28	23	89
Chronic ethmoidal	2	6	2	2	12
Nasal polypi	4	8	9	0	21
	—	—	—	—	—
Total	16	63	47	26	152

There were 12 cases showing an alveolar fistula into the antrum. Eleven of these had chronic antrum trouble which cleared and are listed in the proven cases. The twelfth was in an apparently healthy antrum and is therefore not listed.

One of the above ethmoidal cases cleared after an abscessed central and lateral tooth on that side was removed. Several cases of anterior rhinitis cleared by a similar removal of anterior diseased teeth. These are not listed in the series.

All the other cases concern only the upper bicuspids and molars with rarely an involved cuspid.

For an easier estimate, the above table is reduced to terms of percentage with fractions omitted.

RELATION BETWEEN DENTAL CARIES AND PARANASAL SINUS INFECTIONS
152 CASES SHOWING PERCENTAGES

Of dental origin.	None.	Possible.	Probable.	Proven.	Total.
Acute maxillary	3	11	5	1	20
Chronic maxillary	4	21	18	16	59
Chronic etimoidal	1	4	1	1	7
Nasal polypi	3	5	6	0	14
	—	—	—	—	—
Total	11	41	30	18	100

DISCUSSION OF SUMMARY. It is interesting to discover that my "proven" list closely approximates the 20 per cent figure we started out with. To this I think we can add our "probable" group. This makes a 48 per cent result. But if we could investigate our cases more in detail and watch them through their dental history, I venture to assert that we will find most of our "possible" cases as having a nasal and paranasal disturbance with some con-

tributing dental cause. Only 11 per cent of this series showed no possible dental source that I could find. Proof in every case is difficult or impossible. Many a patient prefers an occasional antrum flare-up to the loss of a dead serviceable first molar. In the light of my experience I feel that we may venture 60 to 80 per cent instead of 20 per cent as a conservative estimate for the incidence of dental infections complicating our adult sinus cases.

CONCLUSIONS. Though we find sinus infections in the young, they are much more frequent in adult life and in its prime. This is not a period when the anatomical nose is growing or changing and thus impeding sinus drainage, unless external traumatism be superimposed; the tonsils are offending no more or but little more than in adolescence; senile infirmity has not yet come; hay fever and asthmatic sensitiveness should not have changed; the patient is usually in fairly rugged health. These factors alone do not adequately explain the higher incidence of sinus infections. On the other hand, the teeth are decaying during this period. They are anatomically in close proximity. Advancing dental caries sooner or later does reach the pulp chamber and the easiest path for an infection caught under the filling or crown is up through the dental canal to just beneath the antral floor. We have relied on the x-ray film to show us a dental abscess. My contention is that the relatively prompt discharge of this infection into the antrum stops the bony resorption we look for in the film; and that in this type of case, unless new methods for diagnosis become available, it is the rhinologist, working with the dentist and roentgenologist, who will determine whether harm is resulting.

A dead or dying tooth in close proximity to the antral floor, no matter how harmless appearing, is a threat. Recurring antrum pains on this side, an occasional seepage of pus from the middle meatus, small polypi in this region, even a chronic unilateral nasal congestion otherwise unexplained, should attract attention to the teeth or to a possible buried root. The finding and removal of such a near-by septic focus will clear many a stubborn nasal and paranasal trouble. This is a reasonable claim and has the support of experience.

DISCUSSION

DR. FRANK R. SPENCER, Boulder, Colo.:

I should like to ask Dr. Berry how he proceeds with this transilluminator.

DR. LEON E. WHITE, Boston, Mass.:

I have been following teeth for some time, inasmuch as they frequently cause disturbances of vision in optic-nerve cases, and I have found that devitalized teeth, not necessarily abscessed teeth, are a more common source of infection than real abscessed teeth.

Dr. Leroy Miner, who has seen many of these cases for me, tells me that when an abscess forms it frequently means that the process is walled off. When an abscess does not form and yet infection takes place, it immediately gets into the system, and he considers every tooth which is a potential source of infection should be removed.

He also speaks of the possibility of infection from heavily filled but vital teeth. In looking over any patient who comes to me, where I suspect dental infection, I examine carefully the fillings in the teeth. If I see a molar that is heavily filled I consider it a menace. If I see a crowned tooth, I consider it also is a menace, so that I am having the teeth studied more and more and this has to be done by an expert in dental pathology.

I noticed Dr. Berry said that he sent his patients to their dentists to have their teeth looked after. In my work I have found this a rather poor method of procedure. The dentist spends so much time on filling teeth and working on them that he hates to advise extraction. I think you must be radical and send your patients to an expert who is willing to take the teeth out if they need to come out.

DR. THOMAS E. CARMODY, Denver, Colo.:

I have been interested in this line for a good many years because of my training and I want to thank Dr. Berry for bringing the subject to us. I agree with him in a great many points and disagree with him in some.

As to the age of his patients, if you will notice, it is somewhere around middle life, when not only abscessed teeth must be taken into consideration but pyorrhetic teeth. As a prominent advertisement in the lay press says, "Four out of five have it." So we must remember that there is possible infection from pyorrhetic teeth also.

Another thing that comes into this is Girdle's work of some years

ago showing that we have three systems of arterial supply of the superior maxillary bone, and we can see how infection may go from the surface of the mucous membrane into the mucous membrane in the maxillary sinus, so that we may have infection even without dead teeth. Nevertheless, that does not nullify what he has said.

I have been using the transillumination that Dr. Berry has spoken of for some time and I find that it is very important in calling my attention to the fact that we may have a darkened area around the roots of some of the teeth, and then we send them to the *x-ray* specialist. Do not send them to the general *x-ray* man, because he does not know the angles at which to take your teeth. The dental *x-ray* specialist knows the angles at which to get them, because he knows the angles at which the roots come off the teeth, and he will give you very much better service than the general *x-ray* diagnostician.

Dr. Berry speaks of the fact that there is no discomfort. Very frequently there is no discomfort from the teeth at all, even though they are dead and have been dead for a number of years, but they may be throwing infection into the system, if not directly into the maxillary

Dr. Berry spoke of one case of a lateral incisor, which he excludes. He need not exclude that in some cases, because I had a case some years ago in which a central incisor went directly into the maxillary sinus, the sinus having passed under the nose, as you know from some of your anatomical slides that it sometimes does.

Dr. Berry said that the dead tooth is a threat. Any dead tooth is a threat, not only to the sinuses, but from the standpoint of focal infection, and we must consider that.

Dr. Berry puts the number of maxillary sinus infections due to dental complications at 80 per cent. Some years ago Dr. Richards wrote a paper putting it somewhere around 32.6 per cent. I said it was one-third, but I have come to the conclusion that that is too high, because many of these sinuses are infected in early life. We have children's sinuses infected long before the teeth are erupted and before the teeth can possibly be decayed. Therefore, we must consider that the early cases cannot be due to dental infection, but some of the later ones can be. You remember what Cryer said, many years ago (and Cryer was a dentist as well as a physician), that more teeth are infected from diseased antra than antra from diseased teeth. I do not agree with that, but nevertheless you have to take into consideration that you may have infection of the mucous membrane of your maxillary sinus and also have infection around the teeth. So if you have infection of both you may have a breaking down of your floor.

DR. WILLIAM B. CHAMBERLIN, Cleveland, Ohio:

I think Dr. Berry deserves a great deal of credit for presenting a series of cases so carefully worked out. I am quite willing to acknowledge that possibly I have been remiss in disregarding the possibility of dental infections in these cases.

I think the title to Dr. Berry's paper has been somewhat mischosen, because he speaks of paranasal sinus disease in relation to dental caries, whereas most of these cases were cases of antral disease. I cannot help but feel that Dr. Berry's statistics, his percentages, are relatively high.

Dr. J. Weston Price, of Cleveland, as probably most of you know, is practically the father of *x*-ray investigation of the teeth. He went into it at a very early day, and built his own *x*-ray machine. In a conversation with him, just a short time ago, he told me that he felt perfectly sure he could interpret 50 per cent of these dental films correctly, but that he was unwilling to express a positive opinion about the remaining 50 per cent.

I think the only people who will exceed Dr. Berry's statistics in this regard are the dentists, for the dentists of Cleveland would probably say that not 80 per cent of these cases are of dental origin, but that 100 per cent of the sinus infections have a dental origin. In other words, our dentists in Cleveland believe that all cases of antral disease are of dental origin and that there is no other possible source of infection.

DR. BERRY (in closing):

Dr. Spencer requested information about the transilluminator I use. There are two forms that I have and which are in common use by dentists. I use the same light with more current, as a sinus transilluminator.

Dr. White spoke of the crowned tooth as a menace. He also said that the dentist was the wrong man to go to. The man whom I have found most helpful (and Dr. Carmody bears me out) is a dentist who does nothing but *x*-ray and diagnostic work. He shows up the angles better than medical roentgenologists do and seems to understand the dental pathology better.

Dr. Carmody said that pyorrhea should be considered. That is true. I have been more concerned with trying to find the blind cases. The pyorrhea is more evident.

He also spoke about the central teeth reaching the antrum. We find those specimens in the anatomical laboratory, but they are relatively rare.

Dr. Carmody spoke about children having sinus troubles, and that these chronic sinuses go on into adult life and so may influence our percentages. There is some question among the members of this Society, I think, as to the incidence of sinus involvement in children. We get differences in different localities apparently. But let us note that perhaps the most frequently offending tooth in antrum infections is the upper first molar, and that appears at six years of age. So we cannot eliminate from our consideration the teeth as complicating factors in antrum disease in childhood.

One phase of radical antrum work that offers an interesting problem concerns itself with those sound teeth whose nerve supply and possibly whose blood supply have been injured by operative traumatism. The dental story is that resorption and decay gradually take place around and in a sound tooth if some injury kills the nerve.

Dr. Chamberlin suggests 50 per cent as a conservative estimate of dental infections in antrum trouble. This conforms to my 48 per cent of "probable" and "proven" cases. But I found in this series 89 per cent as "possible." Many of these would be "proven" cases if we could experimentally sacrifice the teeth. I submit that "60 per cent and possibly 80 per cent" becomes a justifiable estimate for this series.

FURTHER EXPERIENCE WITH FRONTO-ETHMO- SPHENOIDECTOMY UNDER LOCAL ANESTHESIA, PRESENTING A NEW OSTEOPLASTIC FLAP.

EDWARD CECIL SEWALL, M.D.

IN 1926 I had the honor of presenting before this Association an operation upon which we had been at work for a number of years and which then we had performed thirty times.* The two years since have given us more experience with this method, and I am grateful for the privilege of reviewing the work and profiting by your criticism.

I or my associate, Dr. Bacher, or house officer, Dr. Hunnicutt, have operated upon 40 cases since the former report.

In the matter of diagnosis we have made some progress through the microscopic examination of the discharge from the nose and also the antral contents. The cytological study has been a help in establishing the fact of sinus infection and in localizing it. The operative indications have not been materially changed. We advocate, as before, extreme conservatism in determining the necessity for operating on patients with sinus disease. The establishment of the diagnosis should be given whatever time and patience may be required. When the fact of sinus infection has been established we often, in doubtful cases, watch the patient for months or years to estimate if possible the character and constancy of the infection and the significance it may have with respect to his health. Many tire of this apparently fruitless observation and stray away. We feel that patients are allowed by this conservatism to carry about with them a condition that frequently works constantly and insidiously in undermining their health, leading to arthritis, high blood-pressure, deafness, to mention only a few of the well-known results of chronic infection. Our judgment, however, in this matter is based upon our distaste for operating on patients with low-grade sinusitis when we are not sure that such

* Sewall, E. C.: *Archiv. of Oto-laryn.*, November, 1926; *Transactions Amer. Laryn. Assn.*, 1926.

resultant pathology is imminent and because our operative methods may fall short of our ideal.

The patient must be disturbed seriously enough by his sinus infection to warrant the belief that he will be distinctly improved by treatment before he is operated upon. Where operation is advised, we find that our experience and results with the external method lead us to advise it with less hesitation. We find our patients also accept it with less reluctance. In waiting they have sometimes seen and talked with others who have been operated upon. We realize the advantage over the intranasal method of operating.

Ligation of the vessels has proven consistently satisfactory. Believing that it would be dangerous to leave metal clips in place on account of the liability of aspiration, we developed the technique to ligate the vessels with catgut. This we will continue to use on the sphenopalatine artery where it crosses the body of the sphenoid, but there can be little or no objection to the use of the clips on the ethmoid arteries and none at all to their extramucosal application to the terminal branches of the internal maxillary artery at their entrance to the nose. A description of the latter technique I will read at this session before the American Laryngological, Rhinological and Otological Society. The use of clips should save valuable time.

The field is practically bloodless and the work progresses in a manner only comparable to that on the cadaver. Each cell is seen and thoroughly studied before it is opened. The thoroughness with which this study can be carried on is exemplified in distinguishing the posterior ethmoid cells from the sphenoid. These large ethmoid cavities frequently simulate the sphenoid sinus and careful study with the searcher and probe in a bloodless field is sometimes necessary to outline the sphenoid and find its opening.

Better anesthesia is attained by the blocking of the ethmoid nerves supplemented by intranasal cocaine anesthetic. The patient lies drowsily inattentive. The scopolamine and morphine are ideal in their action. Rarely, a high-strung individual will get a little upset and may even vomit. This is provided for by taking up with sterile towels under the gauze mouth drape; even then he rarely remembers the occurrence.

Unusual location of diseased cells complicate our task. The

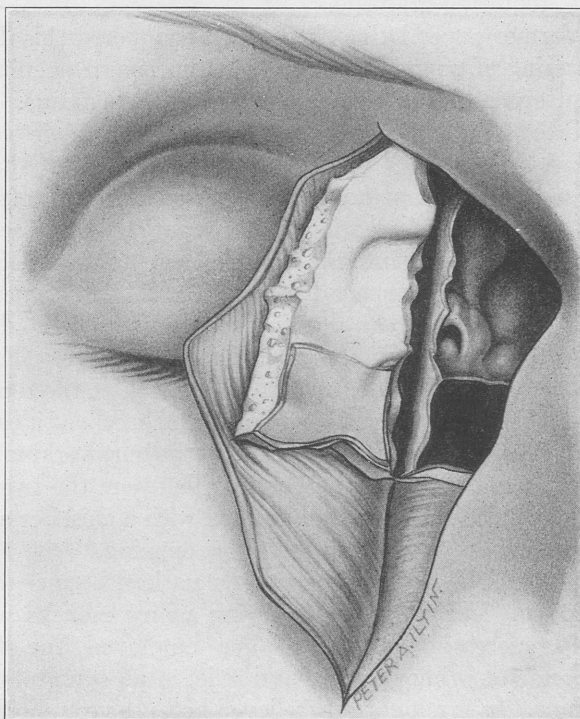
supra-orbital cells extend outward over the orbit in the frontal bone. The supracanalicular extend in the lesser wing of the sphenoid over the optic canal and sometimes even the lateral wall of the canal is hollowed. The sphenoid sinus frequently extends laterally into the greater wing or into the pterygoid process of the sphenoid bone. These extensions lie lateral to the plane capable of being reached by intranasal operating. The supra-orbital cells can usually not only be opened by the external technique, but removal of their orbital walls leads to their obliteration in almost all cases.

Recently, however, we have come to realize a formerly unrecognized stumbling block to progress in the eradication of ethmoid disease. This difficulty is encountered in the treatment of what may well be called the infra-orbital ethmoid cells. These cavities, often quite large, occupy lateral extensions in the ethmoid and palate bones and frequently lie over the antrum and even behind the upper part of the posterior antral wall. We do not believe they can be drained properly by any except the trans-antral route. This leads to the thought that the radical antrum operation and transantral opening of these cells should precede the frontal ethmosphenoid technique where pansinusitis requires operation on the antrum. We are at present working on this problem. The stereoscopic roentgen-ray films will demonstrate the location of these cells as they do the supra-orbital extensions. Where these classes of cells are wanting, intranasal surgery may be satisfactory. It is doubtful, however, if in such apparently suitable cases one would have the temerity to break through some of the heavy cell walls that are plainly seen and easily removed in doing the external operation.

The deformity following the operation has been found to be practically negligible. Even the 3 cases that required reoperating were not badly scarred. A few patients wear rather ugly lines and in some the retraction at the upper inner angle of the orbit is noticeable. In a number of cases all marks of the operation defy detection except with trained scrutiny.

The most radical change that has been made in the original technique is the use of an osteoplastic flap at the site of the incision. (See Fig). The reason for this is obvious to anyone who has attempted the discouraging task of curing frontal sinus disease

without the deforming obliterative methods. The earlier writers, Kuhnt, Ogsten, Luc and others, attempted obliteration of the sinus. The result was unsightly, but in small sinuses must have been satisfactory from a curative standpoint. Killian was outstanding



The osteoplastic flap is seen turned outward, broken away from the thin lamina papyracea. The nasal mucosa is shown attached to the bone. The anterior ethmoids are exposed to view. The retractor will be introduced between the orbital periosteum and the lamina and the parts drawn gently outward.

in his bold attack. The disfigurement following the retraction of the soft parts was extreme in some cases. It is possible that large frontal sinuses demand such obliteration to affect a cure. Another and more fundamental objection to Killian's technique is the fact that the drainage from the frontal sinus, attained immediately and

so perfectly by the operation, is frequently diminished or entirely cut off by subsequent retraction of the soft parts following the window resection of the frontal process of the superior maxilla and frontal bone. If this obliteration of the frontonasal opening occurs before healing in the frontal sinus has taken place, abscess may form, requiring drainage.

In my former paper I thought we had conquered this difficulty by the passing of sounds through the frontonasal opening. We have been successful in some patients by that means. In one case, reported at that time as requiring reoperation, we were able to establish a permanent opening into the frontal. Other cases we have managed to open and keep open intrinsically after their closure led to abscess formation. Many patients have recovered with little or no opening into the frontal sinus. The inadequacy of the operation in this respect has led to much experimentation. In our endeavor to keep an opening patent we have added the principle of Lothrop to our technique in several cases. The space between the cribriform plate and the bony arch at the root of the nose is cut away according to his original and excellent idea but by a different means. He does his work with the bur, working upward through the nose. We cut the partition between the two frontal sinuses and work downward and upward with a chisel or a punch, proceeding entirely through our window opening.

We recently had to reoperate upon a patient because of acute abscess in the frontal sinus, following many months after an apparently successful operation. We employed the Lothrop principle and got primary union and relief of all symptoms. Our anxiety, however, is not entirely relieved because very shortly after the second operation no opening into the frontal could be found with the probe. We are convinced that sometimes an opening exists that cannot be found with the probe and takes care of the situation.

Dr. Ziegelmann, of our clinic staff, made the suggestion that an osteoplastic flap might be useful. I immediately worked out such a flap on the cadaver. Its preparation is not very different from the technique for cutting the window in the bone, described in my former paper, except that the window of bone cut out is retained and replaced at the conclusion of the operation. My former

description of this part of the operation reads as follows: "The window of bone to be removed is estimated, and with a sharp 8-mm. flat chisel, the lower limit of the bony window, usually a few millimeters below the upper end of the lacrimal fossa, is outlined. The chisel is worked through gradually until the nasal mucosa is reached. Care is taken not to cut through this nasal mucous membrane. The cut through the bone is made below first, while the upper parts are still intact. This lends firmness and assists the cutting. With a gouge the thin bone at the inner upper angle of the orbit covering the frontal sinus is removed, and the frontal sinus is entered. If it is normal, it is not disturbed, though a probe is passed downward into the nose to outline the anterior edge of the bony window to be removed. The anterior edge of the bony incision is now outlined with the flat chisel. This joins the lower bony cut with the opening in the frontal sinus. After the bone has been cut through, the chisel is used as a lever and the bony window is pried gently upward. It is grasped in a small rongeur forceps and is removed in one piece, or when this fails, piecemeal. The external posterior edge of the bony window, which includes the attachment of the frontal process of the maxillary bone with the lamina papyracea and the lacrimal bone, is ignored, as it breaks easily."

Formerly skin and periosteum were dissected off the bone before the window was cut. In the present method skin and periosteum and nasal mucosa must be left strictly undisturbed on the bony flap. This makes the technique more difficult and has slowed the operation materially, but we hope that experience and practise will restore celerity. After the incision is made through the skin the periosteum is cut and the skin retracted just enough at the top and bottom of the incision to allow for the making of the bony flap. After the bone has been penetrated with the chisel the nasal, mucous membrane lining it is cut through with a knife, and the flap, covered by periosteum and skin and lined with mucosa, is pried outward with a chisel and the bone broken at the attachment of the frontal process of the maxilla with the thin bone covering the ethmoid. It breaks easily at that place.

The flap is retracted so that the periosteum of the orbit can be separated from the lamina papyracea and the retractor introduced

as heretofore described. From this point the operation proceeds according to the technique formerly outlined.

We have only operated upon two patients by this flap method but have demonstrated its feasibility repeatedly on the cadaver. It remains to be seen whether this will represent a real improvement. At present these patients have excellent openings into the frontal sinus, but that is not remarkable at this time.

The preservation of the nasal mucosa should prove to be an important refinement. It is hoped that it will decrease the tendency toward granulation-tissue formation.

The most difficult part of the operation is the treatment of the sphenoids. It is hardest here to live up to the standards set by pretty illustrations. I am convinced that the principle advocated is a correct one and it is attainable. Patients upon whom we have employed the technique in proper detail have gotten well. Others, where enough floor of the sphenoid was left to interfere with drainage, have required attention and are unsatisfactory. The elaborate and trying technique comes at the end of a long, difficult operation. The tendency to hurry is only human. I have often left an operation with a feeling of incompetency that had at least the beneficial result of sending me back to the dissecting room for more practise.

The ligation of the sphenopalatine artery is not as satisfactory as the other ligations that I have developed. The vessel is tied in mucous membrane. It is not isolated. It is sometimes difficult to place the ligature as far laterally as one would wish. Our anesthesia often is not so satisfactory when we begin to work on the nasopharyngeal wall. The solution of the problem may be greater celerity in the earlier and simpler parts of the operation. This should be advanced by the use of clips instead of gut ligatures. However, nothing makes for smooth, expeditious work as does constant practise. This can be satisfactorily obtained on the cadaver.

I have recently developed a transantral technique for ligating the terminal vessels of the internal maxillary artery at their entrance to the nose. The sphenopalatine artery is tied here much more satisfactorily. I hope to work out some combination of the two operations that will utilize this ligation for the sphenopalatine

and the posterior lateral nasal arteries. Most patients requiring the fronto-ethmo-sphenoidectomy have infection in the antra. It is my present plan to attack a one-sided pansinusitis by operating first according to a modified Luc-Caldwell method on the antrum. The important variation from the classical technique I make in removing the naso-antral wall in the middle meatus. This allows me to reach and tie the terminal branches of the internal maxillary artery submucously just at their entrance to the nose. The ethmoids in the posterior part of the lateral mass can be opened and particularly the infra-orbital cells can be drained also. The technique described for the sphenoid can be carried out in some cases at that time, if the conformation of the bones gives working space. As soon as the patient is fit again, the fronto-ethmo-sphenoidectomy may be done. The sphenopalatine artery has been tied and should give no trouble in carrying out the sphenoid technique, where that has not already been done, or has not been properly done at the antral operation.

Patients with a pansinusitis bring to the surgeon disease located in many different areas, all difficult of approach. It is not to be wondered at that many operations have been required where an attempt was made to drain one or a few cells at a time. Often before the succeeding operation was performed the good results from the first work were stultified by the pus accumulating in the operated cavity from sources not yet attacked. I had a patient consult me recently who referred to her thirty different sinus operations. This leads to the disheartening statement that we hear not uncommonly from the laity that "an operation on a sinus brings endless trouble and repeated operations." Some rhinologists of excellent repute concur in advising their patients against ethmoid operations, saying that they do no good.

Nevertheless, the medical profession recognizes the significance of sinus infection in the causation of disease. They refer their cases for relief from that infection. Where other forms of treatment are so frequently unavailing, surgery seems to present some hope. If it is to be surgery, then our work must be thorough and live up to the requirements of surgical work. Dependent drainage is the most important surgical detail to be attained. We have operated upon 70 cases and can say that the results are better

than by any methods we have formerly used. An encouraging number of our patients are well or relieved of their symptoms to a great extent. We have had to reoperate upon 3 cases and some have given us much trouble; practically all are better than before the operation.

There is no desire on my part to minimize in this report the difficulties and discouragements attendant upon the treatment of sinus disease. We all know the status of sinus work in the hands of our best men and derive but little encouragement from the recital of operative miracles. I believe that we have barely scratched the soil in preparation for the harvest that the future will enjoy. We are happy if our endeavors cause a seed or two to take root.

DISCUSSION

DR. HILL HASTINGS, Los Angeles, Calif.:

Six months ago I had the pleasure of going up to Dr. Sewall's and spending the better part of a week learning something about his work. I should say that I was prompted to do that by the feeling that had gradually grown stronger in my mind that there was no ethmoid operation I knew of that was both safe and thorough.

I say frankly that I would be rather ashamed if some of my friends who do not know me well were to see some of the cases in which I did a radical ethmoid through the nose, after two or three years from the time I operated. They looked fine for awhile, but I am sure they would say, if they did not know me, "Hastings is not telling the truth; he did not do a radical ethmoid on that case; he did not do anything," because the nose became filled with fibrous tissue and polyps. The answer is that I did not do a good ethmoid operation. I have never done what is called a complete ethmoidectomy. Fortunately, I have never lost a patient. However, I think that some of the work in the past has been too radical, and there have been many deaths that have never been reported.

Dr. Sewall offers a procedure that I think, after a week's observation up there, is not only thorough but safe. His first assistant very kindly stepped aside and let me assist him, so that I could see exactly what was being done. We went into the anatomical hall and did work on the cadaver. We went into the x-ray department and saw a number of

x-rays before and after operation. We went into the pathological department and I studied for most of the morning mucosa and polyps removed from ethmoids and antra. I mention this to show you the interrelationship that is possible at Dr. Sewall's place, which is the Lane Stanford Teaching Hospital.

As to the operation, it is all that he says. It is bloodless or almost bloodless. I was perfectly astounded to see everything better than I could in the mastoid operation. I was astounded at the perfect approach to the ethmoid and sphenoid. There was no possibility of any good man going wrong in this operation and doing harm, it seemed to me.

His ligation of the anterior ethmoidal artery is the crux of the situation. It is deeper than it showed in this picture, because we have done two down home since, and it is a little hard to find. But it is a good-sized artery, and I noticed in the pictures, as I have before, that it looks pretty close to you, but it is not; it is pretty deep down, as most of you know. But ligation can be done by his method easily, after you find it. It gives you a practically bloodless field, and you can do your ethmoid work as well as you do a mastoid and know what you are doing all the time. You are not working in the dark. His sphenoid approach is close, and also right under your eye. In his ligation of the sphenopalatine artery, while I did not see the vessel looked for, he goes through the flap with a needle like the old tonsil needle, and ties the flap off. We have all had some dealings with sphenopalatine vessels and we know it is well to get a ligature on them.

Dr. Sewall did not mention the frontal problem. He only mentioned that he is now trying to work out an osteoplastic flap, but that is not under discussion today.

I wish you gentlemen could have the pleasure of seeing Dr. Sewall's work, but hope that you will go home, anyway, and try it out on cadavers, and pick out suitable cases.

Before closing, I want to say that Dr. Sewall has been doing this work for ten or twelve years. He is not overenthusiastic, as he seems to be when he talks. He talks so well that you might think he is too enthusiastic. Furthermore, he is very careful in the selection of cases. He does not jump at cases to operate just because they have some ethmoid and sphenoid disease.

DR. FRANK R. SPENCER, Boulder, Colo.:

Two years ago, at the meeting of the Pacific Coast Otoöphthalmological Society in San Francisco, Dr. Sewall demonstrated his

operation. There were several points about it which impressed us very favorably. First, he had remarkable anesthesia. Dr. Sewall asked the patient if he felt any pain. The patient was quite drowsy and sleepy, as Dr. Sewall has mentioned, but he said he was not suffering any pain whatsoever. Second, there was apparently absolute freedom from hemorrhage. The method of ligation certainly does much to improve the operation as compared with most external operations upon the sinuses. Third, the thoroughness of the operation. The operation seemed to be very complete in every detail, and, while I did not stand very near the operating table much of the time, it seemed to me that Dr. Sewall had a very good view of the field of operation, and I am sure that his illustrations are not exaggerated. It recommends itself very strongly to those of us who have seen him do it, and we believe it has many things in its favor.

DR. PERRY G. GOLDSMITH, Toronto, Ont.:

When one has the courage to present any radical method of this kind, he must be sure that he does not violate any of the cardinal principles of surgery.

All of you are aware that abdominal surgeons once prided themselves on their ability to remove an appendix through a half inch or an inch incision. Nowadays, however, I think they pride themselves on opening abdomens so that they know that not only the appendix has been looked at, but the gall bladder, the gall ducts and other parts have been thoroughly explored.

On that same principle, then, Dr. Sewall advocates opening up the ethmoidal labyrinth in its upper and posterior part under direct vision, and in that way carries out part of the cardinal principles on which good surgery is based.

I have not done his operation with all the refinements associated with local anesthesia and ligating the vessels, but I have, like the rest of you, realized that a certain group of acute sinus cases tend to get well if you will take away a good part of the middle turbinate. Another group will be completely cured by draining some of the anterior ethmoidal cells, or even exposing the mucous membrane of the posterior ethmoidal cells to the air and increasing drainage.

There is still a group of cases in which you have removed everything that you can reach within the nose, and you are in fear of doing anything more; you have a nice smooth dome. Yet, looking up in the roof of the dome, there is a little white, creamy area of pus and it drips down along the posterior wall. It increases very much with various

changes of atmosphere or with changes in the patient's metabolism, which lead to increase of edematous changes in the mucous membrane, much of which we do not understand. That type of case, associated with headache, pain, recurrent attacks of acute sinusitis, is the kind that I am sure worries you, as it does me.

Why could we not wash out the frontal sinus? It is not always the frontal sinus that is diseased. There may be some edema of the frontal sinus mucosa, but the greater part of that edema is in the floor of the frontal sinus. You wash it out with all the various disinfectants you know of and it is not much better. You pass bougies of various sizes. Sometimes you think you have accomplished a great deal. Rarely have you accomplished very much.

Those of you who have, like myself, opened these things externally and visualized what you have failed to remove intranasally will be amazed at the facility with which you can reach all the higher cells of the ethmoid. I believe you must take away the ethmoid and leave all the frontal sinus mucous membrane you can.

I appreciate this operation very much. I believe it is the operation of the future for chronic frontal-ethmoidal disease, but my fear is that those overzealous in their surgery will tend to operate on cases that might have been cured by simpler and more conservative measures. The operation should be restricted to the chronic recurring frontal-ethmoidal cases that do not clear up by even heroic intranasal measures and those in which the symptoms are sufficiently severe to demand an external surgical approach.

DR. LEE M. HURD, New York City:

I am glad that hyoscine morphine is getting to be a regular procedure. I advocated it for many years before it was taken up. But I think when you get the patient well under hyoscine morphine and then use novocain you can do anything you want to do in this neighborhood.

I have been doing an operation very nearly like Dr. Sewall's except that I have not been so careful about my hemostasis. I think that is well worth taking into consideration. I do not seem to find so much hemorrhage from the anterior ethmoidal, and I do not need to regard it so much. I just break it off as I elevate the periosteum.

I can offer one suggestion as to something that I have been using for a few years: To maintain the opening of your frontal sinus, take out your middle turbinate, peel your mucous membrane, and when you have done your spheno-ethmoid and frontal operation lay that mucous membrane down about the frontal sinus orifice, letting it stay there without any packing. Though it may be infected with the same or-

ganism that you have there, it will not flare-up. In that way you get a tubular-covered frontal orifice with the mucous membrane from that person's nose.

DR. GORDON BERRY, Worcester, Mass.:

Under the stimulation of a previous paper, by Dr. Sewall, I used this anesthesia in 2 cases of malignant disease in sinuses, and though I did not do it as perfectly as outlined here, it gave me the anesthesia and the hemostasis.

May I ask Dr. Sewall for one detail about his bony flap? I gathered from his paper that the nasal mucous membrane covering is attached by its pedicle and its nasal blood supply is preserved. The pictures indicate that the mucous-membrane flap is isolated and the blood supply is all from the skin side.

DR. ROBERT C. LYNCH, New Orleans, La.:

I had the privilege of seeing Dr. Sewall operate two years ago, and I thought one of the most dramatic points in his operation was when he cut the nasal branch of the sphenopalatine artery and his patient gagged and bled. He announced during the procedure that the vessel had been cut, and proceeded to ligate it. After ligation, the bleeding stopped and the operation proceeded, giving evidence that he had done what he said he would do.

Since viewing his work I have ligated the anterior ethmoidal and the posterior ethmoidal and the nasopalatine branch from the sphenopalatine artery, and it has certainly been a source of great comfort in the proceeding of the work for the pansinus operation.

I have done the approach as he has recommended it. And I should also like to say something about the usefulness of the instruments which he exhibits. I have had the good fortune, through his kindness, to have the use of his spatulae, for six or eight months, and they have been most valuable in the production of the work and in its completion, and I should like to endorse the statements which he makes in his paper.

DR. SEWALL (in closing):

I wish to thank those who have so kindly discussed my paper, and answer Dr. Berry by saying that when this flap is cut the chisel perforates the bone, and is followed by a knife which cuts through the mucous membrane lying on the inside of that bone. This nasal mucosa is not disturbed in its original location. It is simply cut and left on the inside of the bone, and it receives its blood supply through the bone.

ETHMOIDITIS IN INFANTS AND YOUNG CHILDREN WITH ACCOMPANYING EYE AND ORBITAL COMPLICATIONS

BY CLEMENT F. THEISEN, M.D.

THIS paper is the result of a study of 31 cases of ethmoiditis observed during the past few years in private practice and in the Infants' Hospital, St. Margaret's Hospital for Infants and the Child's Hospital, Albany, N. Y., and will deal only with sinusitis in very young patients.

The number of cases is perhaps not large enough from which to draw very definite conclusions, but some very interesting facts, or it would be better to say observations, were brought out. The youngest patients were, 1, aged six months, the youngest patient we have ever seen with definite ethmoid involvement; 1, aged ten months; 1, aged twelve months; 1, aged sixteen months; 1, aged eighteen months; 1, aged twenty months. These 6 cases all had eye and orbital complications, the 3 youngest orbital abscesses with exophthalmos.

The other 3 had severe orbital inflammation with localized infiltration and swelling in the inner angle of the eye, bulbar chemosis and great edema and inflammation of the lids.

Of the other 25 cases, 9 were between three and four years of age, and 6 aged between five and six years. Of these 15 cases, 9, the youngest patients, had ethmoiditis only; the other 6 had ethmoiditis and maxillary sinusitis.

In these 6 cases, roentgenographs showed unusually large maxillary sinuses, probably a precocious development, although the writer has seen antra large enough for surgical intervention in children between three and four years of age. These cases are far from common however. Of the remaining 10 cases, 4 were aged between six and eight years and 6 between eight and nine years.

These 10 cases had ethmoiditis and maxillary sinusitis. There was no involvement of the other sinuses in any of these 25 cases.

Etiologically large tonsils and particularly adenoids seemed to

predispose the older children of this group to attacks of sinusitis, without doubt because they were more susceptible to attacks of rhinitis than children without adenoids.

The twenty-months-old baby started with a bronchopneumonia. During convalescence abscesses in both ears followed by double mastoiditis developed. During this time, and before the acute ear condition developed, an ethmoiditis with severe inflammation of the eye and lids also came on. This case will be reported in detail.

The diagnosis of sinusitis in all cases was based largely on roentgenographs, particularly in the very young infants and children, as nasal examinations are not always very satisfactory in the very young.

The cases with eye and orbital complications were considered secondary to the ethmoid involvement even without confirmation by roentgenographs.

Roentgenographs, of which we have taken a large number in young infants from six months up, and in young children aged between three and six years, brought out the interesting observation that there is at times a surprising development of the ethmoid cells, particularly in children under four years of age, and in some cases between six and fifteen months.

With the exception of the 6 youngest cases with eye and orbital complications, all the others had enlarged tonsils and adenoids. These were removed as a matter of routine, and also to determine what effect there would be on the existing ethmoiditis and maxillary sinusitis.

With the exception of a few cases in which the removal of the tonsils and adenoids appeared to be followed by a cure of the sinus condition, we could not determine positively that these operations modified the existing sinus involvement in the other cases to any appreciable extent.

Except in the 6 cases with eye and orbital complications no ethmoid surgery was done. Orbital complications, particularly orbital abscesses, make the radical ethmoid operation imperative. In such cases the external operation was performed. Considering the fairly large number of reported cases, and probably more unreported ones on record (mostly adults), of death from meningi-

tis following radical ethmoid operations, we believe that this operation should not be undertaken in infants and very young children unless there are severe eye and orbital complications, other systemic complications, particularly arthritis or heart or kidney conditions.

We have found that in the majority of the cases of ethmoiditis in young children conservative nasal treatment directed to good drainage will suffice. The danger of postoperative meningitis is greater in young children than in adults and could easily follow injury to the lamina cribrosa.

Gerber,¹ Boenninghaus² and Dreyfuss,³ have collected nearly 50 fatal cases from the literature. In the majority of the cases a suppurative meningitis with fatal outcome, and in a small number of cases a serous meningitis with recovery.

In the children over four years of age when roentgenographs showed definite involvement of the maxillary antrum and one large enough for surgical intervention, the antrum was washed out by puncture through the inferior meatus.

In only 1 case was an operation through the canine fossa found necessary, and in many cases a single washing out of the antrum sufficed.

In 2 cases in which multiple arthritis was a complication, the tonsils and adenoids were removed as a preliminary step and later the antrum of Highmore was washed out. Without doubt both the diseased tonsils and maxillary sinusitis were responsible for the arthritis as the operations were followed by a great improvement of this condition.

In some of our cases, children between five and eight years, scarlet fever appeared to be the definite etiological factor as the sinusitis, ethmoid and maxillary, came on during the attacks. We first suspected the presence of sinusitis by the persistent nasal discharge and the diagnosis was later confirmed by roentgenographs.

In 3 cases an ethmoiditis and maxillary sinusitis resulted from diphtheria, and in 2 the sinus infection came on during measles. We could also trace a number of cases to a mild form of influenza in the Infants' Hospital three years ago.

We have also had in the Infants' Hospital a good many cases of

acute otitis media with a small percentage of complicating mastoiditis, and many obscure eye infections coming on after apparently simple colds. A good many of these roentgenographs showed definite involvement of the anterior ethmoid cells in the very young children, and in a smaller percentage of the older children ethmoiditis and maxillary sinusitis. In many of these cases of ethmoiditis followed by acute otitis media and eye complications, it would seem that the old adage "post hoc ergo propter hoc" applies.

Our viewpoint in regard to infections of the accessory nasal sinuses in infants and young children has changed very materially during the past ten or fifteen years. Our better understanding of sinus infections in the very young has certainly been helped by the work of Dean, and anatomically and in a general way by the investigations of Mosher, Skillern, Coakley, Hajek, Faulkner, White and others.

During this time much has also been learned in regard to the development of the sinuses in infants and young children.

Dean,⁴ in his original and illuminating paper states that sinusitis, in children two years of age or more is common.

My own experience, however, while it bears out Dean's statements in nearly all respects, has *not* shown to my own satisfaction that general sinusitis is very common in children aged between two and four years. I mean an involvement of other sinuses than the ethmoid cells.

Ethmoiditis *is* fairly common in children between two and four years of age and we have seen it in a smaller number of cases in infants between the ages of six and eight months, and in a larger number of cases in children between one and two years of age.

Sinusitis in very young children is frequently overlooked, partly because of the difficulty of making proper nasal examinations, and also because the discharge from the infected sinus runs into the throat and is swallowed.

Arthritis and multiple arthritis in young children is practically always the result of a focal infection somewhere, and in the writer's experience this is most frequently in the ethmoid cells or some other sinus. Diseased tonsils also play an important rôle in this respect, but the writer believes that the tonsil has been blamed a little too much, but should not, of course, be overlooked.

The most frequent causes for ethmoiditis in young children are common colds and the infectious diseases, scarlet fever, measles, influenza and diphtheria.

Besides the influenza bacillus there has been found very frequently in sinus suppurations during influenza, the *Diplococcus pneumoniae* of Weichselbaum.

The pathogenic rôle of this organism has been explained by E. Fraenkel's investigations regarding the bacterial content of normal accessory sinuses. In 28 normal sinuses he found the *Diplococcus pneumoniae* most frequently, so it seemed that in pathogenic conditions it was largely a question of an *increase* in the number of bacteria existing in the sinuses under normal conditions.

Hajek views with skepticism the reports of some American writers who reported large numbers of sinus infections in the earliest years of childhood. He speaks of the "fantastic reports of hundreds of cases by American writers" and does not agree entirely with Dean in regard to the relationship between diseased tonsils and adenoids and sinus infections. Without going into the merits of Hajek's criticism in any way, it is a fact, with due respect to Dr. Hajek, that sinus disease in young children is far more common than a review of the literature would indicate.

I think we will agree also that Dean's paper published ten years ago was a decided forward step in our knowledge of the subject.

Another important etiological factor, the writer believes, is malnutrition in infants. This is not only true so far as the ethmoid cells are concerned, but applies also to the mastoid.

Recent investigations have shown the prevalence of mastoiditis in cases of malnutrition in infants. The presence of a mastoid involvement has been discovered at autopsies in many cases of malnutrition.

Children with tuberculous tendencies are also susceptible to sinus disease. The investigations of E. Fraenkel and Wertheim have proved this to be true in adults also.

Very young infants do not appear to be very susceptible to attacks of influenza, but in older children this is a frequent cause and the sinus inflammations so frequently going with it may present the characteristics of a primary infectious condition. Sinus involvements with other infectious diseases are practically

always the result of secondary infections. In influenza it was determined by Lindenthal that the influenza bacillus appeared almost constantly in accessory sinus suppurations, and that sometimes it was found alone without any admixture with various other bacteria. Wolff found that in diphtheria of the upper air passages the accessory sinuses were nearly always involved.

Coakley⁵ states that where a chronic nasal discharge exists in a young child with an absence of adenoids, the presence of sinus disease is fairly positive. The majority of the cases of sinusitis in children under four years of age are ethmoid involvements.

Skillern⁶ considers this to be true in children under five years of age.

Roentgenographs sometimes show a surprising development of the other sinuses as well in children after the third year, and this is borne out by Mosher's⁷ investigations. He considers the maxillary antrum, for example, large enough for surgical intervention in some cases after the third year.

According to Hajek⁸ the cells of the ethmoid labyrinth result from the formation of septa in the interturbinal passages. These septa undergo varying degrees of development; at times they exist in the form of small ridges at the bases of the passages and at times they protrude markedly and bound cavities which communicate with the interturbinal passages by small openings.

Congenital syphilis in very young children should not be overlooked as a cause for ethmoid disease, particularly when ethmoid necrosis is found. In such cases a Wassermann test should always be made.

Ethmoiditis is not uncommon as a result of hayfever in young children, and is a complication of other neuroses as well.

The writer has been impressed with the number of sinus cases, particularly ethmoid and maxillary, that develop in young children after diphtheria, measles and scarlet fever.

A history that we commonly get when a child is brought for examination is that there has been a good deal of nasal discharge since the child recovered from one of the above-mentioned diseases, even in the absence of a cold. Sinus disease, during and after the acute exanthemata and influenza and diphtheria, has been a

recognized fact for a long time. One of the most complete investigations along this line was that of R. M. Pearce, published many years ago, who described a series of autopsies in the Boston City Hospital on children who had succumbed to measles, scarlet fever, or diphtheria.

Autopsies showed the presence of pus and other indications of sinus disease in the different nasal sinuses in a large percentage of the cases.

Transillumination in sinus disease of infants and young children is not very satisfactory. Roentgenographs, although occasionally a little misleading, offer the best method of arriving at at least a fairly positive diagnosis.

CASE REPORTS

CASE I.—Acute ethmoiditis with orbital abscess and exophthalmos. Recovery. Baby V. H., aged six months, was referred to my service in the Child's Hospital from Hudson, N. Y., on December 30, 1926. There was a history of a discharge from the right nostril of a mucopurulent character for a short time before the child was sent to the hospital. This had apparently followed an ordinary cold but had not subsided. A gradually increasing edema and redness of the lids and displacement of the eyeball. The swelling of the upper lid increased considerably, and incisions followed by a free discharge of pus were made. When examined in the hospital the same day the infant was admitted, we found a fistulous opening in the lid near the inner angle which was discharging and pus could be squeezed from it at any time. The exophthalmos, displacement of the eyeball forward and downward, was one of the most extreme ever seen by the writer. There was an extensive chemosis of the conjunctiva. A diagnosis of a probable ethmoiditis with rupture through the lamina papyracea was made and this was later confirmed by the roentgenograph. Dr. Judge, the attending ophthalmologist to the hospital, was called in consultation and his report of the eye findings follows: Baby V. H., aged six months. Admitted to the Child's Hospital December 30, 1926. Swelling of the right eye appeared on December 21. It came rather suddenly. Eyes were normal prior to that date. Was seen the same day by Dr. Lawrence Early, who advised the parents to consult Dr. Wheeler of Hudson, N. Y. Dr. Wheeler advised cold compresses to the eye. On

December 23 both ears were opened by Dr. Wheeler. No pus after myringotomy. Swelling of the right eye continued to increase and on December 25, Dr. J. L. Edwards was called and made several incisions into the orbit. On December 28, another incision was made down and out. The child had had a cold in the head several days prior to the time Dr. Early was called.

Dr. Early's diagnosis accompanying the child was "orbital abscess secondary to ethmoiditis."

On admittance the child showed a typical picture of a right-sided abscess of the orbit with characteristic exophthalmos, marked chemosis and tenseness of the lid structures together with a marked chemosis of the bulbar conjunctiva. The cornea showed a 5-mm. irregular round central ulcer. There was a small piece of gauze drainage in each wound. These were discontinued. Hot compresses were ordered at twenty-minute intervals every four hours, together with a drop of 25 per cent argyrol and a drop of 1 per cent atropine. A bandage was applied to the eye constantly. After several days' treatment there was an increase in the exophthalmos and swelling of the orbital tissues. On January 18 the tissues of the upper lid again showed a tense red appearance, as if there were a small abscess just below the skin. This area was incised, but only a sanguinous serum exuded. Hot compresses were applied daily until February 13, when the area of corneal ulceration had healed and the swelling had completely disappeared from the orbital tissues. Several days after the drainage was removed from the upper and lower outer incisions the wounds healed in. The small wound at the upper inner aspect of the orbit continued to yield a thick purulent material.

March 22, external operation by Dr. Theisen. Compressing continued until June 30. Discharged August 15, 1927. Sinus closed up prior to discharge and eye normal. We could not make a satisfactory nasal examination, so after a few days more the child was given a little ethyl chloride merely for the purpose of making as complete a nasal examination as possible. We found a fair amount of a mucopurulent material in the middle meatus. On very careful probing I thought I could feel slightly roughened bone in the anterior ethmoid region. We were not very anxious to perform a radical operation in so young an infant, so for a while we tried conservative endonasal treatment. Mild irrigations and a spray of a very weak solution of ephedrin sulphate (solution No. 10) which I have found more useful than either cocaine or adrenalin in reducing the congestion of the nasal

mucosa. These measures did not have any effect whatever, the condition of the eye becoming steadily worse and the exophthalmos increasing, so we finally decided upon the external operation. The writer uses the Killian incision, not the complete incision, however, for such a young infant. In older children, depending upon the severity of the orbital involvement, the incision may have to include part of the eyebrow. The Killian incision has also the advantage that the orbital ethmoid cells can be easily reached.

The roentgenographs in this case showed one fairly well-developed ethmoid cell showing the usual whitish cloudy appearance of a diseased cell.

We found at the operation that we could pass a probe through the lamina papyracea where the rupture into the orbital cavity had evidently occurred. We also found one anterior ethmoid cell that was already fairly well developed containing some pus. The post-operative history of this case was uneventful. The child was in the hospital for a long time after the operation, during which time the eye gradually improved, the exophthalmos subsiding fairly rapidly. The eye was perfectly normal in appearance when the child was discharged.

CASE II.—Orbital abscess, following ethmoiditis, in a child aged ten months. Recovery. This case is almost identical with Case I, with the same history of a persistent nasal discharge from the right nostril. The only etiological factor we could find was a cold (a rhinitis) before the nasal discharge came on. The eye symptoms, chemosis of the bulbar conjunctiva, swelling of the lids and exophthalmos, were noticed first about ten days from the onset of the nasal discharge, so that the condition was fairly acute. The temperature ranged from 100° to 104° F., rectal. The parents refused to take the child to a hospital, so we had to operate (under protest) in the patient's home. The child was kept under careful observation for several days prior to the operation, during which time mild nasal irrigations followed by a spray of a weak solution of ephedrin sulphate were used. There was an increase in the exophthalmos during this time which, however, was not as marked as in Case I.

About all we could determine on nasal examination was the presence of a mucopurulent secretion in the middle meatus. The same external operation was performed as in Case I and again we could find a perforation through the lamina papyracea and a purulent secretion in the anterior ethmoid cells. There were two well-developed ethmoid cells,

which was also determined by the roentgenograph prior to operation. There was very little postoperative temperature and no postoperative complications. We feared the possibility of a postoperative meningitis in both these cases, but fortunately escaped that most unpleasant and fatal complication. The swelling of the lids, chemosis and exophthalmos disappeared completely, and during the two years that the child has been kept under observation there has been no recurrence. Warm packs, a compression bandage and argyrol were used in the treatment of the eye complication.

CASE III.—Ethmoiditis, great swelling of the lids and inflammation of the eye. Orbital abscess, exophthalmos, with an infiltration and swelling in the inner angle of the eye pointing to external rupture of the ethmoiditis. Recovery.

In this case, a child aged ten months, we could again not determine a definite etiology except a preliminary cold. The child presented a marked appearance of malnutrition and was in bad physical condition, probably furnishing good predisposing causes for the ethmoiditis. There was a good deal of inflammation of the conjunctiva and so much swelling of the lids that they could not be opened by the patient, and had to be raised before a view of the eye could be obtained.

Roentgenographs showed cloudy ethmoid cells. There had been a discharge from the left nostril for several weeks, the eye symptoms coming on suddenly a week before the child was seen. The nasal examination gave us the usual difficulties that it always does in infants, but we could see a mucopurulent secretion in the middle meatus. The child was sent to the hospital and the usual external operation (Killian incision) performed. Before making the external incision, we carried a thin silver cannula attached to a large hypodermic syringe into the swelling in the inner angle of the eye, injecting a little weak permanganate of potash solution. Some of the purple fluid escaped into the nostril, showing the rupture through the paper plate. The postoperative history was uneventful, no complications. A mucopurulent secretion in the anterior ethmoid cells was found at the operation. The exophthalmos cleared up slowly but completely, as did the inflammation of the lids and bulbar chemosis.

CASE IV.—Baby aged twelve months. Ethmoiditis right side; eyelids very edematous and inflamed; chemosis of bulbar conjunctiva; no exophthalmos; localized infiltration and swelling in inner angle of eye. Patient inmate of Infants' Hospital. The child had had snuffles for a week or ten days with a good deal of discharge from the right nostril. Roentgenographs showed definite involvement of right anterior ethmoid cells. Permanganate solution injected into the swelling in inner angle under ethyl chloride anesthesia showed in nostril, pointing to rupture through the lamina papyracea. Eye treatment prior to operation same as in other cases, with mild nasal irrigations followed by spray of a weak solution of ephedrin sulphate. As no improvement followed after a week's treatment and the eye condition did not improve, the external ethmoid operation was performed. The child made a good recovery. This child had a slight swelling and tenderness on pressure of the right knee-joint without doubt secondary to the ethmoiditis. This cleared up slowly after the operation.

CASE V.—Ethmoiditis. Orbital abscess and exophthalmos. This baby, aged eighteen months, was seen in private practice. The only history we could get was that of a cold followed by a persistent nasal discharge from the left nostril. The mother stated that the eye symptoms started about ten days from the onset of the nasal discharge. The eye presented the usual picture of an orbital abscess, exophthalmos, marked chemosis of the lids and conjunctiva, and slight corneal ulceration. The same plan of treatment for the eye condition prior to operation was followed. The roentgenographs showed positive ethmoiditis of the anterior cells. An external ethmoid operation was performed. The patient made a good recovery. The exophthalmos and eye symptoms cleared up, with no postoperative complications.

CASE VI.—Baby, aged twenty months. Bronchopneumonia; ethmoiditis; double mastoiditis. Recovery. This baby was seen in St. Margaret's Hospital during the bronchopneumonia, for a double otitis media, following a left-sided nasal discharge. Both tympanic membranes were incised followed by a free drainage, but a double mastoiditis developed. One roentgenograph was positive for mastoid involvement, the other showed well-developed anterior ethmoid cells with definite ethmoiditis. There were no eye complications in this case. A double mastoid operation was performed, as by this time the baby was well over her pneumonia.

No operation was performed for the ethmoiditis. The same nasal treatment as given in the other case reports was used with good results. The child made a good recovery.

The writer has found the use of ephedrin sulphate after irrigating the nose with a mild warm saline solution of the greatest benefit, and has followed this as a matter of routine in all cases of sinusitis in children both before and after operation. In most cases this treatment has been sufficient without any operation. The ephedrin solution reduces the congestion of the mucosa so promptly and the effect lasts so long, that the writer has not found the use of tampons necessary except in some cases in older children.

CASE VII.—Boy, aged seven years, had diphtheria with an offensive discharge from the nose during and after the diphtheria. This patient was seen by the writer two months after he was apparently well. Examination showed a rather profuse discharge from the left nostril. The middle meatus was found full of pus which apparently came from the left anterior ethmoid cells and maxillary antrum. The involvement of these sinuses was confirmed by a roentgenograph. Cultures from the nose showed streptococci and diphtheria bacilli. The diphtheria bacilli were found in every culture and were finally definitely located in the antral discharge. There were no eye nor orbital complications in this case. The antrum was washed out a number of times after puncture through the inferior meatus. The ethmoiditis cleared up with simple endonasal treatment.

The interesting thing about this case was the finding of diphtheria bacilli constantly in the antral pus for over a year from the time the patient was first seen. Guinea-pigs were inoculated with negative results, so the Klebs-Loeffler bacilli were apparently innocuous.

We finally had to perform a radical operation through the canine fossa, removing all the diseased antral mucosa, after which the antrum cleared up and no more diphtheria bacilli were found in the cultures.

No other cases will be reported in detail. All our other cases, and that is true of the majority of all cases of ethmoiditis in infants and young children, got well with simple intranasal treatment

directed to bringing on better drainage and aëration of the affected cells.

Most of our roentgenographs were taken in the Infants' Hospital where we have between 200 and 300 infants and young children between the ages of three months and six years. Among this number of patients we always have cases of sinusitis presenting favorable opportunities for observation.

The roentgenographs were taken for the purpose of studying the sinuses at different ages, and evidences of sinus trouble were found in many cases, in some of which it had not been suspected. In the children under four years of age this was practically always an involvement of the anterior ethmoid cells.

We found in 5 cases of children between three and four years of age, that foreign bodies in the nose, causing inflammatory changes with persistent nasal discharge, were probably responsible for the ethmoiditis. In 3 cases we found beans high up in the nose, and in 2 small buttons. How long the foreign bodies had been in we could not determine, as the children had a nasal discharge when they were admitted to the hospital. In some cases, children between the ages of three and four years, the roentgenographs showed surprisingly large maxillary sinuses.

The anterior ethmoid cells were well developed in nearly all children between two and five years of age, and in a few cases in infants between five and eight months of age.

We regarded all cases with chronic persistent nasal discharge in the absence of acute colds as suspicious of sinusitis, and in many of these the diagnosis was confirmed by roentgenographs. Of the 31 cases thoroughly investigated, 3 developed mastoiditis following ethmoiditis and acute otitis media.

We have found the violet-ray treatment a most valuable adjunct to our treatment of the very much run down children with sinusitis. Unfortunately many of the infants are in the worst possible physical condition when they are brought to the hospital. A good many malnutrition cases, and these children seem peculiarly susceptible to colds and ethmoiditis. This class of cases was particularly benefited by the violet-ray treatment which they get every day. It appeared to have a very beneficial effect on the ethmoiditis, but probably without nasal treatment at the same time it would

not have been so effective. We could also determine positively the great physical improvement in all the babies receiving the daily violet-ray treatment. Mild suction for some of the older children also appeared to be of some benefit.

Any form of treatment improving the aëration of the sinuses, such as a spray of a weak solution of ephedrin sulphate, did the children a great deal of good. Ephedrin seems to be safe and without any of the unpleasant effects of adrenalin.

The roentgenographs showed a development of the frontal sinus in only a few of the very young infants between one and two years of age. We had a few exceptions to this rule, however. As the frontal sinus embryologically in its process of development is really an offshoot from the ethmoid labyrinth, and is not much larger than a bean at about the fifth year, it can be easily understood why roentgenographs may not be very clear in this respect. In exceptional cases it might also be a surgical sinus at a much younger age than we believe, so that in cases of ethmoiditis in young children the possibility of its involvement must not be lost sight of. That is the advantage of the Killian incision in doing the external ethmoid operation that the frontal sinus if present can be explored at the same time.

In the 6 cases reported in this paper in which the radical external ethmoid operation was performed we found no frontal sinuses; as a matter of fact in only 1 case could we determine that a frontal sinus had reached a sufficient development to be called one.

In regard to the choice of operation, whether intranasal or external: in children in which a chronic latent empyema of the ethmoid cells exists the intranasal operation might be indicated, but only if complications exist. As before stated the writer is an advocate of the utmost conservatism in dealing with the ethmoid labyrinth in children, and no operation should be performed until all conservative methods of intranasal treatment have been tried.

In cases in which the empyema of the ethmoid cells has ruptured externally, as in cases of orbital abscess, the external operation is indicated. In such cases conservative methods will do no good.

In very young children the tampon treatment, owing to the difficulty of placing it properly against the ethmoid capsule in a struggling child, is not very satisfactory. In older children this

method of treatment, if persisted in, is often followed by good results. We occasionally see polypi in ethmoiditis in older children and in such cases the removal of the polypi is often all that it is necessary to do. The discharge from the cells of the ethmoidal labyrinth stops without any further measures being necessary.

The writer has rarely found it necessary to remove any part of the middle turbinate of a child with ethmoiditis and would urge the greatest conservatism with respect to this procedure also. In adults it is a different matter entirely.

It goes without saying, however, that owing to difficulties in orientation even in skilled hands, no one should attempt either the endonasal or external ethmoid operation unless he is thoroughly familiar with the anatomy, and has had a good deal of the necessary preliminary work on the cadaver. The danger of the endonasal operation in children, even in the most skilled hands, is very considerable.

True nasal polypi in ethmoiditis in children are not very common, but we see, probably as the result of the chronic discharge from the ethmoid cells, soft polypoid granulations in the ethmoid region. The removal of such granulations to give better drainage, is often all that is necessary.

The great majority of cases of ethmoiditis in children will get well spontaneously in time if Nature, assisted by gentle intranasal treatment, is given half a chance.

It was rather difficult, considering the various organisms that are always present in the nose, to determine any predominating organism in our cases of ethmoiditis.

In the case of the child, aged twenty months, in which ethmoiditis and double mastoiditis followed a bronchopneumonia, nasal cultures showed a diplococcus, probably the *Diplococcus pneumoniae*.

In the cases following scarlet fever and measles, nasal cultures showed the *Streptococcus aureus* as the main organism.

The hemolytic streptococcus was isolated in cultures in 2 cases, and in 3 cases Klebs-Loeffler bacilli were found in the cultures from the nose. The cases in which the hemolytic streptococcus is found appear to be unusually severe.

Our investigations of the sinuses of the children in the Infants'

Hospital were carried out mainly because we had so many cases of acute ears, mastoiditis, and inflammatory conditions of the eyes and lids with some orbital abscesses after apparently trivial colds. Most of the babies had simply had "snuffles," very few acute throats, so that we thought there must be some focus of infection responsible for the severe ear and eye complications. We then started to take roentgenographs of the sinuses of a great many babies and were surprised at the large number showing definite ethmoid involvement. In many of these cases the ethmoiditis had not been suspected. We came to the conclusion that this must have been the primary source of infection responsible for many of the acute ear and eye cases.

The cases of ethmoiditis in young children rupturing externally usually rupture at the inner angle of the eye with the appearance of an infiltration and swelling. In older children this is as a rule the result of a more or less chronic process in the ethmoid cells, but in young infants, as in the cases reported in the writer's paper, spontaneous external rupture may follow an acute ethmoiditis very quickly.

In these cases a probe can be passed into the nasal cavity through the lamina papyracea.

In conclusion the writer would again advocate the utmost conservatism in the treatment of ethmoiditis in infants and very young children. No radical ethmoid surgery, except in the cases with evidence of external rupture and severe eye and orbital complications or other severe systemic conditions, should be done until all conservative methods of intranasal treatment have been carried out. We have come to view all cases of persistent nasal discharge in very young children and infants in the absence of acute nasal colds as suspicious of sinusitis; in children under four years of age, probably ethmoiditis.

A persistent nasal discharge occurring with and after scarlet fever, measles or diphtheria, we believe, is nearly always an indication of sinus involvement.

NOTE.—It is well worth noting that Dr. Emil Mayer, one of our Fellows, has written one of the first, if not the first, paper on Sinusitis in Children, published in the United States. This was in 1902.

BIBLIOGRAPHY

1. Die Komplikationen der Stirnhöhlenentzündungen, 1909, and Meningitis nach Nebenhöhleneiterung, Zentralbl. f. Laryngol., 1916, p. 139.
2. Die Operationen an der Nebenhöhlen, etc., 1923.
3. Rhonogene Gehirnaaffektionen, Internal. Zentralbl. f. Ohrenheilkunde, vol. vi, No. 3.
4. Trans. Am. Laryngol. Assn., 1918.
5. Trans. Am. Laryngol. Assn., 1914.
6. Jour. Am. Med. Assn., vol. lxix, No. 11.
7. Trans. Am. Laryngol. Assn., 1914.
8. Path. and Treatment of the Inflammatory Diseases of the Nasal Accessory Sinuses, 1926.

DISCUSSION

DR. E. ROSS FAULKNER, New York City:

The subject of sinusitis in children always seems to be interesting. It does not seem as if we can ever arrive at certain convictions about it. There does not seem to be any orthodox standard of treatment. Even the pathology is so variable that it is difficult to determine what is going on there. We are unfortunate, in a way, in the fact that we do not get postmortems on those cases, so that we can carry out an accurate examination and correlate that with clinical symptoms during life. In other parts of the body that is the way most of our knowledge is obtained.

I am very much interested in orbital complications of sinusitis in children. I seem to have had the good fortune, or bad fortune, to have seen a great many of those cases. Within the last six weeks I have seen four of them, and I must say that every one of them is a puzzle to me still. With all that has been written, and all that I have heard upon the subject, I still consider every case a problem.

Dr. Theisen has emphasized conservatism in the treatment of sinusitis in children, and conservatism is an excellent thing. And it is always well, perhaps, to practise it. Somebody said, "Morals are a matter of geography." Conservatism, to a certain extent, is a matter of age, regardless of experience. I find as I get older that I am inclined to be more and more conservative. I hardly trust my own conservatism at present, and I think perhaps sometimes I am leaning to the other extreme.

About ten years ago almost every case of orbital complication in a child from a sinusitis that came into our hospital was regarded as an

emergency operation case. It was almost immediately operated on. These cases would come in with exophthalmos and swollen lids, running considerable temperature, and they would be put in the operating room within twenty-four hours. I claim some credit for changing that order of things. Those cases are not so urgent as that except in very, very rare instances. Like every other acute suppurative process, if you have time to wait until Nature gets some local immunity, or promotes some barrier around the acute suppurative process, you will operate with very much more safety. The mortality rate from these operations was exceedingly high, especially in one hospital in New York. I talked with a man who was on the house staff at that time, and he said the reason for that was the fact that the oculist used to operate on these cases. By waiting a short period, you can do this operation in a conservative way and with comparative safety.

I am going to very briefly review four cases, because they represent the different types which usually occur:

A child, aged three years, had an exophthalmos, swollen lids and not great fixation of the eyeball. I always regarded that as a very important matter in the diagnosis and a matter of prognosis as to whether you will escape an operation or not. If those ethmoid cells have broken far back in the orbit, and there is very much pus pressure back there, you will get an absolute fixation of the eyeball, perhaps more important than the exophthalmos. That will probably indicate that you will have to open those ethmoids. This child had not much fixation of the eyeball, but a good deal of exophthalmos, and was draining through the nose, and that is a very important thing. There was a distinct discharge from the right nostril where this occurred. This child was shrunk up with adrenalin and cocaine treatment. Being in a private house, and being only a consultant in this case, I do not know exactly the details of the treatment, but no suction was used. If we had had the case in the hospital we would have, after shrinking that mucous membrane about ten minutes, applied suction and continued to do that. However, at about the end of a week, after two or three specialists had decided that this child would have to be operated on, it began to get well, and it got entirely well. And let me say that the after-history of those cases that got well spontaneously has not shown me anything to warrant my thinking that it would have been better to operate on them. I have not seen recurrences in them and I have not noticed that they went on to chronic sinusitis afterward.

The next case was a child, aged ten years, with quite a large frontal sinus. When I first saw the child it was advocated that an opening be

made immediately. The child had scarlet fever, with a temperature of $102\frac{1}{2}^{\circ}$. The swelling increased. With all the means we could adopt we could not get any intranasal drainage at all. A good deal of edema occurred over the frontal bone, indicating considerable pressure in the frontal sinus. The ethmoids did not show quite so much involvement. I operated on that child five days after the onset. I found the frontal sinus full of pus and under considerable tension. I did the Killian incision, perhaps not as long as if I were going to do a Killian operation, opened the floor of the frontal sinus quite near the center line, put a tube in the sinus big enough to irrigate it, which I brought to the outside; then I went into my ethmoids. As far back as I went pus welled out and also pus came out of the sphenoid. It was a very clear field when I finished. The bleeding did not bother me so much, but all that ethmoid region showed pus under pressure in the ethmoid cells. I cleaned them all out, and drained the sphenoid. That sounds fairly radical, does it not, in an acute process? Gentlemen, there is one thing we want to remember: that the ultraconservative operations on ethmoids are about as sensible as the ultraconservative operations on the acute mastoid. Nobody today would think of going into a mastoid and not taking out all those cells. If he got a dural exposure, and had merely taken out half of the cells and left a suppurating mass there, he would get meningitis. If you were taking out the ethmoids, and you get a dural exposure and leave a suppurating mass in there, you will get meningitis just the same. That child's nose, I felt when I was through, was just as clean as if I had done a simple mastoid. I put a tube in through the outside and out through the nose, and the child's temperature was normal the next day and has been ever since.

When I got home from operating on that child I was called uptown to see a boy, aged thirteen years, with no frontal sinus. We had the x-rays, and he had no frontal sinus. His eye was bulging to the outer part with as much exophthalmos as I ever saw, with absolute fixation of the eyeball. An oculist present at that consultation wanted me to consider it an emergency case and operate on him that night. He had no intranasal drainage whatever. I took him to the hospital, expecting to operate on him the next day. We started various agencies, shrinking and suction, and at 12 o'clock the next day he started to drain through the nose, but there was no improvement in symptoms. At about 12 o'clock that night the boy was apparently getting worse. He was having more swelling of his lid and he was having considerable pain. I was going to operate on him the next morning but by that time he started very profuse drainage through the nose and he contin-

ued so for about three or four days. All the exophthalmos disappeared and the boy's nose looks practically like a normal nose now, and that was only about ten days ago.

You might raise the question as to whether this case would have not been better operated on, or whether it will go on to chronic ethmoiditis or running nose. I do not believe it will. As far as my experience with those cases goes, I have not seen that they were any more prone to develop chronic ethmoiditis than cases that cleared up without any orbital complications.

DR. FRANK R. SPENCER, Boulder, Colo.:

There is one thing I should like to emphasize, and that is that, many times, a family physician wants to wait until he has more evidence of sinus disease. I have recently been forced to operate on two children where that is what happened. These children went until there was marked swelling of one upper lid and edema at the inner canthus without any conservative treatment whatsoever.

The pediatricians are apparently quite well educated regarding the importance of early recognition of sinus disease, and if we can educate the family physician we certainly will have an opportunity to carry out some of Dr. Theisen's theories, that these are not all surgical cases and that conservative treatment may clear them early. We all try to educate them, but some campaign which will reach more of them will do more good.

OSTEOMYELITIS OF THE FRONTAL BONE; FOUR CASES PRESENTING PROBLEMS IN ETIOLOGY AND TREATMENT

VIRGINIUS DABNEY, M.D.

THE certain prevention of a disease depends on knowledge of the specific cause; thus we face a serious problem in combating osteomyelitis, whose etiology is still a matter of dispute though several plausible theories are before us. In the long bones, where this disease has been fairly common for many years, trauma and hematogenous infection have been considered usually the cause. However, even here, where demonstration is somewhat easier than in the frontal bone, I believe there is doubt in certain cases as to where the infective agent arose. Hastings, of Los Angeles, reports a case of acute diffuse osteomyelitis of the frontal bone, where it would appear very likely that the focus was of dental origin, and hence hematogenous. Lynch, of New Orleans, who is the originator, I believe, of the theory that it is caused by stripping up the periosteum and the subsequent trauma of the radical operation, makes out a strong case for his belief. However, he fails to account for the fact that men who have been doing this operation for many years have had, some of them, no cases until recently, and others very few at any time. My own belief is that the greatest cause of all, where the osteomyelitis follows another operation, is failure to remove all necrotic material, which is thus pressed against denuded bone, whose nutrition has been almost completely destroyed temporarily. The wound is deprived of air by the suturing of the soft parts over it and the drainage is limited to the opening into the nose. Is it remarkable that reinfection should occur, and is it not more reasonable as a cause of osteomyelitis than merely lifting up of the periosteum on the external frontal wall? In those cases where the osteomyelitis is acute and not the sequela of another operation on the sinus, I believe the cause lies in one or all three of these causes: (1) Trauma; (2) long-continued contact of infective material in an undrained cavity; (3) hemolytic bacteria, generally

the streptococcus. All my cases have showed this type of infection, and all that I have ever personally investigated have shown it. It is within the past nine or ten years that we have encountered this increase in osteomyelitis of the frontal bone and this period coincides with that following the pandemic of so-called influenza, which sent thousands of carriers of the hemolytic streptococcus all over the world to disseminate this deadly organism. In a paper entitled "A Scourge of Hemolytic Streptococcus" I directed attention to the enormous increase of surgical mastoid cases with this organism as the basic cause, giving rise to those cases variously termed hemorrhagic, coalescent or hemolytic. Such cases certainly had been rare in my experience up to that time, but not only were no longer so, but were actually common. As I have said, I attributed this to the dissemination of the bacteria by the thousands of carriers who were everywhere. To the list of the possible causes Hastings has added the hematogenous, and it must henceforth be included in the etiology, as his case is convincing.

These 4 cases present material for proving almost any or all of the various forms of etiology thus far offered, if one chooses to see his own theory in them. In fact, one of them alone could be used to show every one of the theories I have laid down, or that has been suggested by anyone. Of course, tuberculosis and syphilis, the twin banes of all investigators in etiology, are not considered, as they are basic and taken for granted. Moreover, they were not present in my cases. To open an osteomyelitic process and leave it widely open and drained until a sequestrum has formed and the delimiting process has been established cannot be questioned as good surgery in the long bones, but in the frontal bone, I think it rather different. Here we are leaving virulent infective material in contact with so poorly resistant a region as the cribriform plate of the ethmoid, and the thin inner frontal plate alone separating it from the brain. I admit I lack the courage to do this, even if I were convinced that it might help matters, and I am yet far from being so. I prefer to remove all softened bone and leave a widely open wound, though this might prove to be the same thing, as it is not possible to be sure that all diseased bone has been removed.

CASE I.—A vigorous young boy, aged twelve years, presented himself to a colleague of mine showing a soft swelling to the right of the

glabella 1 inch in diameter and painful to the touch. He seemed to think that it had followed an accidental blow some ten days before, and it was accordingly incised under the presumption that it was a periostitis with effusion. Free pus was obtained, two stitches taken and a small drain inserted in the lower angle of the wound. In ten days all symptoms seemed to have disappeared. Two months later he fell into my hands with the same symptoms, only this time the swelling was much more extensive, being pear-shaped and the narrow limb extended vertically to the hair line. The radiograph showed absence of frontal sinuses and outlined the collection of pus in conformity with the swelling. A vertical incision was made from the hair line to the supra-orbital ridge, a great quantity of pus released and a distinct deep channel found which had been burrowed through the external frontal plate by the pus, sufficient to accommodate an ordinary pencil. There was, of course, no connection with the nose, as there was as yet no frontal sinus or even enlarged frontal cell. As no thought of osteomyelitis entered into my calculations, I merely smoothed the rough edges of the sinus and its bottom, sutured the upper two-thirds and inserted a gauze wick. Convalescence was uneventful, with a depressed scar hugging the contour of the pus sinus. Five years later this boy returned with a history of frequent headaches, occasional swelling of the brow and nasal discharge, all of which symptoms had been very frequent the past two weeks, but that now the swelling had become permanent since ten days. He had developed into a large, powerful young man with an unusually large head, and I found bad tonsils, a mucopurulent discharge from the right naris, swelling of the middle turbinate and a brow that was exquisitely painful on the lightest touch. The radiograph now showed small but fully developed frontal sinuses, very cloudy, complete absence of the vertical furrow of the previous operation and dark right ethmoid. His condition was critical; marked weakness, great pain, a septic complexion, temperature of 102° F., and chemosis of the right eye. As the pus had extravasated high up on the frontal prominence I first reopened the old vertical incision and joined this at right angles with the usual Killian brow incision, realizing now that I faced an osteomyelitis and that a cosmetic result was not to be considered. The furrow was completely filled with hard healthy bone, the external plate over the right sinus was necrotic and soft, and it and half that over the left sinus were removed, the bone imparting to the rongeur and curettes the sensation that one gets in cutting a cheese rind. The left sinus was opened through the septum which was

necrotic and showed a large erosion in the center. As the wound was kept widely open and there was no disease in the left ethmoid there was no necessity of disturbing the interior of the left naris. However, the right ethmoid was completely exenterated. I have seen him at intervals of two years and he still is free of a recurrence, though I have since then removed his tonsils as a precaution.

Several interesting features present themselves in this case, notably the formation of new bone to fill a large cavity in the frontal bone, and the development of two frontal sinuses between the two operations. The two conditions were probably the result of the same process: the natural development of the bones in a boy between the ages of twelve and seventeen years.

CASE II.—An obese colored woman, aged twenty-eight years, reported to the clinic at the Episcopal Hospital, giving as her chief complaint a painful swelling on her forehead of ten days' duration and a slight cold in the head. The cold referred to was seen to be a free discharge of pus from the right naris, originating about the middle turbinate, apparently. A large fluctuating swelling about the size of a silver dollar was found 2 inches above the right brow near the midline. The radiograph indicated pus in the right frontal and maxillary sinuses but a perfectly clear ethmoid and sphenoid. It also outlined the frontal collection of pus. A Luc-Caldwell operation was done on the antrum which was full of thick pus, a vertical incision was made to open the swelling above the brow and this too showed free pus. The cavity here was thoroughly curetted and the edges bevelled to a point where it was flush with the cortex, the bone coming away almost like stiff putty, and leaving a cavity 3 by 2 inches. The usual Killian incision at the brow was made to join the vertical line, and a little pus was found in the frontal sinus, whose external wall was softened just at the cortex above. The double wound was dressed as an open wound, but no opening was made in the ethmoid as I believed the contamination of the frontal sinus was from the cortical abscess above and not from the antrum below. As the entire wound healed with a healthy, depressed scar in a month, and a year has elapsed, it would appear that the osteomyelitis has been arrested. The etiology here is certainly not clear.

CASE III.—The first time I saw this patient, a woman, aged fifty-five years, her temperature was 101.5° F., her left eye closed, and her

left naris completely blocked with pus and an enormous middle turbinate. There was no chemosis of the eye, however. Appropriate measures served to return the parts to normal in three days, with the exception of the middle turbinate which receded some but was seen to be cystic. She had been forced to spend several months in Arizona for a number of winters because of what she said was "sinus trouble." Two months later in accordance with clinical and radiographic evidence of a pansinusitis I tried to persuade her to have a Killian operation to be followed by a Luc-Caldwell, but all I accomplished was permission to do an exenteration of the ethmoids and sphenoids under local anesthesia, followed after two months by a Luc-Caldwell, all of which were bilateral. There was nothing at any of these operations other than what is usually found in any neglected pansinus conditions. A year later I did a conservative Killian operation on the left side and found in the frontal sinus only a small encapsulated collection of pus just over the nasofrontal duct, the ethmoid remains were small and removed at this time. The interfrontal septum was healthy and the cortex and internal frontal plate very hard; these points are important in the light of the subsequent developments. A month after healing the wound suddenly swelled and the eye became closed almost over night. I at once reopened the wound and found this time the frontal sinus partly filled with degenerated tissue. There was also some necrosis in the middle ethmoid which I had overlooked or which had taken place after the other operation. The wound was closed, and I had only to reopen it five weeks later. This time, however, I recognized what faced me and removed every vestige of necrotic material, including the supra-orbital ridge, the entire floor of the sinus, and all the bony postocular support. The interfrontal septum was roughened and upon curettement showed an erosion into the other sinus. This was enlarged and a mucopurulent discharge trickled out, but the patient's condition was too critical to admit of an operation on the sinus. Thus far, after nine months, there are no symptoms referable to the unoperated sinus, and the whole wound has healed, solid but depressed, as I carried my curettement far up on the cortex and bevelled all edges.

The history of the case (at least five years), the short time between operations (about a month) and the consistent hardness of the cortex until late suggest an osteomyelitis from the beginning, mild but persistent, increasing in virulence until it became too manifest for me to overlook. Long contact with infectious material

was the cause here, I feel sure. Of course, this time I left the wound widely open.

CASE IV.—This young woman, aged twenty-one years, was Dr. Joseph Bryan's patient and came into my hands after he had done several very thorough and careful operations, but was forced to relinquish control of the case as he had to leave the city for some time. In November, 1925, she reported to him with the history of a severely swollen and painful right eye for the preceding three months. The radiograph and the eye report indicated the necessity for a radical operation on the nasal accessory sinuses of the right side, which was accordingly done by the technique which Dr. Bryan originated and similar to the Killian in its essential points. In accordance with the symptoms and clinical indications the following operations were found necessary and done by Dr. Bryan:

January 28, 1926, intranasal ethmoid and sphenoid, local anesthesia; February 11, reopened frontal and rest of wound; June 26, complete radical operation, again February 9, 1927, ethmoid and sphenoid, local anesthesia, intranasal; February 21, complete radical again (fourth radical operation). It was at this last operation that I came into contact with the case as I was an assistant at the operation. While the disease was extensive, with a burrowing into the glabella, I did not suspect any osteomyelitis nor do I think that Dr. Bryan did. A few days later I took charge of the case, and on May 1 reopened the old wound and found it necessary to remove the interfrontal septum, all the cortex over the right sinus and half of that over the left, and all the floor of the left sinus. The glabella was so soft that it came away under the curettes like the shavings of a soft pine board under the plane. The necrotic process had attacked the cortex to a distance of 3 inches above the supra-orbital ridge. The left ethmoid and posterior and lateral walls of the orbit were all cleaned out carefully. The old wound on the right showed an erosion in the center of the internal frontal plate through which a bubble of dura bulged. The wound was left wide open, but, as the patient was very septic from two years' infection, was slow to heal. However, it did so in two months. From week to week some small area would break down and under local anesthesia would yield to curettement. Her progressive weakness and the tendency to reopening of small spots led me to have her hemoglobin tested and, upon finding it only 44 per cent, I learned that she had had a bad menorrhagia for six weeks. She was put in the hospital, given two transfusions of whole blood in

the vein, two in the buttocks and two applications of radium in the cervix. These measures resulted in an immediate improvement and she is now home with the osteomyelitis cured, apparently, after eleven months.

This case, I think, shows clearly that long contact with diseased material produced the osteomyelitis, as four very thorough operations showed the same pathological findings, but it was only on the fifth with an open dressing that the arrest of the process took place. I believe it was an osteomyelitis from the first operation, though there was no reason to suspect it from the gross appearance. In future, where I get a definite history of long-standing sinus disease and find marked and extensive destruction associated with a hemolytic organism, I shall leave the wound at least partly open if not wholly so. I believe every one of these 4 cases was of osteomyelitic origin from the beginning, but it was not recognized. It is striking that despite the most thorough, painstaking and very radical surgery none of them healed solidly until the open dressing was adopted, the number of operations running from three to five, not counting those done intranasally, before the disease process could be arrested. As anemia is always one of the striking and invariable complications of osteomyelitis and, especially where a hemolytic organism is found, this should be corrected by transfusion. The healing of a wound is, of course, a metabolic process and this is seriously interfered with where an anemia is found.

CONCLUSION. Osteomyelitis of the frontal bone following radical surgery is due not to the operation and its technique, I believe, but to long contact with infective material undrained. Otherwise, why have many rhinologists had no such cases even though they have been doing this operation for many years?

Another potent cause I believe to be the hemolytic bacteria, especially the streptococcus, which may account for the increase in these cases, coinciding with the dissemination of this germ since the World War through carriers returning to their homes all over the world.

REFERENCES

1. Hastings, Hill: Arch. Oto-laryngol., 1927, vi, 559.
2. Dabney, Virginus: Med. Jour. and Rec., New York, 1924, cxix, No. 12.

DISCUSSION

DR. VILRAY P. BLAIR, St. Louis, Mo.:

I think the doctor's record is unique in having 100 per cent recoveries from the treatment of this type of osteomyelitis. I shall not bore you by going into statistics with which you are already familiar. To the 40 cases upon which Dan McKenzie based his conclusions in 1913, and the 1 of his own, we added 6 cases and found 25 more reported since then.

Statistics show that there are thirty-three articles based chiefly on 46 cases with available records, and most of them are in favor of early radical operation. I think Mosher is one who stands out conspicuously as against that practice.

It is difficult from these few cases to draw any conclusions, but the facts as we make them out from a personal study of the literature are that in those cases radical treatment was done in 37; that of those 37, 25 died and 12 lived. Conservative treatment (and the conservatively treated cases are the older cases) was given in only 9; of the 9, 3 died and 6 are living.

Taking it up from 1913 to 1925, of those given radical treatment, 11 died and 8 are living; of those given conservative treatment, 2 died and 4 are living. Adding 6 cases of our own, these are our conclusions of the results in cases with available records up to 1925:

Radical treatment, 56 cases. Alive, 35 per cent; dead, 64 per cent.

Conservative treatment, 21 cases. Alive, 61 per cent; dead, 38 per cent.

These statistics do not make a distinction between early and late radical treatment. Judging from analogy to osteomyelitis of the bones in other parts and from our very limited observations, the early radical operations are the ones most likely to be followed by a further spread of the disease. The late radical cutting into apparently undiseased bone is objectionable only inasmuch as it risks the unnecessary removal.

I think, outside of some few enthusiasts, there is no question that the long bones that live are conserved by early drainage and late removal of the sequestrum. This gives time for a very virulent infection to attack the live bone, for it to lose its virulence and for resistance to develop.

Then we come to another type which has very definite characteristics, and that is the osteomyelitis that is connected with what is called the ulcerated tooth. We for years have seen probably at least one

death a year from the removal of the tooth during the acute infected stage, and I have only seen one case in all these years where death occurred where the tooth was not removed, and in that case there was some very vigorous tearing up of the periosteum with an elevator. In the last three years, in that particular type of case, we have got pretty good evidence that all of the deaths are from that rather new organism, the *Staphylococcus aureus hemolyticus*.

When we come to these other cases, there were 6 of those treated. There were others seen in consultation. Some of the cases were referred after rather radical operation, and in some cases more than one operation had been done to try to eradicate the disease, by trying to cut ahead of it in the bone. In 1 case, we thought we could go very much beyond, and we cut very wide of the apparently diseased area, and still the disease spread; and in 2 of the cases at least the osteomyelitis, before we got through, involved every bone of the calvarium. Three of them died, 3 lived, and all of the deaths occurred from meningitis. Yet we noticed, and others have pointed out, that the organism does not seem to be very virulent.

The point I want to make is this: I believe the organism is probably different from the one that has just been reported, the hemolyticus, on account of the evidence of low-grade virulency, where there may be a meningitis that gets well. We have done as many as 11 operations and 7 transfusions on 1 case, and still the patient got well; and in 2 patients where we got the pus early we found the short-chain streptococcus, but we have never been able to grow it on culture.

DR. THOMAS E. CARMODY, Denver, Colo.:

I wish to thank Dr. Dabney for bringing this before us. I hesitate to report my cases after what Dr. Blair has said. I have seen 5 cases, however, and of these 1 had a syphilitic taint, so it should be eliminated. There were 3 deaths and 2 recoveries, and 1 of the recoveries was the syphilitic case. So that my death-rate has been 75 per cent in those cases that were pure osteomyelitis. All of them were chronic infections like Dr. Dabney reports, except one, and I wish to show some slides of that last one. This child came in with no history of infection, no history of injury or anything of the kind. His head had begun to swell over the glabella on both sides within twenty-four hours of the time he came into the hospital. There was evidence of infection, corroborated by x-ray twenty-four hours later. I opened simply into the left orbit, evacuating some pus from the orbit itself, but there was pus in the nose; however, the x-ray did not show either the frontal or

the maxillary sinus having any infection. Twenty-four hours later, I evacuated pus from the left maxillary sinus also, and about a week later I opened the frontal sinus. This child recovered apparently and was allowed to go home, but the bone began to show disease, and he began to have spots all over the cranium that showed apparent destruction. The frontal sinus had to be opened by the practitioner at home, who was a very good surgeon, and he was later sent back, between three and four months later, and all of the bone removed, and he recovered.

DR. DABNEY (in closing):

I hope you have not misunderstood me. I have no pride of opinion or accomplishment as to the result of these cases, which were reported, as the subtitle of the paper suggests, purely as studies in etiology and treatment, and not to exploit my skill in saving 4 cases out of 4 in the presence of osteomyelitis. No history would have been complete without a statement as to the ultimate outcome, and I regard that as a mere detail here. I make this statement as I fear someone will think that I am trying to give the impression that in my hands osteomyelitis is a simple matter; whereas the next 4 cases I treat may all die. I have had only these 4 cases in the past three years that I could follow closely for a proper time, entirely under my own control and without any interference. I have become firmly convinced that no patient who has been subjected to several radical operations on the fronto-ethmoid region is ever physically, mentally or temperamentally normal thereafter. I merely mean these 4 patients did not die, had no visible suppurative disease and were not under any treatment of the sinuses for periods ranging from three years to eleven months after the last operation. The fact that these patients lived is probably due to luck. I take no issue with this feeling, if anyone so feels, as the wounds may break down any time, but they have not done so for three years.

THE EMBRYOLOGY AND NEUROHISTOLOGY OF
SPHENOPALATINE GANGLION CONNECTIONS:
A CONTRIBUTION TO THE STUDY OF
OTALGIA*

RECIPIENT OF THE CASSELBERRY PRIZE FUND AWARD, 1928

O. LARSELL, PH.D.

AND

RALPH A. FENTON, M.D.

MAN'S use of sternutatory drugs from the remotest antiquity shows his thought of the nasal mucosa as a portal for influence upon the vital forces and upon the brain. In relatively recent years the sensory and sympathetic reactions of the nose have tempted various bold theorists to attack distant cranial, visceral or pelvic disorders by cauterization of certain turbinal or septal areas. Fantastic systems of localization were published, with a succession of reputed cures.^{1,2,3}

Scientific observation in this field began long after the prompting of Hilton,⁴ with the records of neuralgias traced to nasal, sinus and dental disease and studied by Hack,⁵ Delavan,⁶ Legal,⁷ Politzer,⁸ Ziem,⁹ Ménière¹⁰ and others. Medical measures and the cautery proving inadequate, clinicians turned to increasingly radical surgery, often with splendid results. Technical difficulties in securing material from the speno-ethmoidal region have, however, delayed investigation of the minute anatomy of Meckel's ganglion and its connections. Most clinicians have been content to rely upon descriptions by the earlier microscopists, losing sight of the fact that their own operative technique and therapeutic armamentarium has entirely changed in thirty years.

Foremost in scientific accuracy, in the analysis of otalgia and glossodynia, come the studies of nerve distribution based upon herpes zoster oticus, made between 1907 and 1915 by J. Ramsay

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Hunt.^{11, 12, 13} Models of completeness, these studies definitely map the extension of sensory filaments through the geniculate ganglion to the auricular region. Though attacked by Mills¹⁴ and Gordon Wilson,⁴⁸ this work remains standard and has been brought up to our time by clinical reports from numerous others, notably Emerson,¹⁵ Dennis¹⁶ and Sears.¹⁷ Accurate boundaries for nerve distribution when measured by so violent a ganglionic irritation as that of herpes zoster are of course not always obtainable.

The remarkable generalizations of Sluder,¹⁸ based upon his extensive operative experience and upon his method of destruction of the sphenopalatine ganglion, have since 1900 arrested the attention of clinicians throughout the world. Unquestionably his courage has done much to throw light into one of the darkest borderlands of otolaryngology. One looks in vain, however, even in his latest work, for the detailed anatomic and histologic background found in the work of J. Ramsay Hunt. Reliance upon descriptive anatomists causes Sluder to resort to bold hypotheses; he says, "I have indulged in some speculations which will probably be forever impossible of proof."¹⁹ Although brilliant clinical successes have unquestionably followed his own attacks upon referred pain, there have been disappointments among his followers, and not a few active dissenters among contemporary teachers of equal experience and learning.^{20, 21}

Sluder's discouragement over our inadequate knowledge of this field is shared by Müller and his collaborators, who remain uncertain as to the function of the deep petrosal,²² and whether sensory impulses travel along the cervical sympathetic.²³ They regard the study of sympathetic tracts by degeneration methods after section as well-nigh impossible.²⁴ Halphen comments: "Today the sympathetic is in fashion, and we believe we possess the truth because we attach to the sympathetic what yesterday we attached to anaphylaxis, and day before yesterday to bulbar reflexes. . . . Our pathogenesis appears built upon shifting sands."²⁵ Bertein states: "We feel the insufficiency of explanations tending to attach these different troubles to sinus infection which is demonstrable neither clinically nor at operation."²⁶ Terracol considers the sphenopalatine a mixed ganglion, connected with and traversed by mixed nerves; nevertheless he says: "Its rôle appears formidable,

but its pathology remains rudimentary; and it remains really an undiscovered country, perhaps the Promised Land."²⁷

Impelled by these uncertainties among clinicians and teachers, we have felt that the comparative anatomy and embryology of the ganglion and its connections might furnish us with some clues whereby we might trace the pathways of sensation toward the periphery. Fresh material, secured by Dr. Warren E. Hunter, of the Department of Pathology, has permitted modern methods of staining and impregnation. It is hoped that the serial sections and reconstructions thus obtained may assist in solving some of the problems just stated without reference to debatable theories.

The sphenopalatine ganglion has its embryological origin in mammals by migration of cells from the V and VII ganglia (Kuntz).²⁸ It is connected, however, in the adult, not only with the maxillary branch of the trigeminus nerve through the sphenopalatine nerves, and with the facialis through the intermediation of the vidian nerve and the great superficial petrosal nerve, but also with the glossopharyngeus nerve through the great deep petrosal and its continuations, the small deep petrosal and the nerve of Jacobson (Figs. 1 and 2). It is possible that there are also connections with the vagus, through the communicating branches between the nodose ganglion of the latter nerve and the glossopharyngeus nerve.

An understanding of the intricate relations of this centrally located ganglion, with its many connections, must be based upon a knowledge of the comparative anatomy of the region and nerves involved.

In the sharks (Fig. 3), both the facialis and the glossopharyngeus nerves give off a rostrally directed palatine branch. These two rami supply, in general, the same region, and the branches illustrate the fundamental pattern of the cranial nerves as it is conceived by morphologists.²⁹ No sphenopalatine ganglion as such is present in the sharks. The ramus palatinus VII is derived from the geniculate ganglion, as shown in the figure.

In the amniotes (Fig. 4), conditions are somewhat modified. A ganglion has appeared along the course of the palatine VII nerve, and the palatine IX nerve has disappeared as a distinct branch. The IX nerve is still connected with the VII nerve through the communicating branch of Jacobson; and in the amniotes we also

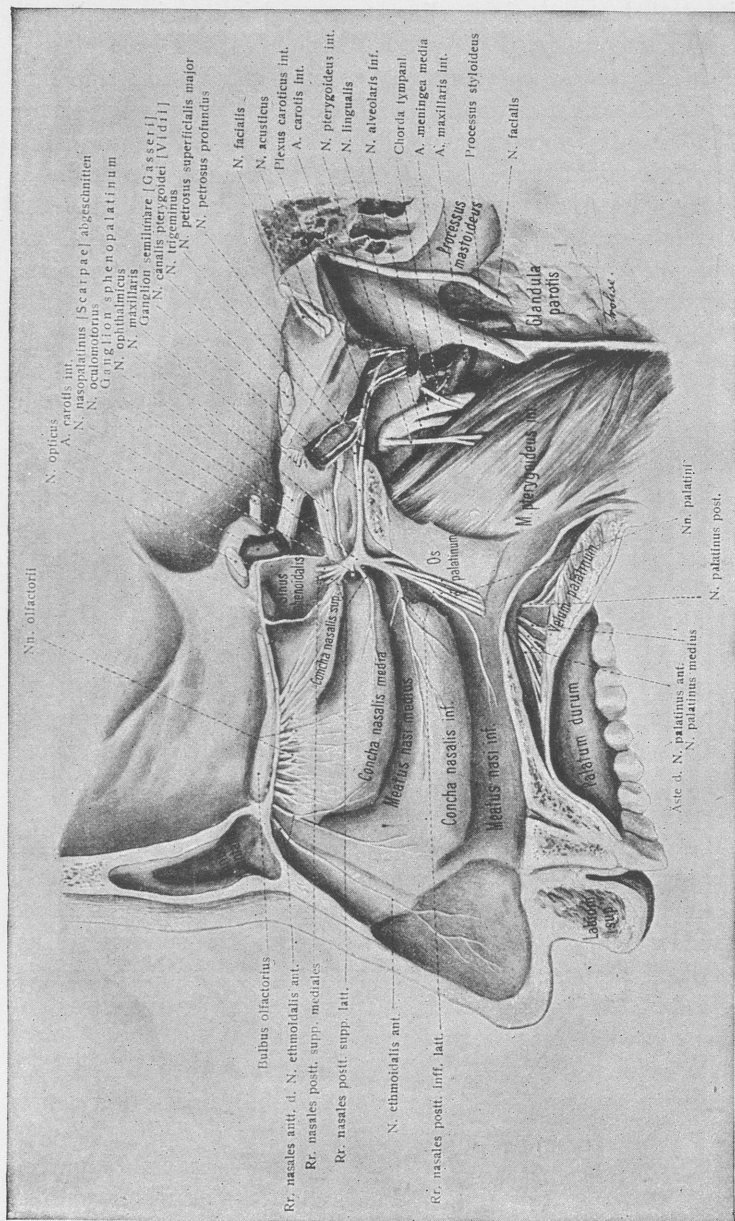


Fig. 1.—The sphenopalatine ganglion and its connections viewed from the medical aspect. (From Rauber-Kopsch, Lehrbuch der Anatomie.)

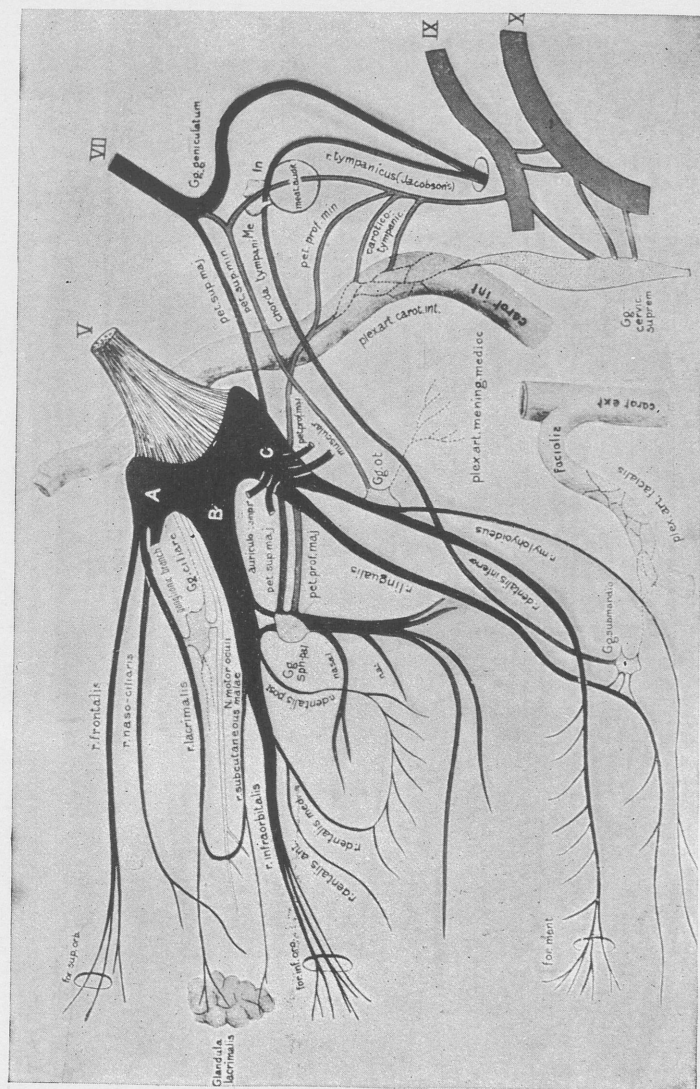


Fig. 2.—The interrelation of the trigeminal, facialis, glossopharyngeus and vagus, together with the sympathetic ganglia in man. (From H. H. Wilder, History of the Human Body; after Gray, Arnold and Gegenbaur.) Systems: *White*, motor oculi; *black*, trigeminal; *dotted*, sympathetic; *light gray*, glossopharyngeus and vagus; *dark gray*, facialis.

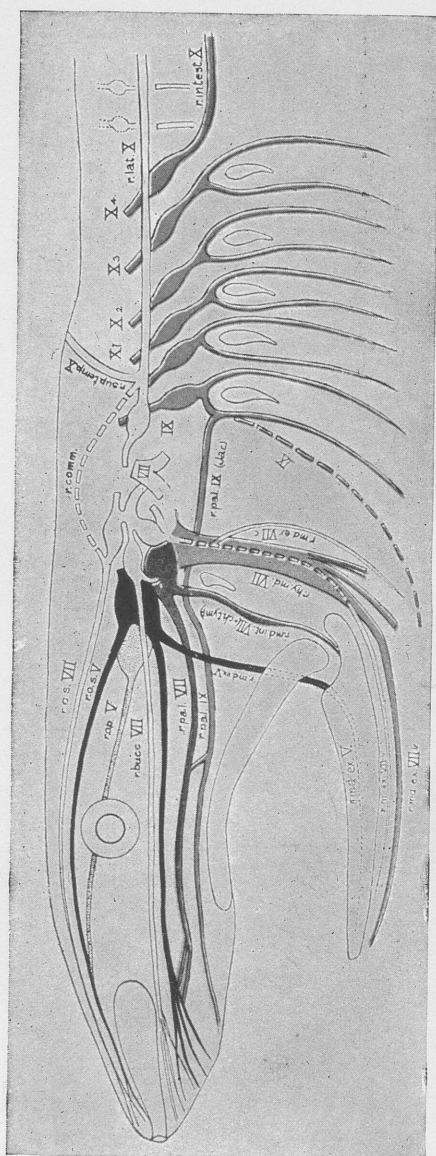


Fig. 3.—Diagram of cranial nerves in anamnia. (From Wilder, after Wiedersheim.) Roman numerals indicate the cranial nerves. Branches of these, are designated as follows: *r. o. s.*, ramus ophthalmicus superficialis; *r. o. p.*, ramus ophthalmicus profundus; *r. bucc.*, ramus buccalis; *r. pal.*, ramus palatinus; *r. md. ex.*, ramus mandibularis externus; *r. md. int.*, ramus mandibularis internus; *r. hy. md.*, ramus hyomandibularis; *r. lat.*, ramus lateralis; *r. inces.*, ramus intestinalis. Systems: *white*, entire supply to lateral line organs, also acusticus; *black*, trigeminus; *dotted*, ophthalmicus profundus; *dark gray*, facialis, sensory elements; *light gray*, facialis, motor elements; *medium gray*, glossopharyngeus and vagus.

find a connection, apparently not present in the fishes, in a branch between the ganglion nodosum X and the petrous ganglion of the glossopharyngeal nerve.

The cranial nerves of the lower vertebrates have a somewhat different equipment of functional components from that which persists in the mammals and man. The facial nerve, for example, possesses some five distinct physiological sets of nerve fibers. This is also true of the glossopharyngeal. These components have been thoroughly studied in many fishes and amphibians by Herrick,^{30, 31} Cole,^{32, 33} Coghill,^{34, 35} Norris,^{36, 37} and others. They may be recognized by their central connections within the brain, and by their peripheral distribution. There are also certain histological variations among the several types, such as differences in diameter and thickness of myelin sheath, and its presence or absence, differences in the size of fibers, etc., so that the fibers may be followed long distances with assurance. During the process of cephalogenesis, and because of the increase in complexity of the central nervous system, components of similar functional type tend to group together, so that within the brain-stem we find those of like function from the various cranial nerves entering the same fiber tract; *e. g.*, the visceral afferent fibers of the VII, IX and X all enter the fasciculus solitarius; similarly the general cutaneous fibers all enter the spinal V tract and nucleus. Peripherally, there is brought about a reapportionment of functional components in the several nerves, so that in mammals, for example, the trigeminus nerve is chiefly sensory and the facialis nerve is chiefly motor, although in the lower vertebrates the two nerves have a very similar equipment of functional components. Particularly has the somatic sensory element of the facialis nerve largely disappeared, while in the trigeminus this component is the most important of all the V nerve system in man. Similar comparisons of other systems can be made, not only in these two nerves, but in others of the cranial series.

With these facts of comparative anatomy in mind, we may now examine more closely the sphenopalatine ganglion and the facialis nerve. The finer structure of the sphenopalatine ganglion has been the subject of many investigations. Retzius³⁸ (1880), by the method of isolating cells, found in the sheep multipolar cells and in the cat cells with two processes. He stated that in general the

ganglion is of the sympathetic type. Müller and Dahl³⁹ showed by the Bielschowsky technique in 1910 that multipolar cells of the sympathetic type are the characteristic feature of this ganglion (Fig. 5). Müller,⁴⁰ in the second edition of his monograph (1924), states that it is made up entirely of multipolar cells, and adds that

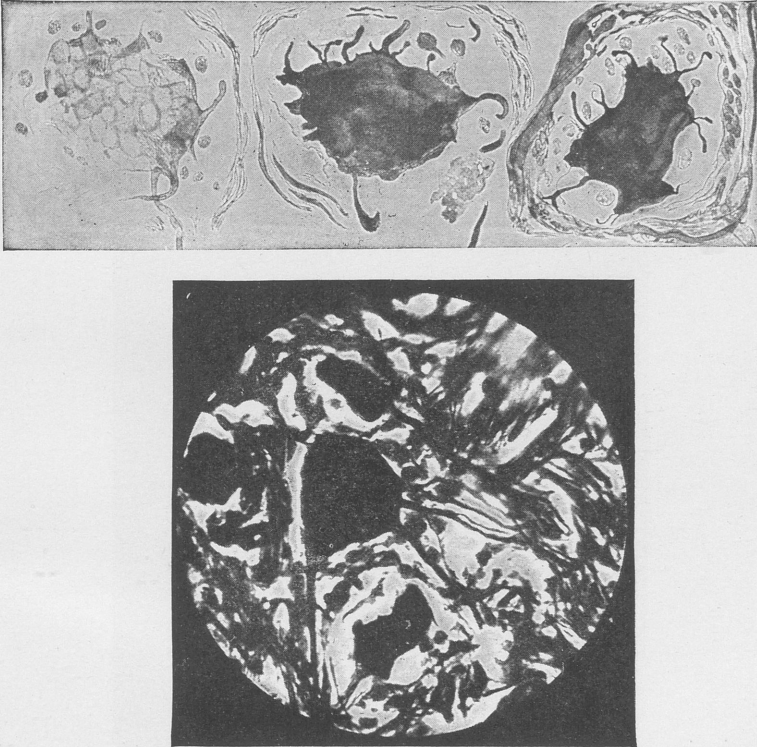


FIG. 5.—Cells of the sphenopalatine ganglion, showing multipolar character: A, in man; B, in the horse. (Bielschowsky technique; from Müller and Dahl, *Deutsch. Arch. f. klin. Med.*, 1910, vol. xcix.

there can be no doubt of its relation to the sympathetic system. He states that the preganglionic fibers reach Meckel's ganglion from the bulb through the great superficial petrosal nerve. Carpenter,⁴¹ using the methylene blue technique in 1912, demonstrated in the sheep not only the multipolar cells resembling the ordinary

type of mammalian sympathetic cells, but he also showed most beautifully the "subcapsular, pericellular end-nets of fine varicose fibrils similar to those of preganglionic fibers in the vertebral and prevertebral ganglia of the sympathetic system" (Fig. 6). These



FIG. 6A.

and other studies appear convincing as to the types of cells present, and their relation to the cranial autonomic system.

Our own observations confirm these statements. In a kitten, aged two weeks, the head region of which was stained by the pyridin

silver method, multipolar cells (Fig. 7 *A*, *C*) are clearly shown in Meckel's ganglion. Also pericellular endings of preganglionic



FIG. 6B.

FIG. 6.—*A*, Cells showing processes, and *B*, cells showing pericellular networks of preganglionic fibers, from various cranial autonomic ganglia of the sheep: 1, cells from submaxillary ganglion; 2, cell from otic ganglion; 3, cell from sphenopalatine ganglion; 4, cell from ciliary ganglion; 5 and 6, end-nets from ciliary ganglion; 7, end-nets from sphenopalatine ganglion, incompletely stained; 8 and 9, end-nets from otic ganglion; 10, end-net from submaxillary ganglion. Methylene blue technique. (From F. W. Carpenter, *Jour. Comp. Neur.*, 1922, vol. xxii.)

fibers from the great superficial petrosal nerve are found. The cells give off delicate postganglionic fibers which leave the ganglion

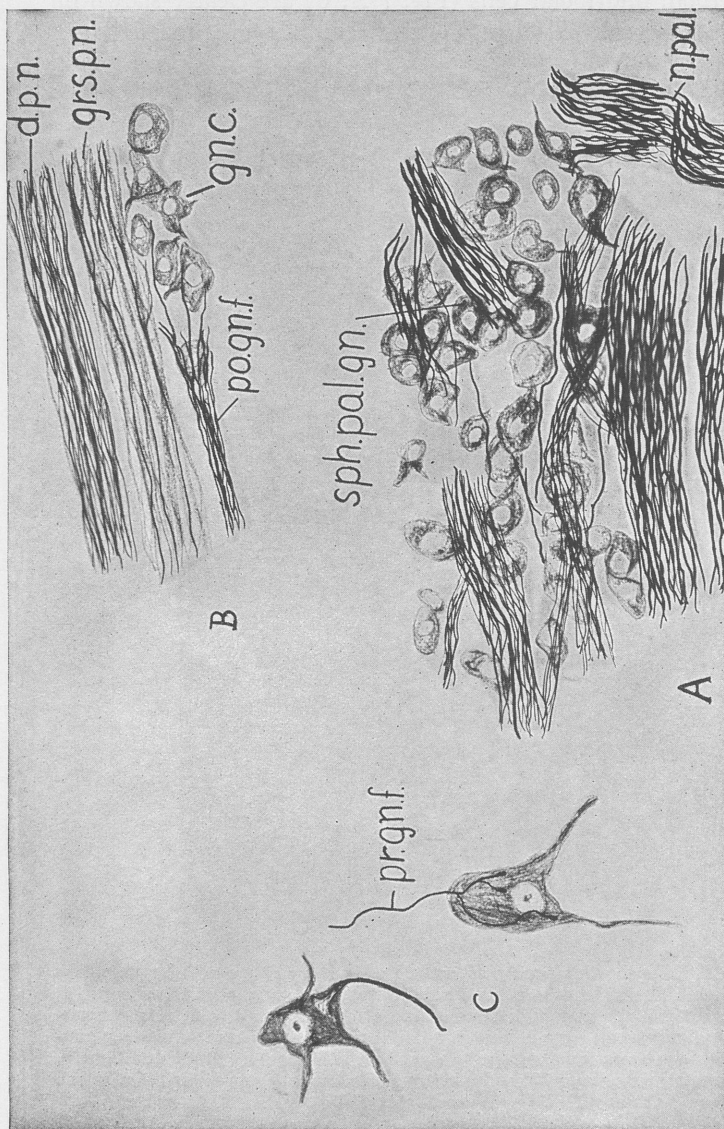


FIG. 7.—A, Portion of the sphenopalatine ganglion. B, Portion of vidian nerve, with small cluster of ganglion cells. C, Sphenopalatine cells, showing multipolar type and portion of an end-net of a preganglionic fiber. *d. p. n.*, deep petrosal nerve; *gn. c.*, ganglion cells; *gr. s. p.*, great superficial petrosal nerve; *n. pal.*, palatine nerve; *po. gn. f.*, postganglionic fibers, having their origin from the ganglion cells; *pr. gn. f.*, preganglionic fiber terminating in end-net about ganglion cell; *sph. pal. gn.*, sphenopalatine ganglion. Kitten of two weeks. Pyridin-silver technique. Camera lucida drawings. A. and B., X470; C., X960. (Larsell.)

with the various nerves that radiate from it. Their ultimate destination we have not followed.

In human material, stained with iron-hematoxylin, osmic acid and by the Pal-Weigert method, the processes of the nerve cells are not shown. There can, however, be no doubt of the similarity of this ganglion to other sympathetic ganglia, so far as its cells are concerned. Preganglionic fibers, with their myelin sheaths of small diameter, enter from the great superficial petrosal nerve. There are also larger fibers of the sensory type from this nerve in considerable number. These larger fibers do not terminate in the ganglion, but pass through it into the palatine nerves, and probably into other branches, with which they are presumably distributed to the palate and elsewhere. Bundles of unmyelinated fibers, together with myelinated fibers of the sensory type, also enter from the deep petrosal part of the vidian nerve, but appear to pass through the ganglion without interruption. This point, however, could not be adequately controlled with the available material. The sphenopalatine branches from the maxillary nerve, in our iron-hematoxylin preparations, appear to pass through the ganglion without interruption, continuing into the palatine nerves. This is in general agreement with the observations of Rhinehart⁴² in the mouse.

It should be recalled that the facialis is primarily the nerve of the hyoid arch. Its somatic afferent fibers in lower vertebrates reach the general region of the skin which becomes involved in the development of the external ear. The studies of Johnston,⁴³ Herrick,^{30, 31} Norris^{36, 37} and others have shown this to be true in fishes and amphibians. The other components of the facialis are all visceral. They include the general visceral efferent to glands, the special visceral efferent to the hyoid and facial muscles, the general visceral afferent for deep visceral sensibility, and a special visceral afferent to the taste buds on the anterior two-thirds of the tongue, and possibly some on the soft palate (Sheldon⁴⁴).

The special visceral afferent fibers arise from cells in the geniculate ganglion and pass through the chorda tympani and the lingual nerve to the taste buds. This route, long in question, has been strongly supported by the investigations of Cushing⁴⁵ by clinical methods, and corroborates the conclusions of comparative ana-

tomists (Sheldon,⁴⁴ Herrick⁴⁶). The general visceral afferent fibers are distributed to the deep surfaces through probably all of the facialis branches (Herrick⁴⁶). The other component of the facialis to which reference has been made and which demands our special attention is the general somatic afferent. This component has also been demonstrated anatomically in the mouse, in which it passes to the skin of the back of the ear (Rhinehart⁴²), after anastomosing with the ramus auricularis vagi. In addition it supplies part of the external auditory meatus and the tympanic membrane (Rhinehart). Aside from these VII fibers, the nerve supply of the tympanum according to Rhinehart is as given by J. Gordon Wilson.^{47, 48} This ramus cutaneus facialis of Rhinehart has not been demonstrated anatomically in man, but J. Ramsay Hunt^{11, 12, 13} has brought forth very considerable evidence of its presence by clinical studies. A number of textbooks of anatomy describe and figure an anastomosis between the facialis and the auricular branch of the vagus corresponding to that described by Rhinehart (Quain, Toldt, Piersol and others).

We have found a small branch, in a human fetus of 54 mm. crown-rump length, which corresponds very closely to that described by Rhinehart in the mouse. In our serial sections, stained with hematoxylin and eosin, we were not able to differentiate size of fibers, but the branch in question anastomoses with the auricular branch of the vagus; and presumably the facial fibers are distributed as in the mouse, namely, through the ramus auricularis vagi, to supply a part of the external auditory meatus, the tympanic membrane and the skin of the cranial side of the concha. In our series this branch is given off close to the chorda tympani, but a little distal to the latter. We have also found another branch of the facialis more distally which may correspond to the cutaneous filaments of the facial nerve to the auricle described by Valentin⁴⁹ in the adult human. This branch in the embryo is directed toward the auricle, but it was not possible to trace it to the surface with certainty.

The palatine branch of the facial, described by Herrick and other authors as visceral sensory in lower vertebrates, has its morphological equivalent in man in the great superficial petrosal nerve. In the forms above the fishes, in which the sphenopalatine ganglion

is represented along the course of this nerve, another element enters, namely, preganglionic fibers to this ganglion. The great superficial petrosal on this basis may be considered a mixed trunk, composed of the equivalent of a white ramus communicans and the palatine VII. Histological studies of mammalian material confirm this interpretation. Rhinehart⁴² found in silver preparations that many of its fibers arise, in the mouse, from cells of the geniculate ganglion. Van Gehuchten⁵⁰ found that some cells of the geniculate ganglion degenerate after section of the facial nerve at its exit from the facial canal. Yagita⁵¹ found that about one-twelfth of the cells of the geniculate ganglion showed chromatolysis following section of the great superficial petrosal.

In spite of much confusion in textbooks and the literature regarding the geniculate ganglion, it appears that its cells are of the unipolar sensory type (Retzius,³⁸ Lenhossék,⁵² Müller and Dahl,³⁹ Müller,⁴⁰ Rhinehart⁴² and others), and that it belongs to the cranio-spinal series of sensory ganglia. Sections of the great superficial petrosal nerve (Fig. 8) show that it contains large myelinated fibers of the sensory type. Presumably it was cutting of these fibers which produced chromatolysis of the ganglion cells in Yagita's experiment. Müller and Dahl also found in this nerve myelinated fibers which they regard as sensory. In addition to the large myelinated fibers, there are numerous small fibers with myelin sheaths, 2 to 4 microns in diameter. These correspond to preganglionic autonomic fibers elsewhere in the body.

In our pyridin-silver series of a kitten, aged two weeks, there are present also unmyelinated fibers, both of small size and of larger diameter. The small fibers represent postganglionic fibers from scattered groups of ganglion cells along the course of the nerve (Fig. 7*B*), but this is not true of the larger fibers. It is of course possible in so young an animal that they represent sensory fibers which have not yet acquired a myelin sheath. Rhinehart's observations on the mouse led him to conclude that "both the chorda tympani and the great superficial petrosal nerve contain afferent fibers whose cell bodies are located in the geniculate ganglion, and efferent fibers which pass through the ganglion without connection with its cells."⁴² This is in agreement with our conclusions based on human material.

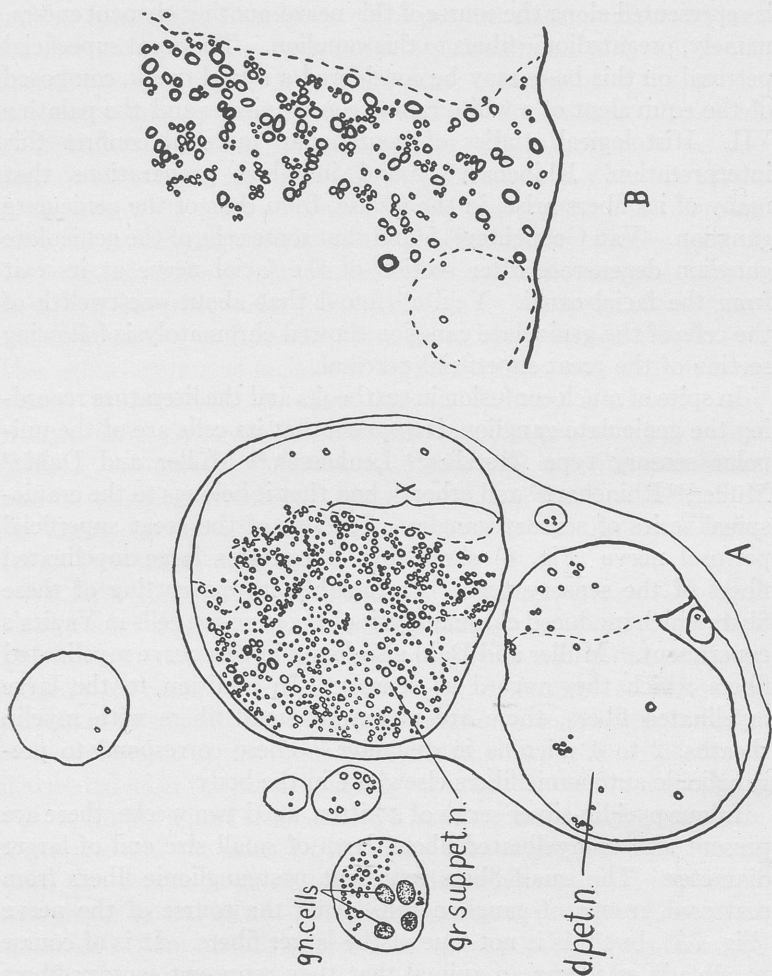


FIG. 8.—A. Section of the nerve of the vidian canal showing myelinated nerve fibers. The fibers of large diameter are of sensory type, those of small diameter are preganglionic fibers to the sphenopalatine ganglion. B. Portion of A. indicated by X, under higher magnification. Human material fixed and stained in osmic acid within twenty-four hours after death. *gn. cells*, ganglion cells; *gr. sup. pet.*, great superficial petrosal nerve; *d. pet. n.*, deep petrosal nerve. FIG. A., drawn with aid of Edinger-Leitz projection apparatus; FIG. B. drawn with camera lucida. (Larsell.)

General visceral afferent fibers are probably distributed through most of the branches of the facialis (Herrick⁴⁶), and therefore also by those rami which pass through the sphenopalatine ganglion. Large myelinated fibers may be followed in our series from the palatine nerves, through the sphenopalatine ganglion without interruption, and into the great superficial petrosal nerve. Presumably these are connected with cells in the geniculate ganglion, and represent the fibers cut by Yagita, which produces degeneration of cells in this ganglion.

In the geniculate ganglion are found also the cells of Rhinehart's cutaneous auricular branch of the facialis. We have here the conditions found elsewhere in the body for reference of pain from a visceral region to a body surface, in that the ganglion cells of afferent fibers of both are located in proximity in the same sensory ganglion, and centripetal processes of both sets of ganglion cells pass together into the bulb (Fig. 9). Irritation due to infection, pressure or infiltration in the region of the sphenopalatine ganglion would stimulate the palatine VII and other visceral sensory fibers. These, passing through the great superficial petrosal nerve to the geniculate ganglion, would come into relation with the somatic sensory cells and fibers of the ramus cutaneus facialis, which has its peripheral distribution to the skin of the lower posterior part of the auricle and over the mastoid process.

It is not necessary to discuss in this connection the mechanism of referred pain. This is a complex problem, whose solution, from the anatomical side, is far from having been accomplished. If one accepts the modified conception based on the histological studies of Dogiel,⁵³ now held by many, that reference of pain from visceral organs to body surfaces is due to transference of the impulse from the afferent visceral fibers to somatic ganglion cells in the dorsal root ganglion, or its equivalent, the relation of the ramus cutaneus facialis to the geniculate ganglion furnishes the necessary anatomical conditions. If, on the other hand, reference of pain should prove to be due to anatomical or physiological relations of visceral and somatic afferent fibers within the central nervous system, the conditions for this would also seem to obtain in the connections of the nerves under consideration within the medulla oblongata.

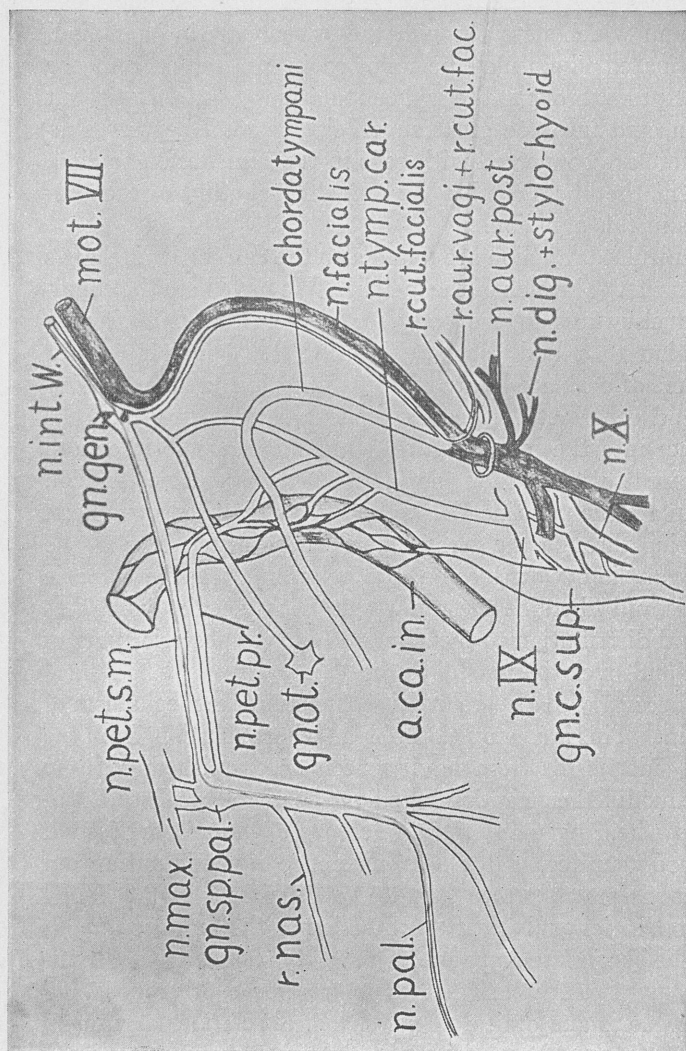


FIG. 9.—Diagram of sphenopalatine ganglion and its connections, showing probable pathway of reference of pain in otalgia from involvement of sphenopalatine region. Motor portion of facialis shaded. *a. ca. in.*, internal carotid artery; *gn. c. sup.*, superior cervical ganglion; *an. ot.*, otic ganglion; *mot. VII*, motor root of facialis nerve; *n. aur. post.*, posterior auricular nerve; *n. dia. + stylohyoid*, nerve to posterior belly of digastric and to stylohyoid muscles; *n. int., W.*, intermediate nerve of Wrisberg; *n. max.*, maxillary nerve; *n. pal.*, palatine nerve; *n. pet. pr.*, deep petrosal nerve; *n. pet. s. m.*, great superficial petrosal nerve; *n. tym. car.*, carotico-tympanic nerve; *n. nas.*, nasal nerve; *n. IX*, glossopharyngeal nerve. (Larsell.)

Further work is needed along various lines opened up in this study. Connections of myelinated, perhaps sensory, fibers traveling in the carotid plexus must be traced. These sensory fibers, coming down from the deep petrosal nerve, appear to be shunted around the carotid plexus into connection with the glossopharyngeus and through it with the vagus. Extensive work in embryonal and adult tissues will be required to clarify these points, and our studies in this region are as yet but fragmentary.

Questions relative to the physiological activities of the sympathetic connections of the sphenopalatine ganglion are not a part of this study. It is possible, however, that changes in sympathetic tonus, and thus in vasomotor conditions, in the crowded nasal, dental and pharyngeal area, may account for some of the pain impulses whose paths we have discussed.^{54, 55, 56, 57} Such cases, wherein no local inflammatory reactions are evident, may be conditioned by disturbances in the sympathetic at a considerable distance.^{58, 59, 60} Surgery of the sympathetic, at least so far as the superior cervical ganglion and carotid plexus are concerned, has up to the present not received much support because of annoying ophthalmic symptoms.^{61, 62} Rufus Cole has recently stated: “. . . If scientists have a dogma, it is that the advancement of knowledge can best be accomplished by pursuing it quite independently of any immediate results.”⁶³ Following this precept, we should examine further into the details of these “nerves of life,” before advocating radical measures which attempt relief of pain through empirical hypotheses.

BIBLIOGRAPHY

1. Bonnier, P.: *L'Action Directe sur les Centres Nerveux*, Paris, 1913, p. 199.
2. Fliess, W.: *Neue Beiträge zur Klinik u. Therapie der Nasalen Reflexneurosen*, Vienna, 1893.
3. Byrd, H.: Pathological Impulses or Currents, *Med. Jour. and Record*, 1925, cxxi, 141.
4. Hilton, John: *On Rest and Pain*, 2d N. Y. ed., 1879, p. 40, 1860.
5. Hack, W.: *Reflexneurosen und Nasenleiden*, *Berl. klin. Wchnschr.*, 1882, xix, 379.
6. Delavan, D. Bryson: *Otalgia from Reflex Dental Irritation*, *Am. Jour. Otol.*, 1882, iv, 177.

7. Legal, E.: Ueber eine öftere Ursache des Schläfen und Hinterhauptskopfschmerzes, (Cephalalgia pharyngo-tympanica), Deutsch. Arch. f. klin. Med. Leipz., 1886-1887, xl, 201.
8. Politzer, A.: Lehrbuch der Ohrenheilkunde, Vienna, 1882, p. 490.
9. Ziem, C.: Ueber die Beziehungen zwischen Nasen und Ohrenkrankheiten, Monatsschrift f. Ohrenheilk., 1885, p. 371.
10. Ménière, E.: Cephalée quotidienne guérie par cauterization nasale et ablation des adénoïdes, Rev. mens. de laryn., 1888, viii, 401.
11. Hunt, J. Ramsay: Herpetic Inflammations of the Geniculate Ganglion; A New Syndrome and Its Complications, Jour. Nerv. Ment. Dis., 1907, xxxiv, 73.
12. Hunt, J. Ramsay: A Further Contribution to the Herpetic Inflammations of the Geniculate Ganglion, Am. Jour. Med. Sci., 1908, cxxxvi, 226.
13. Hunt, J. Ramsay: The Sensory Field of the Facial Nerve, etc., Brain, 1915, xxxviii, 418.
14. Mills, Chas. K.: The Sensory Functions Attributed to the Seventh Nerve, Jour. Nerv. Ment. Dis., 1910, xxxvii, 273.
15. Emerson, F. P.: Two Cases of Herpes Zoster Oticus, The Laryngoscope, 1924, xxxvii, 132.
16. Dennis, F. L.: Herpes Zoster Oticus, The Laryngoscope, 1925, xxxv, 665.
17. Sears, W. H.: Herpes Zoster Oticus, Tr. Am. Acad. O. O., 1926, p. 406.
18. Sluder, G.: Nasal Neurology, Headaches and Eye Disorders (bibl.), St. Louis, 1927.
19. Sluder, G.: Loc. cit., p. 100.
20. Casselberry, W. E.: Attenuated Types of Suppurative Sphenoiditis, Tr. Am. Laryn. Assn., 1911, p. 99.
21. Shambaugh, George E.: Recent Problems in Rhinology, Minn. Med. Jour., 1926, vii, 496.
22. Müller, L. R.: Die Lebensnerven, 2d ed., Berlin, 1924, p. 130.
23. Buscher, J. in Müller: Loc. cit., p. 560.
24. Buscher, J. in Müller: Loc. cit., pp. 569, 574.
25. Halphen, E.: Les phénomènes sympathiques en rhinologie, Arch. Int. Laryn., 1926, v, 267.
26. Bertein, P.: Le système sympathique de la muqueuse pituitaire, Arch. Int. Laryn., 1925, iv, 520.
27. Terracol, J.: Le ganglion sphéno-palatin, Arch. Int. Laryn., 1925, iv, 818.
28. Kuntz, A.: Development of Cranial Sympathetic Ganglia in the Pig, Jour. Comp. Neur., 1913, xxiii, 71.
29. Wilder, H. H.: History of the Human Body, 2d. ed., New York, 1923.
30. Herrick, C. J.: The Cranial and First Spinal Nerves of Menidia; A Contribution Upon the Nerve Components of the Bony Fishes, Jour. Comp. Neur., 1899, ix, 153.
31. Herrick, C. J.: A Contribution Upon the Cranial Nerves of the Cod-fish, Jour. Comp. Neur., 1900, x, 265.

32. Cole, F. J.: On the Cranial Nerves of Chimera, etc. Discussion of the Lateral Line System, and the Morphology of the Chorda Tympani, Trans. Roy. Soc. Edin., 1896, xxxviii, 228.

33. Cole, F. J.: Structure and Morphology of the Cranial Nerves and Lateral Sense Organs of Fishes, etc., Trans. Linn. Soc. Zool. Sec., 1898, vii, 115.

34. Coghill, G. E.: The Cranial Nerves of *Amblystoma Tigrinum*, Jour. Comp. Neur., 1902, xii, 205.

35. Coghill, G. E.: Cranial Nerves of Triton *Taniatus*, Jour. Comp. Neur., 1906, xvi, 247.

36. Norris, H. W.: Cranial Nerves of *Amphiuma Means*, Jour. Comp. Neur., 1908, xviii, 527.

37. Norris, H. W.: Cranial Nerves of Siren *Lacertina*, Jour. Morph., 1913, xxiv, 285.

38. Retzius, G.: Untersuchungen über die Nervenzellen der cerebrospinalen Ganglien und den übrigen peripherischen Kopfganglien mit besonderer Rücksicht auf die Zellenausläufer, Arch. f. Anat. u. Physiol., Anat. abt. 1880, p. 369.

39. Müller, L. R., and Dahl, W.: Die Beteiligung des sympathischen Nervensystems an der Kopfinnervation, Deutsch. Arch. f. klin. Med., 1910, xcix, 48.

40. Müller, L. R.: Die Lebensnerven, 2d ed., Berlin, 1924, p. 614.

41. Carpenter, F. W.: Histology of the Cranial Autonomic Ganglia of the Sheep, Jour. Comp. Neur., 1912, xxii, 447.

42. Rhinehart, S. A.: The Nervus Facialis of the Albino Mouse, Jour. Comp. Neur., 1918, xxx, 81.

43. Johnston, J. B.: The Cranial Nerve Components of *Petromyzon*, Morph. Jahrb., 1905, xxxiv, 149.

44. Sheldon, R. E.: The Phylogeny of the Facial Nerve and the Chorda Tympani, Anat. Rec., 1909, iii, 593.

45. Cushing, Harvey: The Taste Buds and Their Independence of the Nervus Trigemini, Johns Hopkins Hosp. Bull., 1903, xiv, 71.

46. Herrick, C. J.: Introduction to Neurology, 4th ed., Philadelphia, 1927.

47. Wilson, J. G.: The Nerves and Nerve Endings in the Membrana Tympani of Man, Jour. Comp. Neur., 1907, xvii, 459.

48. Wilson, J. G.: The Nerves and Nerve Endings in the Membrana Tympani of Man, Am. Jour. Anat., 1910-1911, xi, 101.

49. Valentin, in Testut: Traité d'Anatomie Humaine, vol. iii, p. 728.

50. Gehuchten, A. van: Recherches sur la termination centrale des nerfs sensibles peripheriques. 1. Le nerf intermédiaire de Wrisberg, Le Nevraxe, 1900, i, 3.

51. Yagita, K.: Einige Experimente an dem Nervus petrosus superficialis major zur Bestimmung des Ursprungsgebietes des Nerven, Folia Neurobiologica, 1914, viii, 361.

52. Lenhossék, M. von: Das Ganglion geniculi nervi facialis und seine Verbindungen, Beiträge zur Histologie des Nervensystems und der Sinnesorgane, Wiesbaden, 1894.

53. Dogiel, A. S.: *Der Bau der Spinalganglien des Menschen und der Säugetiere*, Jena, 1908.

54. Ramadier, J.: Sinusites posterieures latentes; origine de nevrites optique, trigemellaire et sphénopalatine, *Ann. d. mal. de l'Oreille*, etc., 1922, xli, 150.

55. Ramadier, J.: Topographie des troubles sensitifs au cours des affections sphénoethmoidales posterieures, *Rev. d'Otol-neuro-ocul.*, 1923, i, 321.

56. Hubert, L.: Mechanism of Pain as Seen in Otological Cases, *The Laryngoscope*, 1923, xxxiii, 596.

57. Worms, G.: Cephalées et troubles oculaires d'origine sinuso-nasale, *Rev. d'Oto-neuro-ocul.*, 1924, ii, 494.

58. Müller, L. R.: *Loc. cit.*, 1924, p. 77.

59. Senseney, E. T.: Relation of Endocrine Changes to Sphenopalatine Ganglion Neurosis, *Ann. Otol., Rhin. and Laryn.*, 1925, xxxiv, 183.

60. Halphen, E.: Les phénomènes sympathiques en rhinologie, *Arch. Int. Laryn.*, 1926, v, 406.

61. Ranson, S. W.: Anatomy of the Sympathetic Nervous System With Respect to Sympathectomy, *Jour. Am. Med. Assn.*, 1926, lxxxvi, 1886.

62. Casteran, E.: La sympathiectomie périartérielle comme traitement de l'ozène, *Arch. Int. Laryn.*, 1927, vi, 810.

63. Cole, Rufus: Interrelation of the Medical Sciences, *Science*, 1928, lxvii, 48.

PRESENTATION OF THE DE ROALDES MEDAL

D. BRYSON DELAVAN, M.D.

YOU are all familiar with the farsighted generosity of the late Dr. Arthur W. de Roaldes in the establishing of a fund for the purpose of providing a certain prize, and of the fact that for a number of years, under the terms upon which that prize was to be awarded, no thesis of sufficient merit had been offered to win it. The Council, therefore, changed the method of award this year, and determined to bestow the medal on that member of the Association who had contributed the greatest gifts to laryngology.

I now take great pleasure in conducting this presentation. The first one in its history to receive the medal, and by all means the most distinguished among us who could receive it, has been given the award this year, Dr. Chevalier Jackson. His is the name, distinguished not for military prowess or because of power in the pulpit or at the bar, masterly statesmanship or success in high finance, but because the things he has accomplished so brilliantly, so unsparingly of himself in the cause of humanity, have revealed the greatness of his purposes and the beauty of his character—typical of the character of the true physician. For many years his work, modestly done, has glowed with a light too radiant to be concealed.

Dr. Jackson has been, first of all, an ardent student of medicine. His knowledge is wide and deep. He has been an ingenious originator and inventor, and has given us highly superior methods and instruments in many departments. In one he has been pre-eminent. As a practitioner, no word of mine could overstate the extent and value of his unceasing work. All this is well known to us. We also know the generosity and breadth of spirit which characterize him and have been shown so abundantly toward those to whom he has ministered.

Moreover, to these things must be added the distinction which pertains to him as a great instructor; since the prime element of greatness in a teacher is the desire to impart to others who may

use them worthily the good things which he himself has acquired. A master of medicine, a great instructor, an inventor of superior originality and genius, a skilled practitioner, we acknowledge the fine superiority of his life accomplishments. To these things we pay full tribute, for them we desire to do him distinguished honor.

Surely he has done much, and has done it well. But in him there is far more that appeals to us, namely, the man himself. What he *is* awakens what we most appreciate in him, and, appreciating, hold in deepest affection. This we reverence, for none has more beautifully exemplified that spirit of devotion which comes nearest of all worldly things to the divine.

And so this medal has been bestowed, with the enthusiastic concurrence of all, and it is my happy privilege, Dr. Jackson, to ask your acceptance of it. Will you, my dear Doctor, in receiving it take to your heart of hearts the fervent assurance that it bears in fullest measure the admiration, the high esteem, and the deep, warm and abiding affection of all. May your future be one of happiness and peace to yourself as your past has been a blessing to us.

REMARKS OF CHEVALIER JACKSON, M.D.

I ACCEPT this medal in bewilderment mixed with joy, fear and sadness. For once I scarcely know what to say. If I were to say what I really think, it would be a reflection on the judgment and the sincerity of the committee. If I say that I appreciate it to the utmost, it sounds very, very weak.

This Association has selected a committee, among whom there were two past-presidents, to pick someone to whom to give the medal. The Association has accepted their decision and I must do likewise.

To explain what I mean by fear, I always hoped that some day or other I should reach the point in life when I could settle down and do nothing. But along comes the committee who sets a higher standard, sets far above me an ideal to which I must attain. I

must justify in the future—for I feel I have not fully done so in the past—this award.

I accept it as a figurehead. What I have been able to accomplish—be it much or little is not for me to say—is the result of teamwork. In receiving this award, I do so feeling that it is shared by all my co-workers and by all the members of the Association, every one of whom has supported me and has coöperated with me in what little I have been able to do. From every meeting I have gone home filled with fresh inspiration.

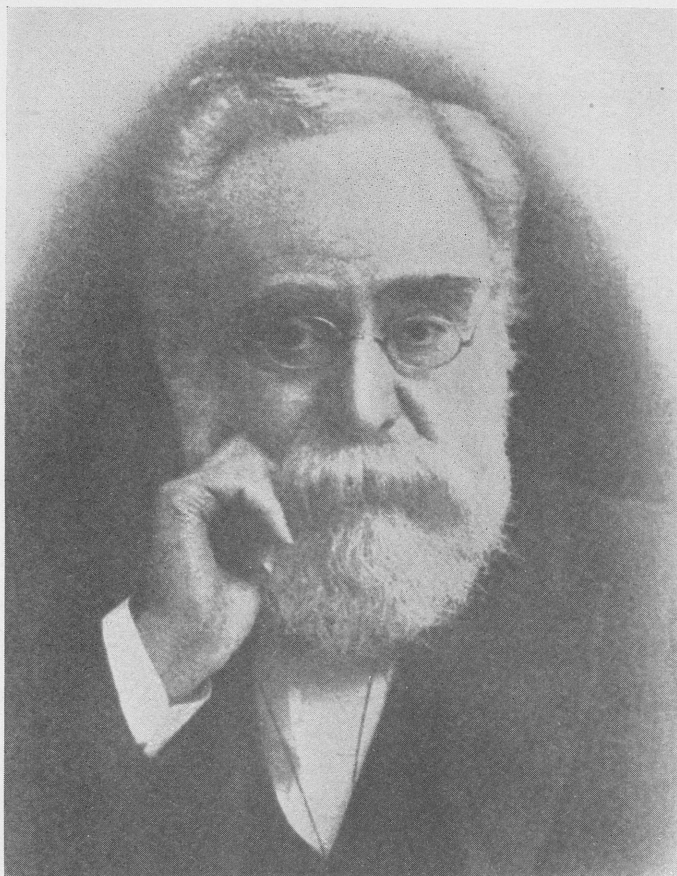
In regard to the element of sadness, twenty years ago I was elected a member of this Association here in Washington. Dr. De Roaldes, then almost totally blind, was president. I shall never forget the kindly way in which he received me. I cannot but think that, were he living, he would certainly approve of the action of the committee.

I feel that I owe credit for this award to many who are dead, and it is sad to think that they cannot share it with me. I know one who would agree with the committee, my dear old Knickerbocker grandmother, to whom I owe much. Another who would agree would be my French grandfather, to whom I am indebted for an inheritance of such mechanical ingenuity as I possess; another, my father, who made untold sacrifices for me.

Another who would agree with the committee would be my mother. I went to her when opportunity came to go to Philadelphia. She was over eighty years of age. I said, "If I go to Philadelphia I shall see you very rarely, in the last few years of your life." She said, "Chev, it is your duty to go. You must go. It is your duty to spread everywhere the methods of which I know so much. I have seen the children come almost dying and I have seen the same children go away well. You have been saving children's lives by the hundreds, and I think by the thousands. You and I both will be dead in a few years, but bronchoscopy will go on forever. It is your duty to go."

I cannot show her the medal. There is one to whom I can show the medal, and she will be overjoyed. She also has made untold sacrifices for me. My dear old friend, Stuke, who has just entered the door, once said that she deserves the front seat in heaven for living with me so long. I shall take the medal home to my wife.

Memorials



J. SOLIS-COHEN, M.D.

JACOB DA SILVA SOLIS-COHEN

1838-1927

JACOB DA SILVA SOLIS-COHEN died at his home in Philadelphia, December 22, 1927. He was born in the city of New York, February 28, 1838. His family history is significant and interesting, for through both father and mother he came of the very best of the oldest stock. For many generations his ancestors had been active in public affairs and prominently connected with charitable and religious projects. His mother was a daughter of Jacob da Silva Solis, a wealthy philanthropist of New York, and through her he was related to the Hays and Etting families, both of which had been prominent in the patriotic cause during the Revolution. In 1840 his father moved to Philadelphia. After graduating from the Central High School, the son attended lectures at Jefferson Medical College, but finished his medical education at the University of Pennsylvania. He received his medical degree in 1860, and was appointed resident physician at the Philadelphia Hospital, resigning at the end of six months to enter the United States Army. No position as assistant surgeon being available, he enlisted as a private soldier, but soon after received a commission as assistant surgeon in the 26th regiment Pennsylvania Volunteers, serving with this regiment in Hooker's brigade. In September, 1861, he resigned from the army to accept an appointment as acting assistant surgeon in the United States Navy. He accompanied du Pont's expedition to Port Royal and served on the South Atlantic blockading squadron, of which he was for a time acting fleet surgeon. After resigning from the Navy in January, 1864, he was appointed visiting surgeon to two of the military hospitals then established in Philadelphia. At the Turner's Lane Hospital he performed one of the ninety-four successful ligations of the femoral artery done by army surgeons during the Civil War.

About this time his attention was directed toward the then young specialty of laryngology. In 1867 he was made chairman

of a committee of the American Medical Association to investigate the value of treatment by means of inhalation. His studies resulted in the publication of his first book, *Inhalation in the Treatment of Disease—Its Therapeutics and Practice*, Philadelphia, 1867. A second edition appeared later. In 1872 Dr. Solis-Cohen published his great work, *Diseases of the Throat and Nasal Passages*, which at once became a standard textbook. A second edition was published in 1879, and subsequent editions attest the continued popularity of this excellent pioneer treatise. In 1874 appeared his monograph, *Croup in Its Relations to Tracheotomy*, based upon a study of over 5000 recorded cases. This work achieved a remarkable and well-deserved success. In 1879 he wrote for the "Health Primer" series a small book, *The Throat and Voice*. In addition to these books he contributed monographs on laryngological subjects to the more important encyclopedic publications of the day, such as *The International Encyclopedia of Surgery* and the *American System of the Practice of Medicine*. He contributed many important papers to medical societies and current periodical medical literature. For many years he edited the laryngological department of the *American Journal of the Medical Sciences*, and was one of the founders and editors of the *Archives of Laryngology*. A profound scholar and a facile writer, his productions attest a high degree of literary culture as well as of scientific ability.

Dr. Solis-Cohen held many official positions. In 1871 he delivered the Mütter lectures at the College of Physicians of Philadelphia. He was professor of physiology at the Wagner Institute of Science of Philadelphia. In 1867 he was appointed lecturer on electric therapeutics in the Jefferson Medical College, and was one of the first visiting physicians elected to the Jefferson Medical College Hospital on the opening of that institution. After teaching laryngology for many years at Jefferson Medical College, he was made honorary professor of laryngology there in 1883. One of the founders of the Philadelphia Polyclinic, he served for many years as professor of diseases of the throat and chest. He was also visiting physician to the German Hospital, physician to St. Mary's Hospital and consulting physician to the Jewish Hospital. He was deeply interested in tuberculosis and

was one of the early advocates of its outdoor treatment, serving as senior and consulting physician to the Home for Consumptives at Chestnut Hill, Philadelphia. He was one of the first to recognize the value of the original investigations and work of the late Dr. Edward Livingston Trudeau at Saranac, furthering it most enthusiastically.

He was a fellow of the College of Physicians of Philadelphia and served two terms as president of the Philadelphia County Medical Society. He was an honorary member of the Neurological Association of New York; of the Philadelphia Laryngological Society; of the Société Française de Laryngologie; and of the British Association of Laryngology and Rhinology. He was also a member of the American Philosophical Society, and because of his war services, belonged to the Loyal Legion and to other military organizations and societies. He received the degree of LL.D. from Jefferson Medical College and from Temple University.

Dr. Solis-Cohen had many interests not strictly appertaining to his profession. He was an active member of the Academy of Sciences and of the Franklin Institute, giving lectures at the latter on acoustics, as he also did at Stevens' Institute and at Wagner Institute. He was a member of the Union League Club of Philadelphia and for many years was interested in various movements for civic betterment and political reform. Devoutly religious, he was a profound Hebrew scholar, active in the work and worship of his synagogue and aiding in the establishment of the Hebrew Educational Society, of which he was for a time the secretary.

The children of Dr. Solis-Cohen's creation in medical science and art are indeed a numerous family, representing as they do the widest range of professional effort. In the departments of invention and of literature no laryngologist contributed more; while the great army of pupils inspired by the loftiness of his character as well as by his energy, his enthusiasm, his deep learning and his unrivalled skill have gone forth into the world of science as men of high ethical standards and of advanced professional training. Through them has been lived over and over again that life of high endeavor which he himself so nobly exemplified.

Entering the field of laryngology during its infancy in this country, Dr. Solis-Cohen witnessed the development of the new

science from a humble and unpopular birth into a position of dignity, influence and power, and saw its votaries increase until, whereas there had been one, there are now a thousand. The clinic which he started single-handed expanded into an important department in a great institution. Meanwhile his pupils and those of his immediate followers have gone forth throughout the land, carrying his message in the building up of splendidly equipped infirmaries for the better care of the sick and establishing new centers of special instruction wherever medicine is taught.

From almost nothing, he witnessed the development of an important department of medical literature. In the recognition and management of disease he saw verified our motto, "E tenebris lux."

In this marvellous advance Dr. Solis-Cohen was the first and the greatest leader. Literally at the head of his compatriots, there was never a time in the active years of his long march when he was not the acknowledged chief. No eulogy could be as eloquent as the simple record of his life. The example of personal and professional uprightness which he set was a veritable beacon light, shining out through the clouded ethics of the time, a sure guide to the doubting and a solace to the honest strivers after truth.

After having gained a substantial education in Philadelphia, both in the arts and in medicine, Dr. Solis-Cohen used to the best advantage his opportunities as intern at the Philadelphia Hospital; and then at the outbreak of the Civil War he at once entered the service of his country as acting assistant surgeon, serving with credit both in the United States Army and in her Navy. At the close of the war he entered upon the practice of medicine in Philadelphia.

In 1866, the very first in America and soon followed by Dr. H. K. Oliver, of the Harvard Medical School, he instituted regularly organized lectures in laryngology at the Philadelphia School of Anatomy. In 1870 he was elected lecturer on laryngoscopy and diseases of the throat and chest in Jefferson Medical College, and later organized a clinical service in the collegiate courses. In 1882 he was elected honorary professor of laryngology in Jefferson Medical College, and for many years still supervised

the throat clinic, until about 1895, when he practically retired from teaching. In 1883 the Philadelphia Polyclinic and College for Graduates in Medicine was established, and as one of the founders he became professor of diseases of the throat and chest. In connection with this he established a laryngological clinic, which he supervised for several years, retiring as emeritus professor.

In the early days of laryngology it remained for three English-speaking authorities to place the department of laryngology and rhinology upon a firm scientific basis—Solis-Cohen, Sir Morell Mackenzie and Francke H. Bosworth. The first of them was Solis-Cohen. His classical work, published in Philadelphia in 1872, gave a full exposition of the subject to that date. It was far more complete and comprehensive than anything which had yet appeared, and as a practical guide was without a rival. No book has ever had a greater influence in disseminating a wide and thorough knowledge of laryngology. The vast number of his contributions to literature have been marked by the originality, the clearness and the scientific accuracy which distinguished him.

Together with Frederick Irving Knight, George Morewood Lefferts and Louis Elsberg, he founded and edited the *Archives of Laryngology*, the first special journal of laryngology published in the United States and a model of its kind. In it was continued the bibliographical reports of Dr. Lefferts, instituted by him in 1875, and since carried on in the *Index Medicus*.

His inventions were many and valuable. He devised and adapted instruments and methods for the treatment of conditions at the time hardly recognized by others, in some instances far antedating claims of priority by others.

As an operator he was twenty years before his contemporaries in the surgical treatment of the nasal sinuses. Profiting by his rich experiences of the Civil War, he excelled in the surgery of the upper air passages in general, both major and minor, in all its branches. To his credit belongs the first really successful complete laryngectomy performed in America, introducing into this country in the course of it the now well-recognized method by which the severed end of the trachea is caused to emerge from the lower part of the neck and is there attached. He also instituted the practice of the operator himself assuming the immediate after-care of the patient in this operation, and, besides, made several

other innovations which since, generally adopted, have vastly improved the statistics of the operation.

In the highest sense a specialist, his knowledge of medicine in general was wide and profound. No one appreciated better the importance of the association of a well-grounded knowledge of general medicine with that of special.

In the American Laryngological Association his influence was preëminent. Its most illustrious founder, through an excess of generosity he was nominally its second president, although actually its first, and the two meetings held under his auspices actually marked the beginning of the brilliant record of its history. At those meetings, thanks to the force of his example and precept, standards were set in ethics, in organization and in scientific excellence which, followed by those who succeeded him, have placed our association foremost of its kind. At that time the department of laryngology was unformed; its many scattered elements, although showing strength and the promise of vigorous growth, were disjointed; its state chaotic; the situation required the help of one possessing peculiar power of organization and, preëminently, of conciliation. His success in uniting elements which might have become discordant placed his successors under an obligation, the weight of which they little realized. From that early day throughout his life the light of his enthusiasm for the Association burned bright and clear. None has ever been its more staunch and untiring friend.

In the long course of his practice of medicine, both public and private, he extended to his patients, whose numbers no man can estimate, unspeakable kindness, sympathy and liberality. It is in this relation, more than any other, that he distinguished himself, for he was in every sense the true-hearted friend, the good physician. The memory of his devotion to others must be the brightest gem of his well-earned crown. We may well honor and cherish his memory, not so much because of his distinguished accomplishments as for what he himself was. From the beginning to the end of his extraordinarily useful and brilliant career, self-seeking, arrogance and unworthy ambition were to him unknown. His was the true modesty of conscious worth. Eminently forgetful of self, he strove to enlighten, to improve and to help. His life was a long-continued story of enduring, heroic effort to raise his fellow-

beings to higher planes of thought and action, to relieve suffering and to better the conditions of mankind. With these ends in view, he labored cheerfully, consistently and with unrelenting zeal throughout his long career. His motives, crystal clear, were those of the scientist, the patriot, the humanitarian. Unspoiled of the world, he was a generous rival, a devoted friend. Few but those nearest him knew of the varied burdens which accompanied some phases of his life. They alone saw him pass through deep waters, through trying experiences of professional endeavor, and those inevitable currents and whirlpools of difficulty which must confront the pioneer in all great work. They realized the integrity and purity of his purpose, the undaunted courage which sustained him, the calm serenity with which he met every decree of fate, recognizing in him a broad and philosophical mind and, above all, a spirit of tolerance, of kindness and of devotion to the interests of those about him and to the world at large which placed him among the leaders of his time—well named the Nestor of American laryngology.

It was my privilege in recent years to have been admitted to the inner circle of his home and to become the friend of that admirable group, his sons and daughters. I never visited Philadelphia without calling upon him, certain of a delightful welcome from the members of his family as well as from himself. Surrounded by his children, he was the center of the most loving and unwearied attention. The picture which he presented of serene patriarchal dignity was one never to be forgotten. My visits to him were invariably an inspiration and a benediction. My friendship for him and his for me is one of the most beautiful experiences of my life.

With advancing age came infirmity and suffering; but his special senses remained unimpaired, his mind bright and his memory clear. Gradually yielding to the burdens imposed by time, his final months were clouded by the loss of a son and of a dearly beloved daughter. At my last interview, late in November, he furnished an impressive picture of one who, having achieved a long and beautiful career, was calmly welcoming the translation which awaited him. Nearly four score years and ten, he departed with the last days of the dying year, days most appropriate for the closing of so perfectly finished a life.



HANAU W. LOEB, M.D.

HANAU WOLFF LOEB

1866-1927

DR. HANAU WOLFF LOEB, born in Philadelphia, Pa., in 1866, died at his home in St. Louis, Mo., July 6, 1927. His father, Bernhard Loeb, a merchant, was a native of Treves, Germany. His mother, Bertha Myer, was of Illigen, also of Germany. His early life was spent in Columbia, Mo., where he attended private school. Later, he graduated from the University of Missouri in 1883, and from that institution, in 1886, received the degree of A.M., having meanwhile been awarded membership in the Phi Beta Kappa Society.

Having entered upon the study of medicine, he graduated from the College of Physicians and Surgeons, New York, in 1888, and later spent one year and a half as intern in the Ensworth Hospital, St. Joseph, Mo. He had begun the study of laryngology at the College of Physicians and Surgeons under Dr. William Kelly Simpson. After practising medicine in St. Joseph for two years, in 1890 he moved to St. Louis, where, with a number of colleagues, he organized the Marion Sims Medical College. He continued with this school as head of the department of oto-laryngology and secretary of the faculty, until its consolidation with the Beaumont Medical College, serving as secretary of the faculty of the combined schools until they were taken over as the Medical Department of the St. Louis University. In 1913 he was made dean of the faculty of the School of Medicine of St. Louis University, and here demonstrated his remarkable leadership and executive ability. His capacity for work and his power of overcoming obstacles won the admiration of his associates. He was ambitious to place the institution among the foremost of its kind. The results accomplished were largely due to his untiring efforts, often at a personal sacrifice.

In 1905 Dr. Loeb was made president of the American Academy of Ophthalmology and Otolaryngology. The membership of this society had been composed largely of men from the West or Mid-West, and it was chiefly through his efforts that its scope was widened until it became national in character. In 1917 he became chairman of the section of otolaryngology of the American Medical Association, and in 1924 president of the American Laryngological, Rhinological and Otological Society. He was a fellow of the American Otological Society and the American College of Surgeons. He interested himself actively in all of these organizations and served on the council of several of them for many years. During the early years of his professional life he was active in the local and state medical organizations, always working to place medicine on a higher plane.

He was among the first to offer his services during the World War and was appointed major during 1917. He wrote a *Handbook on Military Surgery of the Ear, Nose and Throat*, and was also actively engaged in organizing the medical forces of his home city. He became a colonel in the Medical Reserve Corps at the close of the war.

Dr. Loeb made many contributions to otolaryngology, the best known of which are his researches on the nasal sinuses and the determination of their capacity, area, position and relations, also a textbook on the *Operative Surgery of the Ear, Nose and Throat*. He was editor of the *Annals of Otology, Rhinology and Laryngology*, and one of the organizers of the American Board of Otolaryngology, of which body he was secretary from its organization until his death.

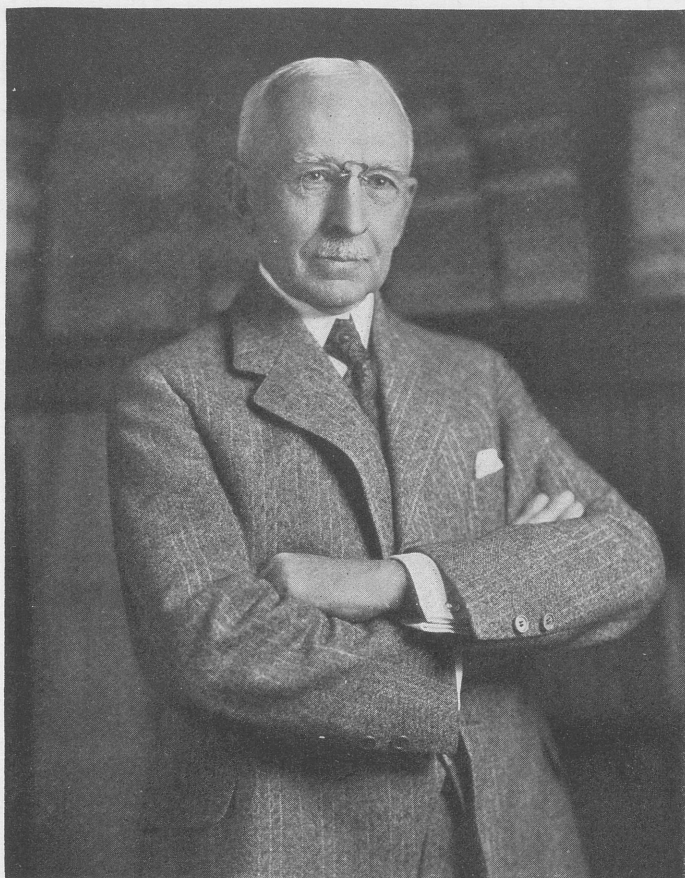
He was one of the most active workers for the advancement of the St. Louis Jewish Hospital, and it was largely through his efforts that its present new building became a reality. He was chief of staff of this hospital during the last years of his life.

His name appears, together with two of his brothers, in *Who's Who in America*.

Dr. Loeb's character and disposition were such that he endeared himself remarkably to all with whom he came in contact; and his circle was very wide. One of his most admirable traits was his unselfish friendship for, and untiring efforts in, the advance-

ment of his younger competitors in his own department. He was ever at their service and his advice was eagerly sought. Few men have been privileged to be chosen for so many important positions; few indeed could have filled so great a number of them as ably as did he.

Dr. Loeb was married, April 12, 1893, to Miss Grace Sadler, who survives him, together with one child.



ALLEN B. THRASHER, M.D.

ALLEN BENTON THRASHER

1851-1927

DR. THRASHER died on July 31, 1927, after a three-months illness. He was born in Groves, Indiana, July 6, 1851. His father, W. W. Thrasher, was a breeder of stock, a native of Kentucky, of English ancestry. His mother, Barbara Daubenspeck, also of Kentucky, was of German origin. Dr. Thrasher's preliminary education was gained at the school and academy of his birthplace; he graduated from Butler University, Indianapolis, Ind., in 1873, receiving the degree of A.B., and a year later that of A.M. He received his degree in medicine from the Ohio Medical College in 1881, and spent a year as interne in the Cincinnati General Hospital. His studies in laryngology were begun with Dr. Hyndman and Dr. Aub, of Cincinnati.

Dr. Thrasher had been connected with the dispensaries of the Ohio Medical College and the Polyclinic Hospital, Cincinnati. He was consultant laryngologist to Christ Hospital and trustee of the Cincinnati Hospital and president of its Board. He was lecturer on clinical medicine in the Ohio Medical College from 1883 to 1886, and professor of laryngology and dean of the Cincinnati Polyclinic from 1886 to 1888. He was admitted to the American Laryngological Association in 1892. He was also a member of the state and national associations, of the American College of Surgeons, of the American Rhinological, Laryngological and Otological Society, and had been president of the Cincinnati Academy of medicine.

He was married, in 1888, to Miss Edith Williams, of Wisconsin. They had three daughters, Barbara, Ruth and Corinne. He was a Protestant and an Independent Republican.

An excellent instructor, his literary contributions to laryngology, made in the earlier period of his career, were of a high order of merit. As a pioneer laryngologist he was for many years the leading specialist in his home city.

Genial, courteous and alert, and with a keen sense of humor, he was beloved alike by his professional associates and his patients and social friends. He was one of the first among the medical profession to interest himself in golf. This and travel were his main diversions.

My own last interview with him took place on the occasion of his embarking upon a trip around the world, when in the course of a delightful hour spent with him we discoursed upon old associations and upon his proposed voyage, which he was taking accompanied by Mrs. Thrasher and his friend, Dr. Reed. He was full of enthusiasm and was looking forward with delight to the adventure, but, as has happened to many others on similar excursions, he was taken ill while in India, presumably with influenza. This was followed by an acute dilatation of the heart and myocarditis. Returning home, repeated attacks of heart disturbance continued, resulting in his death about three months later. His widow survives him.



JAMES E. LOGAN, M.D.

JAMES ELMORE LOGAN

1861-1928

DR. LOGAN, who died on March 24, 1928, was born October 16, 1861, in Jessamine County, Kentucky. In 1871 he removed with his parents to Plattsburg, Mo. He received his literary education at the University of Kentucky, Lexington, and completed his studies at the University of Missouri in 1882. He graduated in medicine at the University Medical College, Kansas City, Mo., in 1883, then spent a year at the Bellevue Hospital Medical College, New York City, where he graduated in 1884. His medical practice was begun with his father, Dr. William G. Logan, a general practitioner. Having graduated from Bellevue, he continued his studies in Philadelphia, but soon began to devote himself to laryngology. On returning to Kansas City he embarked upon the practice of his chosen specialty, including with it diseases of the eye and ear, being the first specialist in these departments in that vicinity. In 1885 Dr. Logan was made lecturer on physiology in the University Medical College, and later full professor. A year later he became professor of laryngology and was elected a member of the board of trustees of the College. Fourteen years later he was elected president, an office which he held for many years.

Dr. Logan made many visits to the principal centers of laryngology in Europe to carry on his studies, and attended many of the medical congresses at which his specialty was represented, among them the International Medical Congress held at Budapest in 1909, the year in which he was president of our own Association.

He was also president of the American Rhinological, Laryngological and Otological Society, and a member of the county, state and national associations.

In 1908 he became a member of the Kansas City Council and for several years was a member of the Park Board. He belonged also to the Kansas City Country Club, of which he was one of the

founders; to the Kansas City Club, serving both as president and director; to the University and Blue Hills Country Club. Dr. Logan was forced into virtual retirement in November, 1926, by a heart ailment, apparently brought on by overexertion in pursuit of physical recreation.

As this brief record suggests, Dr. Logan gave great service to the medical profession in Kansas City, as a pioneer in modern medicine. He was an accomplished, resourceful and progressive master of his art, to which his contributions were many and valuable. Fully alive to the rapid advances which were being made, he lost no opportunity for informing himself authoritatively regarding them from sources both at home and abroad and in putting them into successful practice. His leadership, both professional and social, is evidenced by the record of his life. Of highly attractive personality and commanding presence, his quiet dignity, broad sympathies and expansive nature gathered to him friends without number of his own kind. Among the members of our Association none was held in greater esteem or in warmer personal affection by those admitted to his more intimate acquaintance.

My own acquaintance with him, begun many years ago, was one of uninterrupted satisfaction. We saw much of each other at our various meetings at home and at several great meetings abroad, and corresponded frequently. In a letter written soon after our return from the meeting of our Association in Montreal, he says: "One of my chief pleasures in going to our meetings is to renew my friendship with you and other older members, especially with you. . . . It brings back memories of other days when we had long journeys together which were delightful in every respect. I hope that our next meeting will afford opportunities for the same happy association. This, with every assurance of my very highest regard and best wishes."

R. NORRIS WOLFENDEN

R. NORRIS WOLFENDEN, a native of Lancashire, England, died at the age of seventy-two years. He was educated at Owens College, Manchester, and at Cambridge University, and in medicine at St. Bartholomew's and the London Hospital. His scientific ability apart from clinical work gained for him the position of lecturer on physiology in 1880 at the Charing Cross Hospital. He was also physician to the West End Hospital for Diseases of the Nervous System and to the Northwest London Hospital. His most important appointment was to the London Throat Hospital in Golden Square, where he was the efficient associate of Sir Morell Mackenzie, with whom, in 1887, he became one of the founders of the *Journal of Laryngology and Otology* and took an active part in its development and maintenance, later becoming its editor-in-chief and contributing many articles to it of distinct value. These, as well as his extraordinarily detailed and critical abstracts, gave evidence of the vigor and thoroughness which characterized his work in its various directions. A man of independent means, he retired from active medical practice, for a while devoting himself to the study of marine zoölogy. Eventually he removed to Canada, where he quietly passed the last years of his life, occupying himself in the cultivation of fruits. He was a lover of music, and excelled both as a conductor and a performer. He translated and annotated Joals' work on *Respiration in Singing*.

The force of his character was shown in many ways. As a confidential associate of Sir Morell Mackenzie, during the bitter period of the latter's controversy in the case of the German Crown Prince, Dr. Wolfenden bore himself manfully. A certain aggressiveness of nature was counterbalanced by qualities of a quieter order. A strong man, he played an important part in the advancement of modern laryngology. My own acquaintance with him was particularly agreeable, and my experiences as a guest at his

delightful estate near London are among the brightest and most attractive of many other such privileges. Incidentally it was with him, in company with Mr. Richard Lake, that I was indoctrinated into the mysteries of dry fly-fishing and saw demonstrated for the first time the elaborate methods employed for the propagation and rearing of pheasants.

A GUIDE
TO THE
HISTORICAL EXHIBIT OF INSTRUMENTS
SHOWN AT THE
FIFTIETH ANNIVERSARY MEETING
OF
THE AMERICAN LARYNGOLOGICAL
ASSOCIATION

WASHINGTON, D. C.
1928

Foreword

At the last annual meeting of the American Laryngological Association at Atlantic City the president, Dr. D. Bryson Delavan, asked me to undertake the task of assembling an exhibit to illustrate the progress that has been made in the development of instruments for direct laryngeal, bronchial, oesophageal and stomach work. This exhibit was to be shown on the occasion of the celebration of the Fiftieth Anniversary Meeting of the Society in Washington, D. C., May 1st, 2nd, and 3rd, 1928.

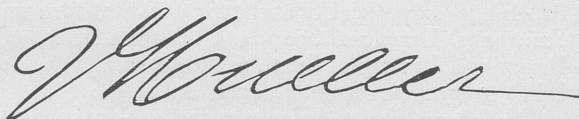
I accepted the commission because I have always been keenly interested in that particular field in instrument making. In the vaults of V. Mueller & Co. we had a fairly complete collection; however, since that time we have been endeavoring to add interesting instrument specimens from this country and abroad.

This exhibit represents approximately one thousand different items. It includes, I feel reasonably sure, an instrument representative of each progressive step of development. It was impossible to ascertain the correct dates at which the majority of these instruments were first introduced; therefore I have given that information only where the originator has furnished it, or where it could be obtained from pertinent literature.

It is a pleasure to express my sincere thanks to the following persons who loaned those of their original models for which copies were not in my possession: Doctors Sidney Yankauer, Harris Peyton Mosher, Chevalier Jackson, Clyde R. Lynch, Charles J. Imperatori, M. C. Myerson, H. Hall Forbes, Hubert Arrow-smith, R. H. Craig, William Lerche, T. E. Carmody; and also to Mrs. Stanton A. Friedberg.

I wish also to express my appreciation of the generosity and kindness of our associates among the surgical instrument makers in co-operating to make this undertaking a success. Our well known Vienna colleagues, H. Reiner and Josef Leiter, contributed some of the very ingenious early models, some of these being the only ones in existence. In this country the following firms have contributed instruments of historic and modern interest to complete the exhibit: Electro Surgical Instrument Co. of Rochester, Feick Brothers Co. of Pittsburgh, Geo. Tiemann & Co., the Kny-Scheerer Corp. and C. M. Sorensen Co., Inc. of New York, and The Geo. P. Pilling & Son Co. of Philadelphia.

My only wish is that this exhibit will be of genuine value and have a real interest for the Members of the Profession, and I am certain I may speak the same sentiment for those who have so generously co-operated with me.

A handwritten signature in dark ink, appearing to read 'V. Mueller', with a long, sweeping horizontal line extending to the right.

V. MUELLER, *President.*
V. Mueller & Co.
Chicago.

ONE of the most interesting items in this Exhibit is Bozzini's Candle Lamp and Endoscope Holder [reconstructed] representing the first attempt to use direct light for endoscopic purposes. Devised by Dr. Bozzini of Frankfurt, Germany, in 1795, and described in Medical literature in 1805.

PANEL No. 1

Item No.	Laryngeal and Oesophageal Specula	
1	Kirstein Original Laryngeal Spatula.	1893
2	Killian Tubular Laryngeal Speculum.	1897
3	Killian Split Tubular Speculum for introducing Bronchoscopes.	
4	Killian Tubular Spatula with broadened distal end, in universal handle.	1897
5	Killian Tubular Spatula, small, with broadened distal end and Ingals' Flat Light Carrier.	1904
6	Ingals' Original Laryngeal Specula, open on top; not illuminated.	1905
7	Ingals' Modern Laryngeal Specula, open on top; illuminated.	1908
8	Ingals' Modern Laryngeal Specula, extra small, for infants.	
9	Bruenings' Laryngeal Suction Spatula.	
10	Bruenings' Laryngeal Spatula for Infants, open on side.	
11	Bruenings' Laryngeal Spatula, Children's size.	
12	Bruenings' Laryngeal Spatula, Adult size.	
13	Hill's Laryngeal Spatula, open on side.	
	The above five spatulae are for use in connection with the Bruening Electroscopes.	
14	Kahler's Laryngeal Suction Spatula.	
15	Kahler's Laryngeal Spatula, Adult Size.	
16	Kahler's Tracheascope, Child's Size.	
17	Kahler's Tracheascope, Adult Size.	
	The above four instruments are used in connection with the Kahler-Leiter Electroscope.	
18	Mosher's Original Open Laryngeal Speculum with universal handle, not illuminated.	1912
19	Mosher's Open Laryngeal Speculum, second model, illuminated.	1913
20	Mosher's Modern Adjustable Laryngeal Speculum, adjustable, with universal handle, illuminated.	1913
21	Mosher's Original Adjustable Laryngeal Speculum, not illuminated.	
22	Mosher's Suspension Speculum with universal handle—with three speculae of different sizes, not illuminated.	1913
23	Mosher's Triangular Fenestrated Tube for Removing Papilloma or Pedunculated Fibromata.	1908
24	Mosher's Impression Tray used in connection with adjustable Laryngeal Speculum.	
25	Jackson's Original Laryngeal Speculum, illuminated, Closed Tube.	1907
26	Jackson's Laryngeal Speculum, second model, with slide.	1908
27	Jackson's Laryngeal Speculum, child's size, with slide.	1910
28	Jackson's Oval Laryngeal Speculum, adult size, with slide.	1914
29	Jackson's Modern Oval Laryngeal Speculum, adult size, with slide.	
30	Jackson's Laryngeal Speculum, child's size, with slide, modern.	
31	Jackson's Laryngeal Speculum, adult size, with slide, modern.	
32	Johnston's Laryngeal Speculum, closed tube.	1912

Item
No.

PANEL No. 1—(Continued)

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| 33 | Dickinson Laryngeal Speculum, open on side, no slide, illuminated. | 1913 |
| 34 | Jackson's Aspirating Laryngoscope with Moore's Aspirating attachment, child's size. | |
| 35 | Yankauer's Oval Laryngeal Speculum, for use in connection with Bruenings' Electroscope. | |
| 36 | Yankauer's Oval Laryngeal Speculum, with handle and illuminating attachment. | 1911 |
| 37 | Yankauer's Self-Retaining Direct Laryngoscope, modern. | |
| 38 | Craig's Adjustable Laryngeal Speculum, illuminated. | 1913 |
| 39 | Flagg's Laryngoscope with battery handle. | |
| 40 | Lynah's Anterior Commissure Speculum. | |
| 41 | Lynah's Adjustable Laryngeal and Intubation Speculum, with three different sized spatulae. | |
| 42 | Lynah's Ovoid Laryngeal Speculum, child's size. | |
| 43 | Lynah's Ovoid Laryngeal Speculum, adult size. | |
| 44 | Jackson's Anterior Commissure Laryngoscope, heart-shaped, with posterior bevel. | |
| 45 | Clerf's Anterior Commissure Laryngoscope, heart-shaped, with anterior bevel. | |
| 46 | Jackson's Laryngostat, heart-shaped. | |
| 47 | Jackson's Oesophageal Speculum, adult size, original model, with slide. | 1914 |
| 48 | Jackson's Oesophageal Speculum and Hypopharyngoscope, child's size, modern. | |
| 49 | Jackson's Oesophageal Speculum and Hypopharyngoscope, adult size, modern. | |
| 50 | Jackson's Special Oesophagoscope, oval. | |
| 51 | Lynah's Oesophageal Speculum, ovoid, adult size. | |
| 52 | Forbes' Oesophageal Speculum, child's size, oval. | |
| 53 | Forbes' Oesophageal Speculum, medium size, oval. | |
| 54 | Forbes' Oesophageal Speculum, adult size, oval. | |
| 55 | Imperator's Oesophageal Speculum, child's size, heart-shaped. | |
| 56 | Imperator's Oesophageal Speculum, adult size, heart-shaped. | |

PANEL No. 2

Bronchoscopes, Oesophagoscopes and Accessory Instruments

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| 57 | Killian's Bronchoscope and Oesophagoscope with slide to cover perforations when used as oesophagoscope; short. | 1897 |
| 58 | Killian's Bronchoscope and Oesophagoscope with slide to cover perforations when used as oesophagoscope; medium. | 1898 |
| 59 | Killian's Bronchoscope and Oesophagoscope with slide to cover perforations when used as oesophagoscope; long. | 1898 |
| 60 | Killian's Adult Bronchoscope and Oesophagoscope with slide left off. | |
| 61 | Killian's Universal Handle attached to adult Oesophagoscope. | 1897 |
| 62 | Kirstein's Headlight attached to Killian Universal Handle for the purpose of throwing light to the bottom of the tube. | About 1892 |
- NOTE: This was the forerunner of the modern Bruenings' Electroscope.
- | | | |
|----|--|--|
| 63 | Yankauer's Improvised Set of Bronchoscopy Instruments, used for removal of foreign bodies from the bronchus, consisting of | |
| | 1 Small Laryngeal Tubular Speculum. | |
| | 1 Large Laryngeal Tubular Speculum. | |

PANEL No. 2—(Continued)

- 1 Small Bronchoscope.
- 1 Large Bronchoscope.
- 1 Frame with Mirror for holding Kirstein Headlight.
- 1 Forceps.
- 1 Hook.
- 2 Sponge Carriers.

NOTE: With these instruments Dr. Sidney Yankauer removed the first foreign body from the bronchus of a patient in New York in 1905. (This Set is mounted in wooden case.)

- 64 Set of Seven Tracheascopes, Bronchoscopes and Oesophagoscopes—
Killian's as modified by Ingals, to fit into universal handle. 1902 to 1904
- 65 Ingals' Original Light Carrier, Oval Lamp. 1904

NOTE: This was made in all lengths to fit tubes above described.

- 66 Ingals' Bronchoscope with universal handle and Jackson Light Carrier. Made in three sizes.
- 67 Ingals' Emergency Bronchoscope.
- 68 Friedberg's Perforated Obturator for Bronchoscopes and Oesophagoscopes.

NOTE: This was made for all sizes of tubes.

- 69 Friedberg's Upper Oesophagus Tubes, with perforated obturators, child's and adult size.
- 70 Friedberg's Oesophagoscope with beveled distal end.
- 71 Bruenings' Electroscope, original model; illuminating head fitted permanently into the handle.
- 72 Set of five Bruening's Extension Tubes for Bronchoscopic and Oesophagoscopic work.
- 73 Bruenings' Electroscope, modern type.
- 74 Kirstein Headlight, used by Ingals in bronchoscopic work for about twenty-five years.

NOTE: Instruments listed under Nos. 63 to 72, inclusive, were used for many years by the late Doctors Ingals and Friedberg, and were loaned for this exhibit by Mrs. Stanton A. Friedberg.

- 75 Set of three Bronchoscopes with universal handle—Killian Type modified by Yankauer. Used in connection with Kirstein Headlight.
- 76 Killian's Set of six Infants' and Children's Bronchoscopes with tubular obturators, used in connection with Bruenings' Electroscope.
- 77 Killian's Triple Channel Bronchoscope for examination, irrigation and evacuation. May be used in connection with Bruening's Electroscope or Kirstein Headlight.
- 78 Killian's Oesophagoscope with window for inflation, for use in connection with Bruenings' Electroscope or Kirstein Headlight. These are made in two sizes, for children and adults.
- 78A Bruenings' Extra Large Extension Oesophagoscope.
- 79 Bruenings' Cardiograph for attachment to Bruenings' Electroscope.
- 80 Bruenings' Counter Pressure Apparatus for use in Autoscopy in adults and children.
- 81 Caspar's Panelectroscope with Bruenings' Bronchoscope.
- 82 Mosher's Emergency Bronchoscope.
- 83 Kahler-Leiter Electroscope—modern type.
- 84 Two Kahler-Bruenings Extension Bronchoscopes.
- 85 One Oval Kahler-Bruenings' Extension Oesophagoscope.
- 86 Two Hasslinger-Bruenings' Extension Oesophagoscopes, child and adult size, with thickened distal end on anterior tube.

Item
No.

PANEL No. 2—(Continued)

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| 87 | Two Kahler Oval Oesophagoscopes—non-extendable. | |
| 88 | Guisez' Open Laryngeal Speculum. | |
| 89 | Guisez' Bronchoscope and Oesophagoscope with flexible probe pointed obturator, child's size. | |
| 90 | Guisez' Bronchoscope and Oesophagoscope with flexible probe pointed obturator; adult size. | |
| 91 | Guisez' Universal Handle, for use in connection with Laryngeal Speculum, Bronchoscopes and Oesophagoscopes. | |
| 92 | Jackson's Tracheascope, child's size. | 1903 |
| 93 | Jackson's Tracheascope, adult size. | 1903 |
| 94 | Jackson's Bronchoscope—4 m.m. x 30 c.m. | 1911 |
| 95 | Jackson's Bronchoscope—5 m.m. x 30 c.m. | 1911 |
| 96 | Jackson's Bronchoscope—7 m.m. x 40 c.m. | 1911 |
| 97 | Jackson-Lynah Tracheascope. | 1919 |
| 98 | Jackson-Lynah Bronchoscope. | 1919 |
| 99 | Jackson Bronchoscope, modern type—5 m.m. x 30 cm. Infant size. | |
| 100 | Jackson Bronchoscope, modern type—7 m.m. x 40 cm. Adolescent and older children. | |
| 101 | Jackson Bronchoscope, modern type—9 m.m. x 40 c.m. Adult size. | |
| 102 | Jackson Bronchoscope, modern type—5 m.m. x 45 c.m. for depth of the lower lobe. | |
| 103 | Myerson { Full-Lumen Bronchoscope—5 m.m. x 39 c.m. | |
| 104 | Myerson { Full-Lumen Bronchoscope—7 m.m. x 39 c.m. | |
| 105 | Jackson Staple Bronchoscope—made in four sizes. | |
| 106 | Imperatori's Cleaner for Bronchoscopic Light Carrier, Lamp and Cords. | |
| 107 | Jackson's Bronchoscope, arranged for use with universal handle as well as for use with Kahler Electroscopic, by Israel. | |
| 108 | Israel's Universal Handle for use with Bronchoscopes and Oesophagoscopes. | |
| 109 | Mosher's Forceps Bronchoscope. | 1913 |
| 110 | Goodloe's Forceps Bronchoscope—made in two sizes. | |
| 111 | Yankauer Bronchoscope with Searcher. Modern. | |
| 112 | Lerche's Bronchoscope with instrument with flexible shank and lancet on end for puncturing abscess of the tracheobronchial lymph nodes. | |
| 113 | Boise's Bite Block. | |
| 114 | McKee-McCready Bite Block—child's. | |
| 115 | McKee-McCready Bite Block—adult's. | |
| 116 | Moore's Bite Block—child's. | |
| 117 | McKee-McCready Bite Block with Anesthesia Tube. | |
| 118 | Moore's Right Angle Bite Block. | |
| 119 | Jackson's Light Carrier and Lamp for use with Laryngeal Specula, etc. | |
| 120 | Jackson's Light Carrier and Lamp for use with Bronchoscopes and Oesophagoscopes. | |

PANEL No. 3

Oesophagoscopes and Accessory Instruments

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| 121 | Jackson's Oesophagoscope, child's size—4 m.m. x 30 c.m. | 1903 |
| 122 | Jackson's Oesophagoscope, medium size—7 m.m. x 40 c.m. | 1903 |
| 123 | Jackson's Oesophagoscope, medium size—7 m.m. x 45 c.m. | 1907 |
| 124 | Jackson's Oesophagoscope, adult size—10 m.m. x 53 c.m. | 1907 |
| 125 | Coolidge's Oesophagoscope, Oval, small, with light carrier. | |

Item
No.

PANEL No. 3—(Continued)

- 126 Coolidge's Oesophagoscope, Oval, medium, with light carrier.
- 127 Coolidge's Oesophagoscope, Oval, adult, with light carrier.
- 128 Einhorn's Light Carrier as used with Coolidge's Oesophagoscopes.
- 129 Mosher's Oesophagoscope, Oval, No. 1, child's size, 28 c.m. long
with light carrier and obturator. 1906
- 130 Mosher's Oesophagoscope, Oval, No. 2, adolescent size, 30 c.m. long. 1906
- 131 Mosher's Oesophagoscope, Oval, No. 3, adult size, 33 c.m. long. 1906
- 132 Mosher's Oesophagoscope, Oval, No. 4, adult size, 46 c.m. long. 1906
- 133 Window Plug for making oesophagoscope air tight when ballooning to
facilitate introduction.
- 134 Window Plug, to fit smaller oesophagoscope, with opening to permit the
introduction of instruments.
- 135 Mosher's Oesophagoscope, Oval, for upper oesophagus, with folding
handle; extra light carrier being stowed away inside of the obturator
staff, 25 c.m.
- 136 Mosher's Oesophagoscope, adult size, with accessories as above, 46 c.m.
- 137 Mosher's Oesophagoscope, medium size, with operating window plug,
45 c.m.
- 138 Arrowsmith's Oesophagotome as used with Mosher's Oesophagoscope,
with air-tight operating window.
- 139 Lerche's Oesophagoscope with two auxiliary channels, built sideways—
one for light carrier, the other for suction tube; child's size.
- 140 Lerche's Oesophagoscope with two auxiliary channels, as above—adult size.
- 141 Lynah's Oesophagoscope (made in three sizes), adult size. 1919
- 142 Lynah's Oesophagoscope, Oval Model (made in three sizes). 1920
- 143 Jackson's Oesophagoscope, 6 m.m. x 35 c.m., infant size, modern.
- 144 Jackson's Oesophagoscope, 7 m.m. x 45 c.m., adolescent and older chil-
dren's size.
- 145 Jackson's Oesophagoscope, 9 m.m. x 45 c.m., adult size.
- 146 Jackson's Oesophagoscope, 10 m.m. x 53 c.m., adult size.
- 147 Jackson's Oesophagoscope, 9 m.m. x 45 c.m., full lumen.
- 148 Jackson's Centimeter Rule to determine by subtraction the depth to which
tubes are inserted.
- 149 Conducting Cord for Bronchoscopes and Oesophagoscopes.
- 150 Jackson's Ballooning Oesophagoscope and Gastroscope, 9 m.m. x 53 c.m.
NOTE: This is made in four sizes—exhibit being the largest.
- 151 Forbes' Oesophagoscope, Oval, child's size.
- 152 Forbes' Oesophagoscope, Oval, adolescent size.
- 153 Forbes' Oesophagoscope, Oval, adult size.
- 153-A Tucker's Oval Full Lumen Oesophagoscope.
- 154 Dean's Oesophagoscope, Oval and Tapering, with side opening for the
introduction of instruments and radium carriers.
- 155 Hill's Dilating Oesophagoscope for use with Bruenings' Electroscope when
used in the removal of large foreign bodies.
- 156 Dean's Modification of Hill's Dilating Oesophagoscope with auxiliary
light carrier and individual handle attached, for use as above.
- 157 Ingals' Safety Pin Closing Tube for upper bronchus. 1913
- 158 Ingals' Safety Pin Closing Tube for lower bronchus. 1913
- 159 Ingals' Bronchoscopic Tube for finding and extracting pins.
- 160 Mosher's Original Safety Pin Closing and Removing Tube, adapted for
use with the Bruening Electroscope. 1913
- 161 Mosher's Modern Safety Pin Closing and Removing Tube, short, small
calibre. 1915

Item
No.

PANEL No. 3—(Continued)

- 162 Mosher's Modern Safety Pin Closing and Removing Tube, long, small calibre—children's.
- 163 Mosher's Modern Safety Pin Closing and Removing Tube, large, large calibre—adult's.
- 164 Mosher-Jackson Trap-Door Oesophagoscope for closing and removing safety pins.
- 165 Boot's Safety Pin Closing and Removing Tube (made out of Breunings' Extension Tube).
- 165 Boot's Safety Pin Closing and Removing Tube (made out of Bruenings' stomach Tube). 1909
- 166-A Material for Cleaning Auxiliary Light Carrier and Suction Channels.

PANEL No. 4

Earliest Models of Rhinoscopes, Pharyngoscopes, Bronchoscopes and Oesophagoscopes

Some of these models are the only ones in existence and antedate the advent of the Edison Miniature Electric Bulb. Illumination was obtained by heating a small platinum loop. To overcome the great heat generated by this method a stream of water was constantly circulated through the instrument during examination.

- 167 Zaufal-Leiter Pharyngo-Rhinoscope—first model. 1878
- 168 Zaufal-Leiter Pharyngo-Rhinoscope—improved model. 1878
- 169 Semeleder Pharyngoscope. 1872
- 170 Zaufal Laryngoscope. 1879
- 171 Zaufal Laryngoscope—improved model. 1880
- 172 Zaufal Rhinoscope, extendable. 1880
- 173 Stoerk-Semeleder Oesophagoscope. 1877
- 174 Stoerk-Reiner Oesophagoscope—second model. 1878
- 175 Stoerk Oval Enlargeable Oesophagoscope—third model. 1880
- 176 Stoerk-Reiner Extendable Oesophagoscope, in three segments—fourth model. 1882
- 177 Stoerk Extension Oesophagoscope—fifth model. 1896
- 178 Nitze-Leiter Oesophagoscope—first model. 1879
- 179 Nitze-Leiter Oesophagoscope—second model. 1880
- 180 Hacker-Leiter Panelectroscope with Kussmaul Short Oesophagoscope. 1883
- 181 Von Schroetter's Bronchoscope, tube glass-lined, lamps for illumination situated in the head of the handle. 1904
- 182 Stoerk Straight Tube Oesophagoscope, flexible distal end and flexible obturator with hard rubber olive. 1897
- 183 Gluekman's Oesophagoscope, oval body, with removable lens system.
NOTE: Double method of illumination—the two halves carrying the electric bulbs are closed when introduced, and instrument is gradually advanced after ballooning. Instrumentation can be accomplished when lens system is removed.
- 184 Caspar's Panelectroscope, second model, with Killian-Gottstein Suction Bronchoscope and Oesophagoscope.
- 185 Rosenheim's Oesophagoscope with individual light carrier.
- 186 Kussmaul's Oesophagoscope with rubber tipped obturator.
- 187 Bruenings' Electroscope, Model No. 2, with J. B. Murphy's Oesophagoscope.

PANEL No. 4—(Continued)

- 188 Einhorn's Oesophagoscope, with obturator and light carrier. 1901
NOTE: To Dr. Max Einhorn, of New York, belongs the honor of having first suggested an oesophagoscope with an individual light carrier housed in an auxiliary tube.
- 189 Lewisohn's Telescoping Oesophagoscope with illumination furnished on the principle of the Kirstein Headlight.
- 190 Bruenings' Foreign Body Extracting Dilator and Bronchoscope combined for the purpose of extracting foreign bodies in cases of stricture and edema, arranged for use in connection with Bruenings' Electrocope.
- 191 Bruenings' Oesophageal Dilating Specula for use in connection with Bruenings' Electrocope to facilitate the extraction of large foreign bodies in the upper oesophagus.
- 192 Seiffert's Upper Oesophagoscope, enlarging sideways. May be used in connection with Bruenings' Electrocope or with Jackson Light Carrier and Lamp.
- 193 Seiffert's Oesophageal Dilating Specula. This instrument is intended for use in emergency cases for forcible dilatation of the upper oesophagus to permit removal of large impacted foreign bodies.

PANEL No. 5

Laryngeal, Bronchial and Oesophageal Tube Forceps and Scissors for Grasping, Punching and Cutting Purposes

- 194 Killian's Tube Forceps with Serrated Grasping Jaws for removing foreign bodies.
- 195 Killian's Tube Forceps with Toothed Grasping Jaws for removing foreign bodies.
- 196 Killian's Tube Forceps with Cupped Jaws for removing globular foreign bodies, and for removing specimen.
- 197 Killian's Tube Forceps for inserting and grasping foreign bodies, with opening in center.
- 198 Killian's Tube Forceps with universal handle, and with Toothed Jaws.
- 199 Killian's Tube Forceps with Serrated Jaws for insertion in universal handle.
- 200 Killian's Tube Forceps with large cupped Serrated Jaws for insertion in universal handle.
- 201 Coolidge's Forceps for removing foreign bodies.
- 202 Mosher's Tenacula Forceps for Grasping Safety Pins, for use in connection with Coolidge Handle.
- 203 Ingals' Improved Oesophageal Foreign Body Forceps.
- 204 Ingals' Small Tube Forceps for imbedded foreign bodies.
- 205 Bruenings' Extension Tube Forceps with six Grasping Tips of different shapes.
- 206 Kahler's Extension Tube Forceps with accessories same as above.
- 207 Schlindwine's Modification of Bruenings' Forceps, non-extendable, made in several lengths.
- 208 Ingals' Tube Forceps in connection with Krausse Handle, made in several lengths.
- 209 Lerche's Tube Forceps with adjustable shank and assorted attachments, as used with Bruenings' Extension Tube Forceps.
- 210 Lerche's Stricture Incisor. Set consists of 3 lengths of shanks, 30, 40 and 56 c.m.

Item
No.

PANEL No. 5—(Continued)

- 211 Mosher's Tube Forceps with adjustable alligator jaw, for use with oesophagoscopes and gastroscopes, 73 c.m. long. 1915
- 212 Mosher's Tube Forceps with extra long Alligator jaw and Ratchet Handle, with shank 36 c.m. long. 1913
- 213 Mosher's Tube Forceps with Alligator Jaw and Ratchet Handle with shank 43 c.m. long. 1913
- 214 Mosher's Tube Forceps with Alligator Jaw and Ratchet Handle with shank 54 c.m. long. 1913
- 215 Lynah's Oesophageal Tube Forceps with Alligator Jaw and without ratchet handle, with shank 29 c.m. long.
- 216 Lynah's Oesophageal Tube Forceps with Alligator Jaw and without ratchet handle, shank 43 c.m. long.
- 217 Mosher's Ring Punch for use in mouth and oesophagus with shank 33 c.m. long. 1913
- 218 Von Mikulicz Ring Punch for use in lower oesophagus and stomach, 60 c.m.
- 219 Killian-Little Tube Forceps with Alligator Cutting Jaw for laryngeal use.
NOTE: These Forceps are made in several lengths for bronchoscopic and oesophagoscopic use.
- 220 Killian Tube Forceps as modified by Yankauer, made in lengths for laryngeal, bronchial and oesophageal use.
- 221 Jackson Universal Handle as modified by Mueller, with tubes of proper length for laryngeal, bronchial and oesophageal use to carry the various types of universal alligator grasping and cutting tips.
- 222 Killian-Little Tube Forceps with Alligator Grasping Jaw, made in three lengths for laryngeal, bronchial and oesophageal work.
- 223 Irwin-Moore's Oesophageal Alligator Type Grasping Jaw, made in several lengths.
- 224 Patterson Tube Forceps with Alligator Cutting Jaw. These are made in several lengths.
- 225 Lynah's baby size Alligator Jaw Tube Forceps, made in three sizes for laryngeal, bronchial and oesophageal work.
- 226 Fisher's Universal Handle for accommodating forceps and punches that work on either push or pull.
The following five instruments are used in connection with Fisher's Universal Handle:
- 227 Lerche's Tooth Blade Cutting Forceps.
- 228 Mosher's Pin Bending Forceps.
- 229 Irwin-Moore's Dental Blade Cutting Scissors.
- 230 Irwin-Moore's Alligator Grasping Forceps with rat teeth.
- 231 Casselberry's Bronchoscopic Pin Cutter and Fragment Holder.
- 232 Boot's Alligator Jaw Grasping Forceps, especially intended for use with friable foreign bodies.
- 233 Boot-Jesberg Alligator Tube Forceps, especially intended for grasping round foreign bodies.
- 234 Jackson Tube Forceps with Alligator Toothed Jaws for removing detached filiform bougies or similar foreign bodies. Shank 30 c.m. long.
- 235 Jackson Tube Forceps, same as above. Shank 60 c.m. long.
- 236 Jackson Oesophagoscopic Grasping Forceps, made in several lengths as required.
- 237 Jackson Bronchoscopic Grasping Forceps, made in several lengths and different sized jaws.

Item
No.

PANEL No. 5—(Continued)

- 238 Jackson Oesophagoscopic side grasping forceps, made in several lengths and different sized jaws.
- 239 Jackson Bronchoscopic Grasping Forceps in several lengths with side grasping jaw.
- 240 Jackson's Forceps for removal of peanuts, meat and similar objects, made in several lengths and sizes.
- 241 Jackson's Rotation and Double Pronged Forceps for grasping and turning irregular foreign bodies, made in several lengths and sizes.
- 242 Jackson's Extra Large Forceps for removal of peanuts and similar objects.
- 243 Jackson's Heavy Dilating and Grasping Forceps, made in several lengths and sizes.
- 244 Jackson's Upper Lobe Bronchus Forceps, original, small model.
- 245 Jackson's Upper Lobe Bronchus Forceps, modern, adult size.
- 246 Jackson's Rotation Double Pronged Forceps for grasping and pushing open safety pins in the stomach for turning, original model.
- 247 Jackson's Rotation Double Pronged Forceps, modern, made in several lengths and sizes.

PANEL No. 6

Instruments for Removing Foreign Bodies, Securing Specimen, Removing Growths, Dilating and Intubating

- 248 Mosher's Safety Pin Catcher, two sizes, for the lower pharynx and upper oesophagus, original models. 1907
- 249 Mosher's Safety Pin Closer, original model. 1905
- 250 Mosher's Safety Pin Closer, improved model. 1906
- 251 Jackson's Safety Pin Closer, made with three sizes of rings.
- 252 Del Rio Pin Closing and Removing Forceps with extension shank.
- 253 Von Eicken's Safety Pin Closing and Removing Forceps with extension shank.
- 254 Schlemmer-Leiter Safety Pin Closing Attachment for use in connection with Kahler's Bronchoscopic Tube Forceps.
- 255 Lerche's Safety Pin Closing and Removing Forceps.
- 256 Arrowsmith's Safety Pin Closing Forceps.
- 257 Arrowsmith-Clerf Safety Pin Closing Forceps.
- 258 Tucker's Tack and Pin Forceps, made in several lengths and sizes.
- 259 Hubbard's Safety Pin Closing and Extracting Instrument.
- 260 Hubbard's Shield Hooks, made in two sizes, right and left, for releasing impacted foreign bodies and assisting in closing open safety pins in the air passages.
- 261 Jackson's Mechanical Spoon and Bean Extractor.
- 262 Jackson's Safety Pin Closer with Arrowsmith Ring Handle.
- 263 Ingals' Pin Finders, three different models.
- 264 Boot's Pin Finder.
- 265 Bruenings' Button Removing Forceps.
- 266 Tucker's Double Pointed Staple Forceps.
- 267 Tucker's Improved Staple Forceps.
- 268 Mosher's Pin Bender, small model.
- 269 Mosher's Safety Pin Bender and Cutter, heavy model.
- 270 Casselberry's Bronchoscopic Pin Cutter and Fragment Holder.
- 271 Bruenings' Forceps for introducing intubation tubes in bronchial stenosis.

Item
No.

PANEL No. 6—(Continued)

- 272 Two Bruenings' models of Bronchial Stenosis Intubation Tubes.
- 273 Six Myerson's Oesophageal Intubation Tubes, different models and sizes.
- 274 Guisez' Rubber Oesophageal Intubation Tube.
- 275 Mosher's Forceps for introducing Intubation Tubes by the direct method.
- 276 Mosher's Direct Intubation Tube, made in five sizes.
- 277 Lynah's Forceps for Direct Intubation with hard rubber-covered "*Non-Cough-Out*" Intubation Tube.
- 278 O'Dwyer's hard rubber-covered Intubation Tube, used by the direct method.
- 279 Lynah's Trachea-Bronchial Intubation Tubes, extra long, made in five sizes.
- 280 Jackson's Direct Method Intubation Tube Introducer.
- 281 Jackson's Self-Retaining Intubation Tube.
- 282 Jackson's Laryngeal Basket Specimen and Tissue Forceps, round type.
- 283 McCoy's Forceps for removal of laryngeal growth.
- 284 Freudenthal's Epiglottis Punch.
- 285 Jackson's Clinic Model Endoscopic Shear for cutting bones, artificial dentures, etc.
- 286 Jackson's Mechanical Spoon with Ring Handle for removal of pieces of meat and other soft substances from the upper oesophagus, made in several lengths and sizes.
- 287 Jackson's Universal Handle with Basket Tissue Cutting Forceps, made with tubes 20, 40 and 60 c.m. long.
- 288 Twenty-three Grasping Tips, Cutting Tips and Guillotines, devised by laryngologists abroad and in this country.
- 289 Pfau's Laryngeal Cutting Forceps, arranged so that the various grasping and cutting tips described above may be used with it.
- 290 "Dentlenk" Non-Bobbing Laryngeal Forceps, arranged so that a variety of similar cutting tips as above described may be used.
- 291 Ostrom's Forceps for applying Silver Suture Clips in the throat.
- 292 Matthews' Laryngeal Forceps with Alligator Jaw.
- 293 Patterson's Laryngeal Cutting Forceps, Alligator Type.
- 294 Jackson's Clinic Laryngeal Scissors, Alligator Type, standard model.
- 295 Bumpus' Laryngeal Scissors, Alligator Type.
- 296 Jackson's Specimen Tissue Forceps, square jaw, Alligator Type, straight.
- 297 Jackson's Laryngeal and Specimen Forceps, square jaw, upturned.
- 298 Jackson's Laryngeal and Specimen Forceps, triangular, Alligator Type, straight.
- 299 Jackson's Laryngeal and Specimen Forceps, triangular, Alligator Type, upturned.
- 300 Jackson's Laryngeal Cup Forceps, straight, large, Alligator Type.
- 301 Jackson's Laryngeal Cup Forceps, straight, small, Alligator Type.
- 302 Jackson's Laryngeal Cup Forceps, upturned, small, Alligator Type.
- 303 Jackson's Papilloma Forceps for scalping of recurrent laryngeal papillomata.
- 304 Imperatori's Laryngeal Web Forceps.
- 305 Jackson's Laryngeal Grasping Forceps, Alligator Jaw, straight.
- 306 Jackson's Laryngeal Grasping Forceps, Alligator Jaw, opening downward.
- 307 Jackson's Laryngeal Grasping Forceps, Alligator Jaw, rat-toothed at end.
- 308 Lynah's baby size Alligator Type Grasping Forceps.
- 309 Bruenings' Universal Laryngeal Handle and Tube with small oval cup-shaped cutting tip.

PANEL No. 6—(Continued)

NOTE: Every type of universal cutting and grasping tips as mentioned before may be used with this handle.

- 310 Mosher's Papilloma Removing Instrument with Spiral Wire Grasping Jaw. 1910
- 311 Lynch's cup-shaped Cutting Forceps for reaching under the vocal chords for removing nodules; reversible.
- 312 Krause's Laryngeal Cutting Forceps.
- 313 Von Mikulicz-Jackson Laryngeal Cutting Forceps, early model.
- 314 Jackson's Laryngeal Knife.
- 315 Mosher's Laryngeal Knife.
- 316 Von Pieniazek Laryngeal Grasping Forceps.
- 317 Von Pieniazek Laryngeal Foreign Body Forceps.
- 318 Von Pieniazek Curved Laryngeal Knife.
- 319 Bevan Laryngeal Alligator Type Grasping Forceps.
- 320 Lynch's Set of Instruments for operating upon larynx with patient in suspended position, consisting of straight and curved Scissors, straight and curved Artery Forceps, straight, obtuse, and right-angle Knives, blunt and sharp Curettes, straight forward and side grasping Forceps.
- 321 Lynch's Adjustable Mirror for use with patient under suspension.
- 322 Killian's Forceps, Cutting Type, for use through infant bronchoscopes and with patient under suspension.
- 323 Killian's Forceps with Fenestrated Jaw, for use through infant bronchoscopes and with patient under suspension.
- 324 Killian's Forceps with Tenaculum Jaw for use through infant bronchoscopes and with patient under suspension.

PANEL No. 7

Foreign Body Removing, Stricture Dilating, Radium Applying and Accessory Instruments

- 325 Jackson Cupped Tube Forceps for grasping globular objects, small.
- 326 Jackson Cupped Tube Forceps for grasping globular objects, large.
- NOTE: Both the above forceps are made in three sizes and lengths.
- 327 Jackson Forceps for grasping globular objects, jaws in the shape of a pair of rings instead of cups, made in three sizes and lengths.
- 328 Jackson Double Pronged Forceps, made in several lengths and sizes.
- 329 Jackson Tube Forceps, extra light and delicate, for use through 4 and 5 m.m. bronchoscopes, 30 c.m. in length, with forward grasping or side grasping fenestrated jaws, and one with jaw for grasping wooden screws.
- 330 Bruenings' Bronchoscopic Snare, with automatically reforming loop.
- 331 Jackson's Bronchoscopic Snare, with automatically reforming loop.
- 332 Jaennicke's Laryngeal Snare, with automatically reforming loop.
- 333 Israel's Laryngeal Snare, with automatically reforming loop.
- 334 Lerche's Adjustable Bronchial and Oesophageal Forceps with set of accessories, consisting of tenculae, probes, knives, curettes, etc.
- 335 Jackson Dilating Forceps, made in several lengths and sizes.
- 336 Jackson Dilator for small bronchial strictures.
- 337 Jackson Dilator for larger bronchial strictures.
- 338 Jackson Dilator for dilating successively a series of oesophageal strictures.
- 339 Mosher's Spiral Wire Olive Carrier for dilatation of oesophageal strictures.

No.
Item

PANEL No. 7—(Continued)

- 340 Mosher's Mechanical Dilator for strictures of the oesophagus, with two blades of different lengths, with flexible bougie and perforated olive at distal end, so dilator may be introduced over silk string if desirable.
- 341 Lerche-Stark Mechanical Dilator for strictures of the oesophagus and for cardiospasm, with two flexible bougies.
- 342 Bruenings' Set of Fenestrated Olives for diagnostic purposes.
- 343 Bruenings' Set of Stricture Dilating Olives, made of ivory.
- 344 Flexible Oesophageal Dilating Bougie, cylindrical.
- 345 Flexible Oesophageal Dilating Bougie, probe pointed.
- 346 Brown's Flexible Oesophageal Dilating Bougie, probe pointed, perforated, for the purpose of introducing bougie over piano wire with olive pointed guide, which in turn is introduced over a silk string; made in five sizes.
- 347 MacKenzie Oval Flexible Oesophageal Bougies; made in ten sizes.
- 348 Bunte Double Olive Dilating Bougie for stricture of the oesophagus; made in eight sizes.
- 349 Jackson Clinic Single Olive Oesophageal Dilating Bougie; made in seven sizes.
- 350 Bunte Double Olive Dilating Bougie, as modified by Jackson, for stricture of the oesophagus; made in six sizes.
- 351 Jackson Filiform Bougie with flexible woven end for dilating cicatricial stricture in oesophagus; made in eighteen sizes.
- 352 Lynah's Oesophageal Dilating Bougies of metal; made in eight sizes.
- 353 Plummer's Oesophageal Dilating Set with 12 metal olives and whalebone staff, original model, perforated olives to introduce over silk string.
- 354 Plummer's Set of Oesophageal Stricture Dilators, consisting of 16 olives from 15 to 45 French scale, with whalebone staff and flexible metal spiral perforated end for the purpose of introducing over silk string; modern set.
- 355 Mosher's Oesophageal Stricture Dilating Set with flexible tip piano wire and spiral coil for holding olives in position while being introduced. 1908
- 356 Sippy's Set of Olives for dilating oesophageal strictures, consisting of 34 olives ranging from 18 to 51 French scale, flexible spiral staff and spring wire, olive tipped staff, tip perforated for introduction over silk string.
- 357 Sippy's Infant Oesophageal Stricture Dilating Set, consisting of 19 olives ranging from 10 to 29 French scale, with proportionate accessories as above.
- 358 Arrowsmith Set of Dilating Bougies for very tight oesophageal strictures with six olives, sizes 10 to 16 French scale, with distal end olive perforated for introduction over silk string.
- 359 Lerche Flexible Oesophageal Sound introduced over piano wire guide with graduated staff to measure distance from incisor teeth to stricture.
- 360 Lerche large Flexible Sound introduced over silk string with spiral wire staff.
- 361 Lerche Oesophageal Flexible Sound with wire staff.
- 362 Lerche Funnel Curved Metal Tube for the purpose of introducing piano wire guide with flexible tip over silk string.
- 363 Myerson's Spiral Wire, olive pointed, Oesophageal Stricture Dilating Bougie; made in six sizes.
- 364 Sippy's large Oesophageal Dilating Olive with very flexible whalebone staff for patient's use after being discharged and sent home.
- 365 Dean's Electrically Heated Flexible Bougie for dilating oesophageal strictures with cable and thermostat; made in six sizes.

Item
No.

PANEL No. 7—(Continued)

- 366 Dean's Electrically Heated Bougie, short type, for dilating laryngeal strictures; made in six sizes.
- 367 Dean's Electrically Heated Bougie for retrograde introduction; made in six sizes.
- 368 Tucker's Retrograde Bougie for dilatation of cicatricial oesophageal stenosis; made in eleven sizes.
- 369 Jackson Clinic Tracheal Dilating Bougie; made in seven sizes.
- 370 Lynah's Endoscopic Laryngeal Bougie; made in eight sizes.
- 371 Lynah's Retrograde Laryngeal Bougie, for dilating trachea and larynx from below upwards; made in eight sizes.
- 372 Tucker's Retrograde Laryngeal Stenosis Dilating Bougies; made in seven sizes.
- 373 Bruenings' Flexible Bougie with oval distal end, used for introducing the anterior part of Bruening's Extension Tubes; made in three sizes.
- 374 Marschick's Flexible Bougie with radium container, closed and fenestrated.
- 375 Plummer-Vinson Radium Applicator for use in oesophagus, flexible distal end perforated for introduction over silk string, with six sizes of olives, with removable whalebone, introducing staff and fishline attached for withdrawing radium container.
- 376 Hanford's Oesophageal Radium Applicator with flexible wire stem introducer.
- 377 Vienna Oesophageal Radium Applicator with perforated olive tipped spiral end for introduction over silk string, piano wire stem.
- 378 Dean's Oesophageal Radium Applicator with three sizes of radium containers, piano wire staff.
- 379 Jackson's Endoscopic Syringe for injection of solutions of radium salts, local anesthetics, etc.; capacity 25 milligrams.
- 380 Yankauer's Instrument for planting radium seeds in the oesophagus and bronchial tubes.

PANEL No. 8

Accessory Laryngeal, Bronchial and Oesophageal Instruments such as Curettes, Searchers, Probes, Hooks, Magnets, Electrodes, Suction Tubes, Specimen Collectors, Etc.

- 381 Mosher's Dull Oesophageal Curette for removing a bolus of meat.
- 382 Mosher's Oesophageal Curette, short, sharp.
- 383 Mosher's Oesophageal Curette, long, sharp.
- 384 Killian-Hubbard Laryngeal Curette, sharp, for use in laryngeal work with patient under suspension.
- 385 Killian-Hubbard Laryngeal Curette, as above, Model No. 2.
- 386 Killian-Hubbard Laryngeal Curette, as above, Model No. 3.
- 387 Boot's Staple Point Protector.
- 388 Coin Catcher, basket form, with whalebone staff.
- 389 Todd's Coin Catcher, with wire loop, metal stem, for use through children's and adults' oesophagoscopes.
- 390 Seiffert's Magnet for removing foreign bodies from the oesophagus and bronchial tubes.
- 391 Dean's Magnet for removing foreign bodies from the oesophagus and bronchial tubes.
- 392 Lynch's Speculum for examining larynx with patient under suspension.

Item
No.

PANEL No. 8—(Continued)

- 393 Seiffert's Laryngeal Examining and Dilating Speculum, adjustable in every direction.
- 394 Myerson's Double Platinum Loop for taking smears.
- 395 Iglauer's Concealed Foreign Body Searcher.
- 396 Jackson's Original Laryngeal and Bronchial Electrode.
- 397 Jackson's Aseptic Laryngeal Cautey Electrode.
- 398 Lynah's Laryngeal and Bronchoscopic Galvanic Cautey with exchangeable cautey tips for destroying tubercular ulcers, cutting strictures, etc.; two lengths of staff and three types of electrodes.
- 399 Arrowsmith's Oesophageal Diathermy Electrode.
- 400 Hubbard's Laryngeal Diathermy Electrode.
- 401 Israel's Laryngeal Injection Needle with patient under suspension.
- 402 Lerche's Oesophageal Galvanic Electrode.
- 403 Hill's Oesophageal Feeding Tube, with hard rubber olive.
- 404 Hill's Oesophageal Feeding Tubes, two sizes, with aluminum olives.
- 405 Jackson's String Cutting Oesophagotome.
- 406 Jackson's String Probe.
- 407 Gluekman's Oesophageal Probe with Marker.
- 408 Killian's Oesophageal Probe; made in two lengths.
- 409 Killian-Jackson Oesophageal and Bronchial Probe, hook shape; made in two lengths.
- 410 Killian-Jackson Oesophageal and Bronchial Probe, right angular; made in two lengths.
- 411 Killian's Blunt Hook; made in two lengths.
- 412 Birkett's Serrated End Foreign Body Hook; made in three lengths.
- 413 Gluekman's Oesophagoscopic Sponge Holder.
- 414 Kahler's Bronchoscopic and Oesophagoscopic Sponge Holder.
- 415 Ingals' Bronchoscopic and Oesophagoscopic Sponge Holder; made in two lengths.
- 416 Bruenings' Bronchoscopic and Oesophagoscopic Sponge Holder, double-ended.
- 417 Coolidge's Bronchoscopic and Oesophagoscopic Sponge Holder with screw collar.
- 418 Jackson's Bronchoscopic and Oesophagoscopic Sponge Holder with long collar; heavy model.
- 419 Jackson's Bronchoscopic and Oesophagoscopic Sponge Holder for small tube.
- 420 Jackson's Bronchoscopic and Oesophagoscopic Sponge Holder; late model.
- 421 Israel's Laryngeal Suction Tube for use through laryngeal specula with patient under suspension.
- 422 Gluekman's Oesophageal Suction Tubes.
- 423 Killian's Oesophageal Suction Tube, large.
- 424 Killian's Bronchoscopic and Oesophagoscopic Suction Tube, small.
- 425 Lynah's Suction Tube for small bronchoscopes.
- 426 Lynah's Double Channel Bronchial and Oesophageal Suction Tube.
- 427 Yankauer's Bronchial and Oesophageal Suction Tubes; made in three lengths and sizes.
- 428 Jackson's Bronchial and Oesophageal Suction Tubes; made in three lengths.
- 429 Jackson's Tracheotomic Aspirating Tube with valve; made in several sizes.
- 430 Jackson's Upper Lobe Bronchus Hooks, right and left; made in two lengths.
- 431 Jackson's Upper Lobe Fenestrated Bronchus Hook.

Item
No.

PANEL No. 8—(Continued)

- 432 Clerf's Bronchoscopic Atomizer.
- 433 Luken's Specimen Collector, for use through bronchoscopes and oesophagoscopes.
- 434 Clerf's Suction Tube with glass specimen collector.
- 435 Yankauer's Suction Tube and Container for taking bacteriological specimens through bronchoscopes and oesophagoscopes.
- 436 Bruenings' Atomizer for use through laryngeal speculum and bronchoscopes.
- 437 Bruenings-Kahler Atomizer for use through laryngeal speculum and bronchoscopes.
- 438 Yankauer's Flexible End Irrigating Canula; the rubber tube contains flexible wire, by means of which the direction of the tube can be adjusted.
- 439 Lynah's Lung Injection Tube with spiral end for the purpose of injecting bismuth mixtures and other opaque substances into the lung of the living for mapping out abscessed cavities, for the localization of bronchial strictures, draining and irrigating of the lung abscesses.
- 440 Lynah's Spiral and Irrigating Tubes, two types, straight and curved, for use in connection with Lukens-Jackson Irrigating and Aspirating Bronchoscope.
- 441 Luken's Bronchoscopic Aspirating and Irrigating Tube with valve stop cock.
- 442 Clerf's Bronchoscopic Bismuth Insufflator used in connection with standard atomizer bulb; made in several lengths.
- 443 Clerf's Bronchoscopic Bismuth Insufflator as above described, but with spiral end.
- 444 Yankauer's Lung Irrigation and Suction Tube with inlet and outlet tube.
- 445 Myerson's Modification of Yankauer's Suction and Irrigating Tube with flexible distal end tube so it can be inserted in the upper lobe bronchus.
- 446 Luken's Bronchoscopic Syringe for instilling small quantities of medicine into the bronchii.
- 447 Ballon's Pressure Syringe for injecting lipiodol into the bronchial tubes.
- 448 Ballon's Set of Tubes for injecting lipiodol by means of pressure syringe above mentioned into the bronchial tubes, including the upper lobe bronchus.
- 449 Lynah's Bronchoscopic Atomizer.

PANEL No. 9

Gastrosopes—Past and Present Day Models

- 450 Mickulicz Original Gastroscope with optical lens system, electrically illuminated by means of heating platinum wire loop and with cooling system to overcome the heat radiated by the white-hot platinum. Curved to the right, with auxiliary channel for inflation of the stomach. 1881
- 451 Mickulicz Original Gastroscope, as described above. Curved to the left side. 1881
- 452 Mickulicz Gastroscope, second model, illuminated by means of Edison electric miniature bulb; curved. 1881
- 453 Mickulicz Gastroscope, third model; lower half flexible to facilitate introduction. After introduction it can be straightened by means of lever attached to wire cable. Illuminated by means of Edison electric miniature bulb.

Item
No.

PANEL No. 9—(Continued)

- 454 Kausch's Original Gastroscope, built on the plan of the Nitze Ureter Cystoscope. Illuminated by means of the Edison electric miniature bulb. Auxiliary channel for inflation of stomach.
- 455 Kausch's Flexible Tube with spiral metal obturator. This is introduced first, obturator is withdrawn and the gastroscope is passed through the flexible tube.
- 456 Kausch's Mouth Gag for use in connection with introduction of gastroscope.
- 457 Jackson's Gastroscope, 10 m.m. x 85 c.m. Original model with auxiliary channel for light carrier, and auxiliary suction tube with obturator. 1907
- 458 Jackson's Gastroscope, 9 m.m. x 60 c.m., with beveled distal end; modern type.
- 459 Sussman's Flexible Gastroscope, showing instrument in flexed position as used during introduction. For the purpose of straightening and locking, lever "A" is turned toward the operator. Two telescopes are furnished with this instrument, which permit the operator as well as an assistant to view the interior of the stomach. The lens system is arranged on the principle of a periscope, and by means of disc wheel near the handle may be turned in every direction to examine the walls of the stomach.
- 460 Elsner's Gastroscope, built on the plan of the Nitze Cystoscope with flexible bougie at distal end.
- 461 Rovsing's Oesophagus Gastroscope for examination and retrograde introduction of bougies for the purpose of dilating oesophageal strictures.
- 462 Jackson's Retrograde Gastroscope, 5 m.m. x 30 c.m.
- 463 Radium Carrier and Filter for gastroscopic work.
- 464 Platinum Loop, which was used to illuminate cystoscopes and gastroscopes before the advent of the Edison miniature electric bulb.

Instruments and Apparatus Displayed on Table

- 465 Sternberg's Gastroscope with optical system on the principle of the Zeiss-Ringleb Cystoscope, showing an upright image.

Owing to the method in which the lenses and the illumination are placed, the operator is enabled to see retrograde to some extent. It has a camera attachment to permit taking photographs of the inflated interior of the stomach.
- 466 Kausch's New Universal Gastroscope with lens system and arrangement of prisms which can be raised and lowered, permitting the operator to view the pyloric portion and the walls, as well as get a retrograde view of the cardiac entrance to the stomach.
- 466A Kahler-Foramitty's Combination Oesophagoscope and Gastroscope with removable lens system and set of operating instruments.
- 467 Struycken-Glogau Laryngeal Speculum, adjustable, for direct operative work in the upright position—or, for use in connection with suspension apparatus.
- 468 Killian's Suspension Gallows with original model of Killian's Suspension Hook and Tongue Spatula.
- 469 Lynch's Modification of Killian's Suspension Mouth Gag and Tongue Spatula.
- 470 Freudenthal's Modification of Killian's Tongue Spatula.
- 471 Killian's Suspension Hook, second model, with adjustable tongue spatula and counter pressure device.

Item
No.

Instruments on Table—(Continued)

- 472 Killian's Third and Last Model Suspension Hook and Spatula—with Mouth Gag adjustable in every direction.
- 473 Lynch's Suspension Hook with set of five tongue spatulae of different sizes.
- 474 Arrowsmith Illuminator for use in connection with suspension apparatus.
- 475 Arrowsmith-Imperatori Illuminator for use in connection with suspension apparatus on adjustable sliding bar.
- 476 Max Unger's Laryngoscope with six tongue spatulae for examination and operative work on larynx.
- 477 Hasslinger's Directoscope—a self-retaining, adjustable speculum for examination and treatment of larynx.
- 478 Seiffert's Universal Autoscope. When introduced this apparatus works on same general principle as Killian Suspension Apparatus. After introduction handle is swung around and the movable pad rests on the chest. It permits not only of laryngeal treatment but also facilitates introduction of Bronchoscopes and Oesophagoscopes.
- 479 Seiffert's Laryngeal Speculum for examination and treatment of the larynx, made in two sizes. The instrument on exhibit is the child's size.
- 480 Atkinson's Laryngoscope for examination and treatment of the larynx. This instrument is made in two sizes.
- 481 Killian's Phantom for the purpose of practicing bronchoscopy, laryngoscopy and oesophagoscopy by the direct or indirect method.
- 482 Hubbard's Phantom for practicing direct laryngoscopy, bronchoscopy and oesophagoscopy.
- 483 Killian's Chloroform Inhaling Apparatus for use in connection with direct tube work.
- 484 Bruenings' Suction Apparatus for use in connection with direct tube work.
- 485 Seidel's Face Shield for use in connection with direct tube work.
- 486 Boise's Caliper Guide for use in connection with a radiograph in getting adjustment by which the point of the bronchoscope can be brought in close proximity to a foreign body.
- 487 Sippy's Dilator for Cardiospasm, used in connection with a mercury blood pressure manometer.
- 488 Sippy-Mosher Cardiospasm Dilator with barium lines painted lengthwise on the inner silk bag.
- 489 Plummer-Vinson Dilating Equipment for cardiospasm—used in connection with water pressure.
- 490 Mosher's Diagnostic Barium Bougie. Barium lines are painted lengthwise on the inner rubber bag. With manometer and adjustable pressure bellows.
- 491 Yankauer's Porcelain Cocaine Cup.
- 492 Jackson's Aspirating Outfit, for hand use, with all metal suction pump.
- 493 Jackson's Tube Washing Device for use in connection with water faucet.
- 494 Yankauer's Earliest Model Suction Pump with rotary blower, for use in bronchoscopy and oesophagoscopy.
- 495 Yankauer's Suction Apparatus, second model, combined with Ether Pump.
- 496 Carmody Suction Apparatus for use in connection with Bronchoscopes and Oesophagoscopes. Original Model.
- 497 Garel's Stereoscopic Laryngeal Camera with accessories.
- 498 Jackson's Bronchoscopic Battery, arranged so that current is supplied from two separate circuits at the same time, which enables the operator to illuminate the laryngeal speculum as well as the bronchoscopic tube during the process of introduction.

Item
No.

Instruments on Table

- 499 Jackson's Bronchoscopic Battery with three circuits, so that in case of failure of one, operation will not be interrupted for lack of current.
- 500 Jackson's Practice Battery for use in connection with cadaver and dogs.
- 501 Jackson's Open Manikin Board for working out mechanical problems before attempting removal of foreign bodies.

Books on Direct Laryngeal, Bronchial, Oesophageal and Gastroscopic Work

Chevalier Jackson—Tracheo-Bronchoscopy, Oesophagoscopy and Gastroscopy. Pittsburgh, Pa., 1907.

W. Bruenings'—Die Direkte Laryngoskopie, Bronchoskopie und Oesophagoskopie. Freiburg, 1909.

W. Bruenings'—Direct Laryngoscopy, Bronchoscopy and Oesophagoscopy. Translated by W. Howard, London, England. London, 1912.

Chevalier Jackson—Bronchoscopy and Oesophagoscopy. Philadelphia, Pa., 1922.

Chevalier Jackson—Foreign Bodies in Air and Food Passages. Philadelphia, Pa., 1923.

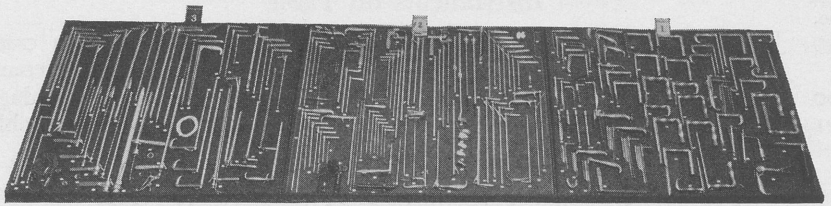


FIG. 1.—Panels 1, 2 and 3, showing laryngeal speculas, bronchoscopes and esophagoscopes.



FIG. 2.—Panels 5, 6 and 7, showing laryngeal forceps, bronchoscopic forceps, gastroscopic forceps and accessories to direct laryngeal and esophageal work.

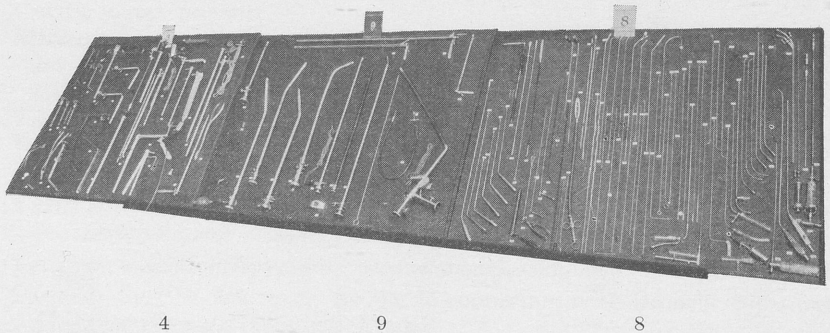


FIG. 3.—Panels 4 and 9, showing the earliest models of direct laryngeal and esophageal speculas, bronchoscopes, esophagoscopes and gastroscopes. Panel 8, showing accessories for direct laryngeal, bronchial and gastroscopic work.

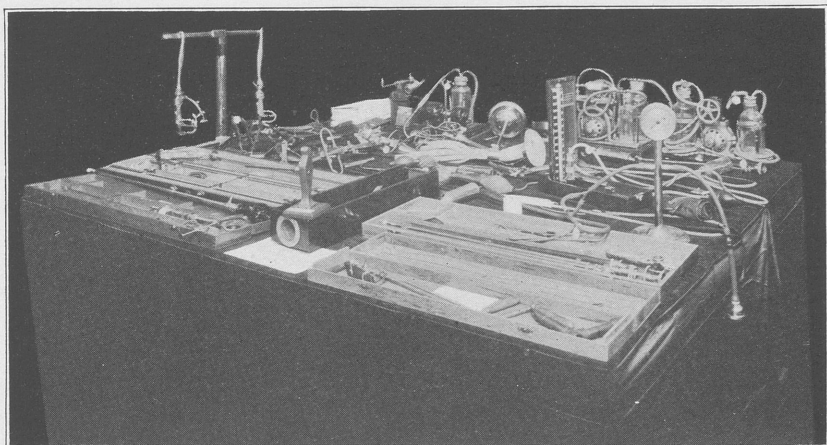


FIG. 4.—Table exhibit, showing esophageal stricture and cardiospasm dilators, suspension apparatus, directoscopes, modern gastroscopes, original models of suction apparatus.

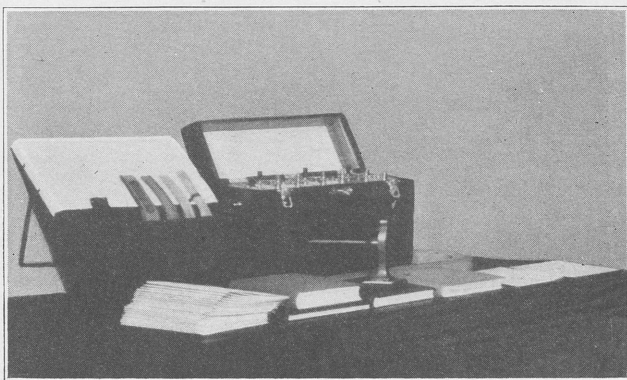


FIG. 5.—Table exhibit, showing bronchoscopic batteries, practice manikins, books and pamphlets on direct laryngeal, bronchial and esophageal work.

Historical Address

READ BEFORE THE CONGRESS OF AMERICAN PHYSICIANS AND
SURGEONS, WASHINGTON, D. C., MAY 1, 1928



DE ROALDES PRIZE MEDAL

OBVERSE—1907



HORACE GREEN, (1802 - 1866)

NEW YORK

Father of Laryngology (1846)

HISTORICAL ADDRESS

D. BRYSON DELAVAN, M.D.

THE American Laryngological Association commemorates this year its fiftieth anniversary. This is indeed a notable accomplishment in the history of medicine. To us the occasion is particularly worthy of recognition and of no little national pride, for the science of laryngology, like that of gynecology, is distinctly the outcome of American genius. Both were primarily originated in the United States. It is right that our Association, its accredited national representative, should upon this occasion be accorded the position of dignity and honor which it so richly deserves, and that our fellow-countrymen who have been the makers of laryngology through the principles which they as pioneers have established for it should be suitably commemorated.

While not the oldest national society of specialists in this country our Association can claim that, in the world of laryngology, it was the first organization of its kind and is now the oldest of them all. If for no other merit than that of priority, indisputably evidenced by the fifty consecutive volumes of our *Transactions*, our Association stands at the head.*

The British Laryngological Society, the next in order of time, founded in 1888 by that most distinguished leader of our science, Sir Morell Mackenzie, was long since discontinued, while the similar societies of the continent appeared at later periods.

Thirty years before the birth of the Association the science of laryngology was founded by Horace Green; ten years later Garcia had given us the laryngoscope, the literature of the modern art had begun to appear, and instruction in it to be set in motion. A decade thereafter saw the specialty beginning to be recognized in several of our principal cities. In 1873, the importance of the

* It is interesting to note that the first important original contribution in this country to the department of diseases of the throat, was made just one hundred years ago when, in 1828, the distinguished Dr. Philip Physick, of Philadelphia, invented his tonsillotome, the prototype of countless, world-wide modifications, still in process of development.

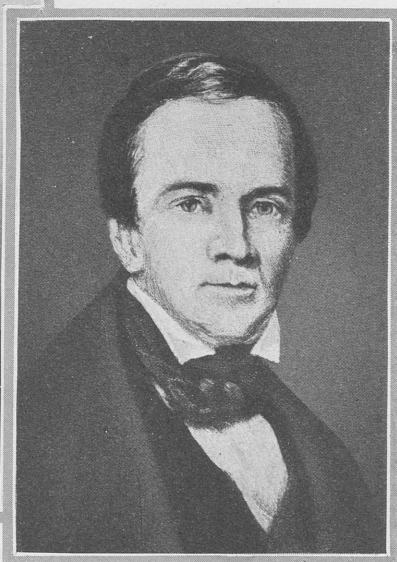
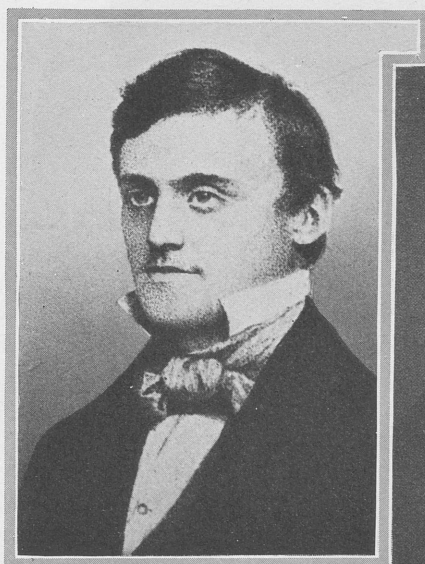
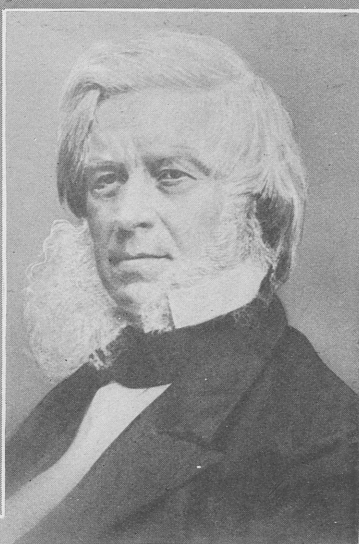
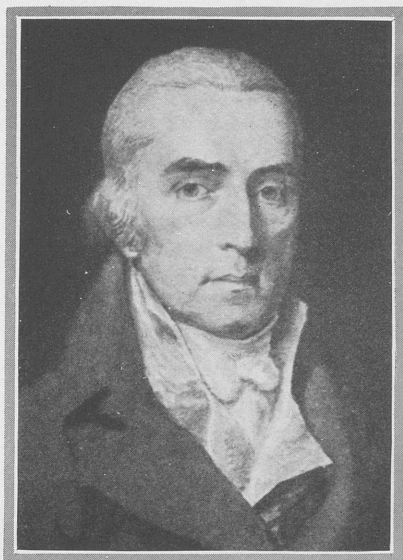
friendly interchange of ideas was recognized in the formation of the New York Laryngological Society, the first of its kind. The founding of this small local organization proved to be an event of momentous importance, for the character of its membership and the high order of their work soon attracted attention to the example which it was quietly establishing. Five years later, in 1878, the influence of this example was such that from all of our chief centers of laryngology leading men were found who, more or less isolated and longing for the stimulus and support of professional companionship, responded with alacrity to the call for the founding of a national society. This was soon effected, and thirty years after the awakening call of Horace Green had challenged the world the American Laryngological Association sprang into existence. This event was the beginning of a new era in laryngology, for "it afforded an opportunity for concerted action, and stimulated labor and thought that otherwise would have been spasmodic and erratic."

The years which have followed have been full of incident, each one of them bringing valuable addition of prestige, of growth and of scientific knowledge but it is of the earlier period that you will wish to hear; for it is this period which marks the origin, birth and infancy of a great department of medicine.

Again let it be emphasized that the science of laryngology was conceived in the United States, and that in our specialty this country has been the acknowledged leader of the world. In proof of this let me recall the following long-established facts:

Many years in advance of others, George Catlin, born in 1796 at Wilkes-Barre, Pa., civil engineer, traveler, skilled master of portraiture, and tireless student of the personalities and customs of the American Indian, spent many years among the various tribes, painting his celebrated series of typical portraits of leading braves and noting the peculiarities of the race. Foremost among his contributions was his book upon the evils of mouth breathing, issued in 1861, *Shut Your Mouth and Save Your Life*. This principle, fully appreciated by himself, was destined to bring daylight to a darkened world. Neither its import nor the basic value of its wide circulation and acceptance can be overestimated.

It has long since been universally conceded that credit for the



Philip Syng Physick, (1768 - 1837)
Philadelphia
Inventor of the tonsillotome

Ephraim Cutter, (1832 - 1919)
Boston

John C. Cheesman, (1788 - 1862) New York
First scientific contributor to American Laryngology

George Catlin, (1796 - 1872)
Wilkes-Barre, Pa.
Engineer, student, painter, explorer



GURDON BUCK, (1807 - 1877)

- NEW YORK

Father of Intralaryngeal Surgery (1846)

actual initiation of laryngology as a science is accorded to Horace Green, of New York, whose convincing demonstration in the early forties of the long suspected *tolerance of the larynx to the presence of a foreign body* opened a new era in the history of medicine; for upon this basic physiological principle depends in large measure all the achievements of modern laryngology. Antedating the invention of the laryngoscope by many years, Horace Green added to his discovery a knowledge of the diseases of the upper air passages and developed methods for their treatment which enabled



INVENTORS AND EARLY TEACHERS OF THE LARYNGOSCOPE

Robert Liston, (1794-1847)
London

Manuel Garcia, (1805-1906)
Madrid

Johann Czermak, (1828-1873)
Prague

Sir Morell Mackenzie, (1837-1892)
London

Wilhelm Meyer
Copenhagen

Ludwig Tuerck, (1810-1868)
Vienna

Pierre Charles Henri Fauvel,
(1830-1895) Paris

him to devote his entire attention to the subject, to the exclusion of the practice of other branches of medicine in which, nevertheless, he was one of the authorities of his day. He thus inaugurated specialism in our art and was, in fact, its first votary, maintaining his position with such success that discriminating critics of highest standing have insisted that, under the influence of his teaching, laryngology would have lived and flourished as a specialty even had the laryngoscope never been invented.

Most unfortunately, not all of Dr. Green's contemporaries were open-minded or well disposed. By many, even of those nearest to him, his contentions were disputed and his accomplishments disparaged. Moreover, specialism itself had not yet been established and the prejudice against it was strong. Dr. Green's life ended in disappointment, notwithstanding the final plaudits of intelligent observers, both at home and abroad.

Dr. Green, in 1842, was the first to introduce a solution of nitrate of silver into the larynx of a child affected with croup. His most important published work was his treatise on *The Diseases of the Air Passages*, first published in 1846. In this he explained the value of intralaryngeal medication and gave clear directions as to its application. In an appendix is given a series of letters from several eminent physicians of the time, corroborating from personal experience his statements.

It is interesting to note the expressions of approval made by various foreign critics, especially of Great Britain, who were the first to accord him unreserved confidence and support and who unhesitatingly acclaimed him "The Father of Laryngology."

Thus the *Dublin Quarterly Journal of Medical Science* said: "We cannot but consider Dr. Green deserving of much praise for bringing to light this new remedy. Had his investigations gone no further than to prove that a foreign body may under certain limitations be safely carried within the rimaglottidis, he would have added to our physiological knowledge a fact of such great practical importance that no one could venture to predict how far it may yet influence the treatment of laryngeal diseases."

From the *London Medical Gazette*: "We are fully convinced of the originality of the applications displayed by our author and of the perfect truth contained in his treatise. The French patholo-



JACOB DA SILVA SOLIS-COHEN, (1837 - 1927)

PHILADELPHIA

Dean and Exemplar of Laryngologists

gist, Trousseau, may have anticipated the author in some degree by the local application of nitrate of silver to the *fauces*, but Dr. Green was the first to extend its use successfully to parts below the epiglottis in various inflammatory diseases of the vocal organs."

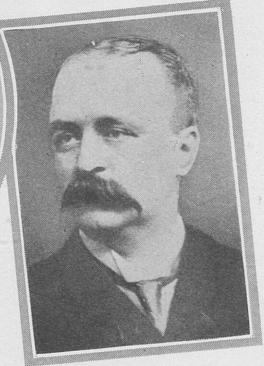
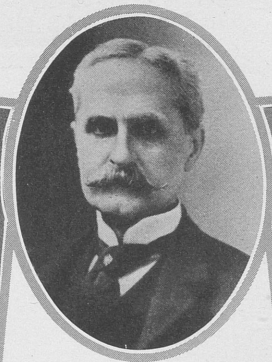
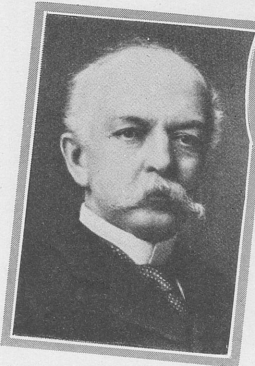
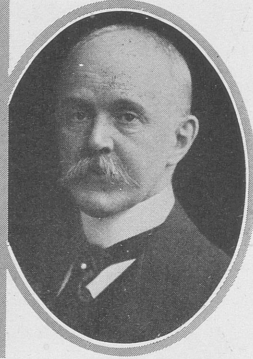
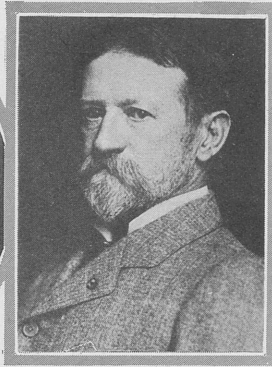
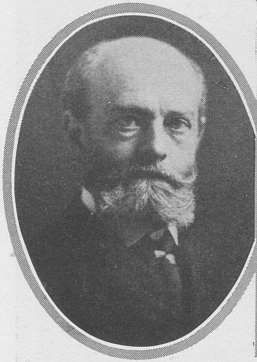
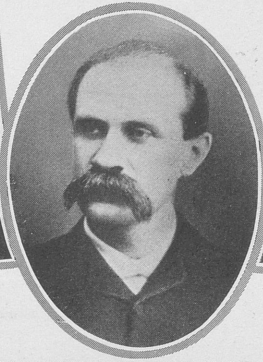
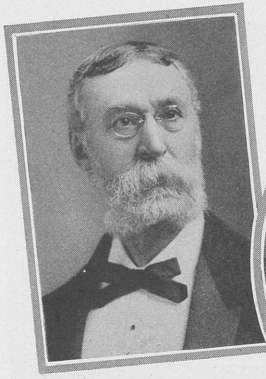
The *British Foreign and Medical Review*: "We think that the author has not only made a most valuable addition to practical or empirical medicine but that the results of his method of treatment will lead to important changes in the prophylaxis and cure of pulmonary phthisis. It would appear from various testifying

documents which the author has collected that his statement as to the practicability and safety of topical medication in laryngeal disease was met by some of his countrymen with sneering incredulity. There can be no doubt, however, that this part of the question is set entirely at rest, nor does the previous publication of the methods used by Bell, Vance, and Trousseau and Belloc detract at all from the merit due to Dr. Green for his persevering and successful attempts to render the treatment of some forms of pulmonary diseases more effectual and certain. We have adopted this mode of treatment recommended by him and can corroborate his statements as to its great value. This much is due Dr. Green."

Professor Bennett, in the *Edinburgh Monthly Journal of Medical Science*: "The results obtained from Dr. Green's methods have exhibited the great advantages to be derived from it in the treatment of laryngeal diseases. Now, thanks to Dr. Green, we can with safety and certainty apply various solutions directly to the parts affected."

While Horace Green was announcing his discoveries in the physiology of the larynx and their application to the pathology and therapeutics of the organ, another light arose. Gurdon Buck, the most famous general surgeon of his time, published in 1848 his method for the relief of obstruction to breathing due to edema of the glottis, by scarification of the tumefied laryngeal tissues. In doing this he operated in the dark, aided only by the sense of touch. The value of his suggestion was at once recognized and was received with widespread approval. It has been the means of saving many lives. Dr. Buck also successfully removed several laryngeal tumors and greatly improved the procedure of tracheotomy as well as making many other well-known contributions to general surgery. Unlike the reception given the ideas of Dr. Green, his met with almost instantaneous recognition, especially in Europe, where, with a generosity equal to that accorded Horace Green, he was acclaimed "the Father of Intralaryngeal Surgery."

The work of Horace Green and Gurdon Buck had been widely discussed, thereby calling general attention to the larynx. It was natural that attempts should be made to demonstrate its interior to the eye; but it was not until several years later that the prin-

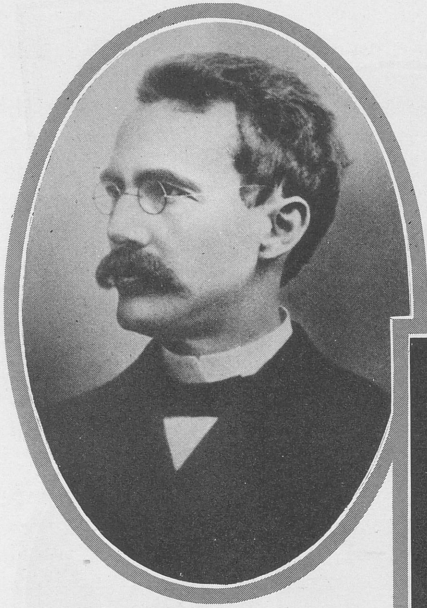


CHARTER MEMBERS OF THE NEW YORK LARYNGOLOGICAL
SOCIETY, 1873

Morris Joseph Asch
Matthew Darbyshire Mann

Francke Huntington Bosworth
Clinton Wagner
Founder
Robert Fulton Weir

George Morewood Lefferts
Francis Parker Kinnicutt
Woolsey Johnson

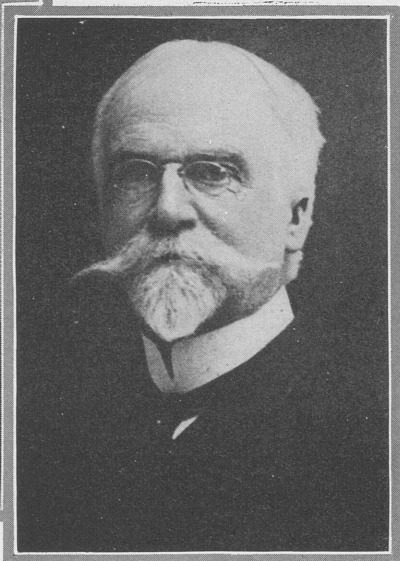
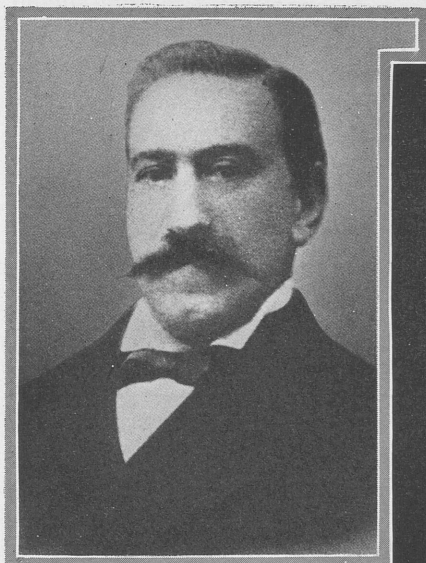
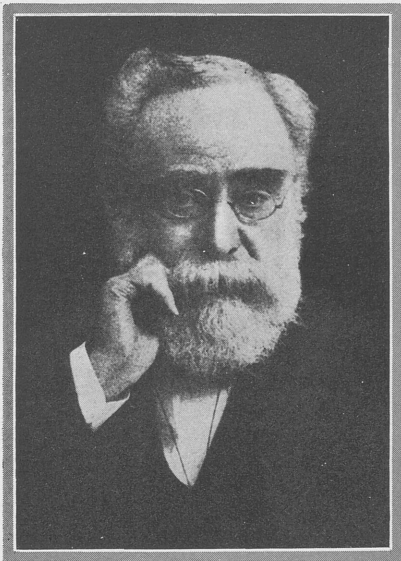


PIONEER DEVELOPERS OF INTUBATION FOR CICATRICAL
STRICTURE OF THE LARYNX

Joseph O'Dwyer, (1841-1898)

Henry Lowndes Lynah, (1879-1922)
New York

John Rogers, Jr., (1866)



FOUNDERS OF "THE ARCHIVES OF LARYNGOLOGY," 1880

J. Solis-Cohen
Philadelphia

Louis Elsberg
New York

George Morewood Lefferts
New York

Frederick Irving Knight
Boston

ciple of the modern laryngoscope, already suggested by Mr. Liston, of London, in 1837, was announced by Manuel Garcia, and its development and its application to practical medicine made by Czermak, of Budapest, and Tuerck, of Vienna. In 1858 Horace Green procured a laryngoscope from Vienna through Dr. Ernest Krackowitzer, surgeon to the New York Hospital, and in company with his partner, Dr. John H. Douglas, afterward physician to General U. S. Grant, immediately began its use in practice and the treatment of patients. He was the first in this country to appreciate its value and to use it clinically.

The invention of the laryngoscope ushered in the grand epoch in the history of laryngology. Without detracting in the least from the credit due to that greatest of all masters of vocalization, Manuel Garcia—it was only a question of time when the problem of the demonstration of the larynx would be solved. Several, all of them physicians, were working upon it, employing more or less complicated methods. Among the number was Dr. Ephraim Cutter, of Boston, Mass. It seems strange that the solution should have come through the simplest principle of them all, namely, the reflection of rays of light from a plane mirror at an angle such as to throw the reflected ray in the desired direction. One would have supposed that this method would have been the first to suggest itself; and it was the irony of fate that the credit of the discovery should not have been made by one of the members of the medical profession who were so earnestly seeking it. There is at least consolation in the thought that it fell to a man of such high character and attainment as Manuel Garcia.

During the sixties progress in this country was greatly retarded by the Civil War; but meanwhile the use of the laryngoscope had been introduced into Europe by Czermak, Tuerck, Mackenzie, Fauvel, Meyer, Stoerk and others, and its teaching carried on by men under whose masterly influence were trained the most distinguished teachers of the following generation, who in their turn became my early American teachers and friends, many of whom had spent a year or two abroad for the purpose of this special study. With the return to this country in the early seventies of these earnest and well-trained students, the science of laryngology received the impetus which was to establish it thoroughly in the



THE AMERICAN LARYNGOLOGICAL ASSOCIATION
1878-1888

- | | | | |
|----------------------|---------------------|---------------------|--------------------|
| 1. Horace Green | 15. J. Solis-Cohen | 29. F. Davis | 42. F. W. Hinkel |
| 2. S. O. Vanderpoel | 16. D. B. Delavan | 30. J. H. Douglas | 43. J. C. Mulhall |
| 3. S. Johnston | 17. C. E. Sajous | 31. F. L. Ives | 44. C. Seiler |
| 4. J. N. Mackenzie | 18. C. C. Rice | 32. R. H. Kealhofer | 45. F. H. Hooper |
| 5. G. W. Major | 19. M. J. Asch | 33. E. C. Morgan | 46. J. H. Lowman |
| 6. F. H. Bosworth | 20. U. G. Hitchcock | 34. W. C. Glasgow | 47. C. H. Knight |
| 7. J. H. Hartman | 21. E. F. Ingals | 35. S. W. Langmaid | 48. J. O. Roe |
| 8. W. C. Jarvis | 22. E. L. Shurly | 36. B. Robinson | 49. W. H. Daly |
| 9. F. Donaldson, Jr. | 23. A. W. MacCoy | 37. F. Donaldson | 50. T. R. French |
| 10. T. A. DeBlois | 24. C. E. Bean | 38. W. Porter | 51. W. Johnson |
| 11. S. Solis-Cohen | 25. C. Wagner | 39. H. Allen | 52. H. C. McSherry |
| 12. L. Elsberg | 26. A. H. Smith | 40. H. F. Johnson | 53. D. N. Rankin |
| 13. F. I. Knight | 27. S. W. Chapman | 41. E. Holden | 54. R. P. Lincoln |
| 14. G. M. Lefferts | 28. B. F. Westbrook | | |

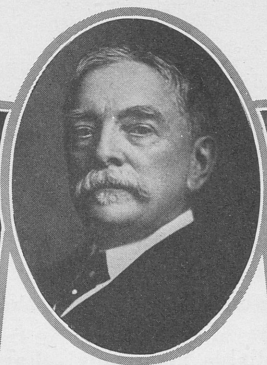
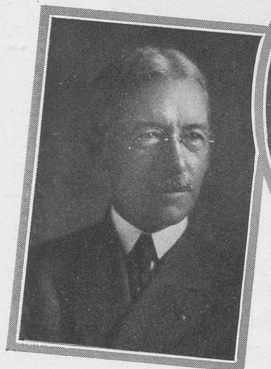
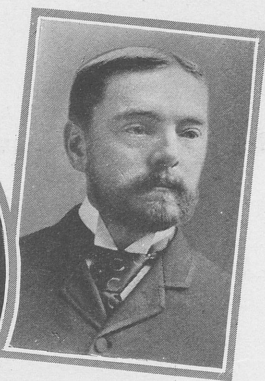
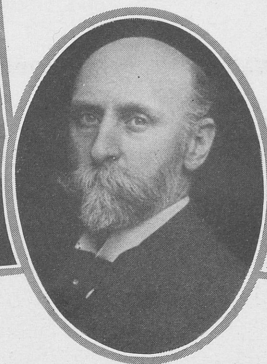
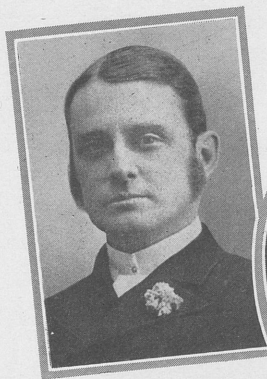
(Presented by D. Bryson Delavan)

confidence and esteem of the public, and advances were made with rapid steps. The first of these was the publication in 1872 of the work of Dr. J. Solis-Cohen, a voluminous compendium of the knowledge of the day together with invaluable suggestions of his own which covered the whole range of rhinolaryngology and gave conclusive evidence of his own vast knowledge of the specialty and his unrivalled skill, originality and inventive genius as a practitioner. The first complete system in either this country or in Europe, embracing all the then-known subjects of the specialty, was this of Dr. Solis-Cohen.

Dr. Solis-Cohen, at the Jefferson Medical College, was the first in this country to establish regularly organized undergraduate instruction in laryngology. In this he was followed eight months later by Dr. Henry K. Oliver, at the Harvard Medical School.

Almost simultaneously with the appearance of Dr. Solis-Cohen's book young aspirants for laryngological fame who had been studying abroad, principally in Vienna and London, began to return, and establishing themselves at home gave rise to the new order of things which we are now enjoying, perhaps unconscious of our debt to them. Among these was Dr. Clinton Wagner. He it was who, in 1873, established in New York City the Metropolitan Throat Hospital, the first hospital in this country exclusively devoted to the study and treatment of diseases of the nose and throat, and inaugurated in it the first regularly organized courses of instruction for graduates in medicine. Of still greater importance, he became the founder, also in 1873, of the New York Laryngological Society, already alluded to.

The proper place which this Society should have been given in history has unfortunately never been accorded it, and I take this occasion to place it properly and authoritatively upon record. A number of years ago Dr. J. W. Gleitzman, an unusually careful scholar and brilliant specialist, who had come to New York long after the establishment of the New York Society but never had belonged to it, furnished an article for a German encyclopedia upon the subject of laryngology in America, in which he alluded to the New York Society as "an organization which had led a short life and soon passed out of existence." This strangely uninformed and erroneous statement has since been repeated by at least three



THE SECRETARIES OF THE AMERICAN LARYNGOLOGICAL
ASSOCIATION, (1878 - 1928)

George Morewood Lefferts
(1878-1882)

Charles Huntoon Knight
(1889-1895)

David Bryson Delavan
(1882-1889)

Henry Lawrence Swain
(1895-1900)

James Edward Newcomb
(1900-1911)

Harmon Smith
(1911-1918)

John Marvin Ingersoll
(1919-1920)

David Bryson Delavan
(1918)

George Morrison Coates
(1920)



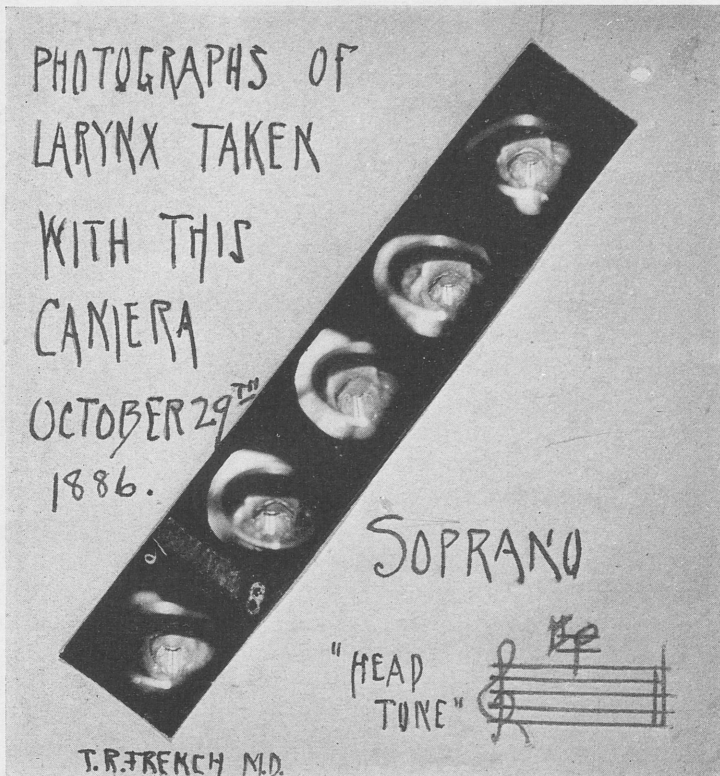
THOMAS RUSHMORE FRENCH, (1849 - 1929)

BROOKLYN

Inventor—Teacher

Perfector of Laryngeal Photography, 1884

of our usually most reliable historians. Far from having led "a short and insignificant life," the New York Society flourished from the time of its organization until shortly before it was merged into the Section of Laryngology of the New York Academy of Medicine, in 1886. The New York Society was the arena in which was exploited the pioneer work of Wagner, Bosworth, Jarvis, Beverley Robinson, Lefferts, Elsberg, Roe, Asch, French, Sass, Lincoln, and others of the brilliant group which composed its membership.



Indeed, it might be said that within it was originated the science of rhinology. Catlin had, in 1861, first called attention to the evils of mouth breathing, a subject later emphasized by Clinton Wagner and French; but to Solis-Cohen and Bosworth belong the credit of having first directed attention authoritatively to the subject of nasal obstruction as influencing this condition. In 1881, Bosworth's work appeared. In this the subject of rhinology, which had been extensively entered into by him, was carefully considered and presented. Other early contributors in this country, and at about this time, were Harrison Allen, John N. Mackenzie, Shurly, Bryan, Daly, Roe, Jarvis, Seiler, Sajous, Asch, Glasgow and Ingals.

The pioneer work in the study of the physiological functions of the nose by Harrison Allen, of the anatomy and pathology of the

nasal sinuses of Bryan, and the highly original and ingenious methods devised by Roe for the repair of deformities and injuries of the nasal framework, long antedated similar work abroad. The same may be said of the work of Bosworth, Asch and Emil Mayer relating to the surgery of the nasal septum. Bosworth was the first to institute the removal of septal spurs and ridges for the relief of nasal obstruction, by means of the saw. Goodwillie devised an efficient trephine for the same purpose and Curtis the cylindrical electric saw. Asch corrected septal deflections by incising the deflected parts and replacing them in the median line. He taught that while no one method would answer for every variety of septal deformity his operation was superior for the vast majority of cases. It is unfortunate that this excellent procedure as applied to certain types of septal deflection should have been discarded for extensive submucous resections, a method valuable in certain cases but by no means always as desirable as the principle of the Asch operation, especially where a proper setting-up operation would relieve obstruction and obviate the removal of extensive areas of bony and cartilaginous tissue. Emil Mayer and Roe are on record as having been the first to advocate and practice submucous resection.

A notable advance in the technique of the treatment of the throat was made in 1872 by Dr. Luis F. Sass, of New York, who introduced the spray apparatus for the application of medicaments to the upper air passages, thus doing away with the nasal douche, the postnasal syringe and the various sponge probangs and laryngeal brushes which had been employed up to that time. It was not long in superseding the older methods.

In the department of the undergraduate teaching of laryngology, rapid strides were made during this decade by our leaders, beginning, as already mentioned, with Drs. Solis-Cohen at Jefferson and Henry K. Oliver at Harvard. Several years later there arose one who became foremost among them, Dr. Lefferts, who began lecturing at the College of Physicians in New York in 1873. 'Assiduously elaborated from year to year, his course soon became famous as the most original, the most impressively presented and illustrated, and the most comprehensive and usefully instructive of any in the world. Students graduated not only with clear ideas as to the



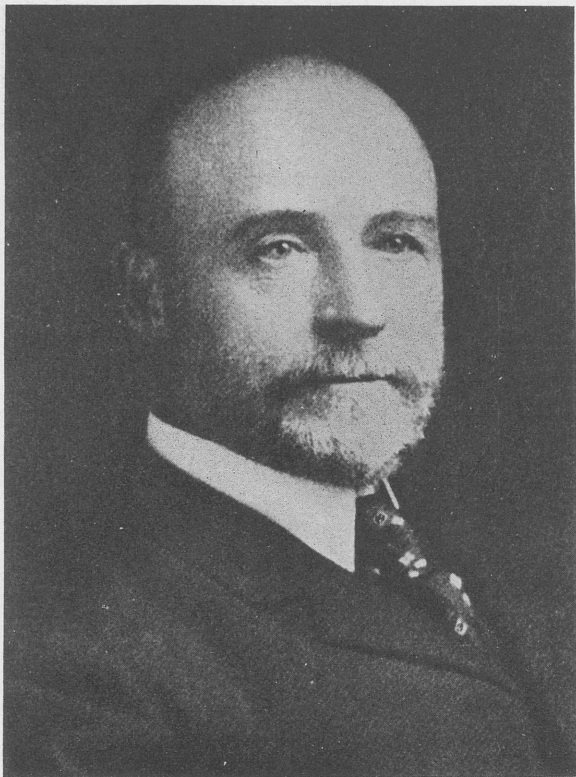
FRANCKE HUNTINGTON BOSWORTH, (1843 - 1925)

NEW YORK

Father of Rhinology, (1881)

practical technique and pathology of the subject but the department itself became a standard type of organization, equipment and conduct for clinics of a cognate order, and was so recognized during the period of his incumbency of nearly thirty years. Meanwhile the teaching of the specialty had been established in most of the important medical schools of the country by instructors of ability and zeal.

From the beginning, our literature of laryngology has been notable for its originality, scientific excellence and abundance.



JOHN ORLANDO ROE, (1848-1915)

ROCHESTER, N. Y.

Father of Intranasal Surgery

Following the writings of Catlin, Buck, Green, and the other pioneers, our leaders have put forth innumerable monographs and have produced systems and textbooks of the highest order, including the works of J. Solis-Cohen, Bosworth, Shurly, Ingals, Kyle, and more recently the notable treatise of Jonathan Wright and Harmon Smith, not to mention many others.

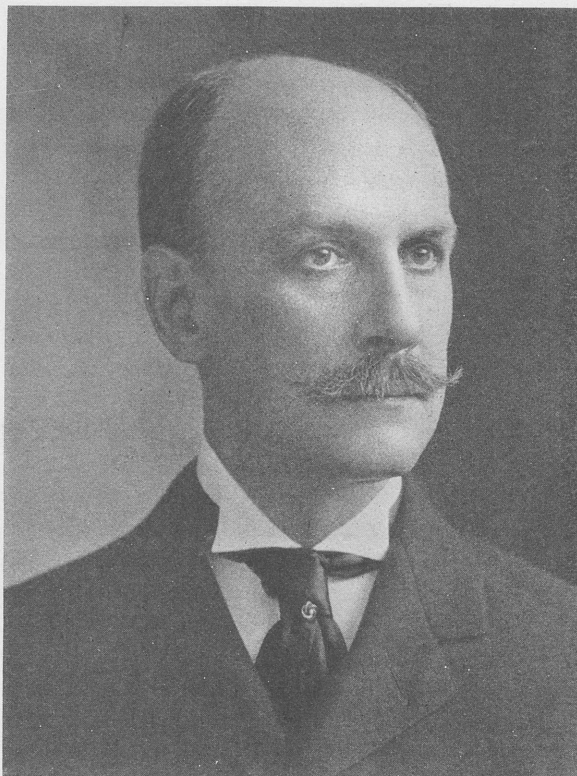
In the first volume of the *Transactions* of the American Laryngological Association, 1879, Dr. Louis Elsberg presented a complete bibliography of American Laryngology from its earliest

dawn to that date. The article upon "Growths of the Pharynx and Larynx," published in 1817, by Dr. Cheesman of New York, was the first of its kind upon our records.

The first continuous contemporary bibliography of Laryngology on record was started by Dr. George M. Lefferts in the *New York Medical Journal*, May, 1875, and was carried on by him and his associate, Dr. Delavan, until January, 1880, when it was transferred to the *Archives of Laryngology*, a new literary enterprise started in March, 1880, with Drs. J. Solis-Cohen, George M. Lefferts, Frederick Irving Knight, and Louis Elsberg as editors. It was published quarterly in New York City by George P. Putnam's Sons. It was continued for four years, and as a magazine was superior to anything of its kind and to this day so remains—pretentious in make-up and rich in what it contained. In the words of Dr. Lefferts, "it was the earliest periodical in the world devoted to the specialty."

Upon the discontinuance of the "Archives" in October, 1883, the bibliography, which contained notices and abstracts of the laryngological literature of the world and had become greatly expanded through the rapidly increasing volume of scientific contributions, was continued and has been carried on up to the present time without interruptions in the *Journal of Laryngology*, founded by Sir Morell Mackenzie and in other journals, now easily accessible, as well as in the *Index Medicus*.

The foregoing are some of the contributions made to laryngeal science by our countrymen during the seventies. The eighties brought others of importance, the foremost of all being those of Joseph O'Dwyer. O'Dwyer's most brilliant gift was his discovery of the tolerance of the larynx to the *continued* presence of a foreign body. In this he supplemented the great physiological principle of Horace Green, and founded upon it a series of ideas and practical accomplishments which have made his name famous in the history of medicine. These included the affording of instant relief in acute obstruction of the larynx; the cure of chronic cicatricial obstructions as never before possible, by the application of two fundamental principles; first, forcible distension of the stricture; second, the continuation of this distention over long periods of time; and, finally, he advanced the basic idea from which



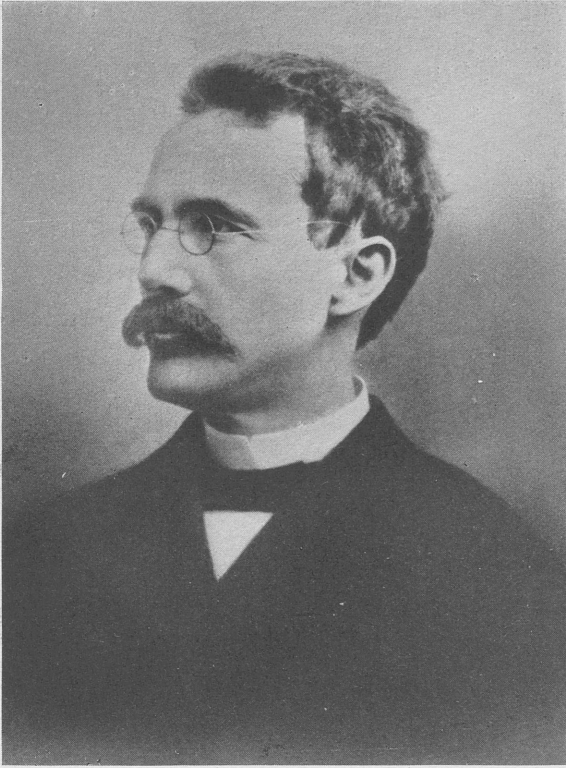
JOSEPH H. BRYAN, (1856)

WASHINGTON, D. C.

Early Student of the Nasal Sinuses

has been developed the whole science of bronchoscopy, literally, it may be said, *his* idea—since aided by the discovery of local anesthesia, illuminated by the genius of Edison and perfected by the ingenuity of Chevalier Jackson.

The development of the technique of the dilatation of cicatricial stricture of the larynx, interrupted by the death of Dr. O'Dwyer, was taken up by Dr. John Rogers, Jr., and by Dr. Henry Lowndes Lynah, both also of New York, who carried it to a degree of perfection never since surpassed.



JOSEPH O'DWYER, (1841 - 1898)

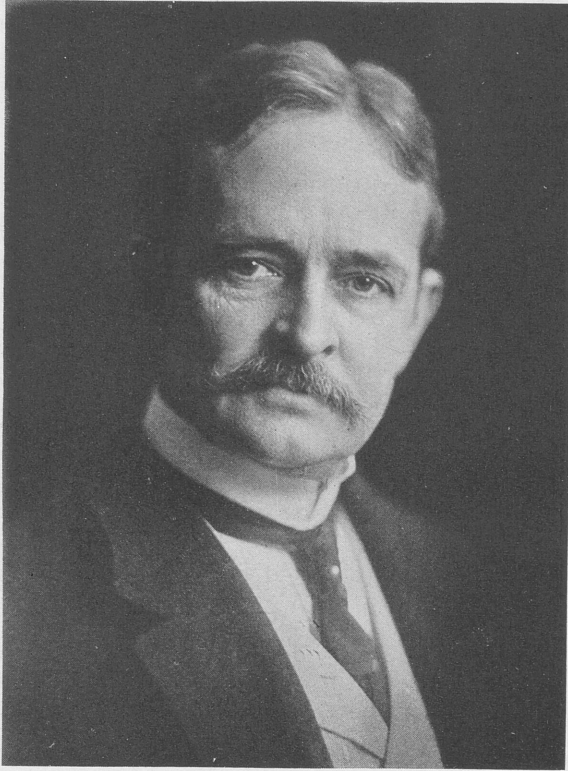
NEW YORK

He Established Intubation

Few discoveries in any department of medical science have been as farreaching and beneficent as those resulting from the life-work of that great-souled man and splendid philanthropist, Joseph O'Dwyer.

It was Dr. Robert Abbe, of New York, who first introduced the use of radium to our country and demonstrated its value as applied to the larynx in the cure of certain benign intralaryngeal growths.

Another notable American contributor to laryngology is Dr. Thomas R. French, of Brooklyn, who many years ago developed



ROBERT ABBE, (1851 - 1928)

NEW YORK

First to Cure Laryngeal Tumors with Radium

by far the most effective method yet or since devised for the photography of the larynx, and clearly demonstrated its practicability and usefulness for the study of the physiological action of the larynx in vocalization, and of its pathological conditions. The application by French of his photographic methods to the study of the mechanism of the singing voice corrected many old theories of voice production and established the knowledge of these points upon a scientific basis. Among many other original contributions of value, Dr. French has exhaustively studied the diseased condi-



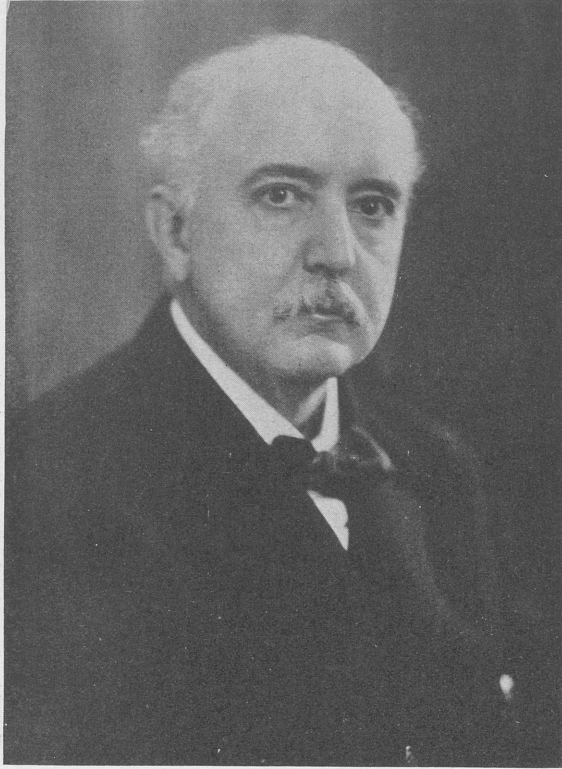
WILLIAM HALLOCK PARK, (1863)

NEW YORK

Introduced Aseptic Methods in Our Laryngological Practice

tions of the tonsil, with results valuable as promising to place our knowledge of this subject upon a basis of scientific accuracy.

Thus we have given an all too hasty glimpse of the rise and early growth of laryngology. From the days when Trousseau, groping in dark ignorance, taught Horace Green the value of applications of silver to the pharynx, we have followed the heroic efforts of Green, the Father of Laryngology, to promulgate his knowledge of the tolerance of the larynx to the presence of a foreign body and to apply it to the practical uses of clinical medicine. We have



JONATHAN WRIGHT, (1860 - 1928)

BROOKLYN

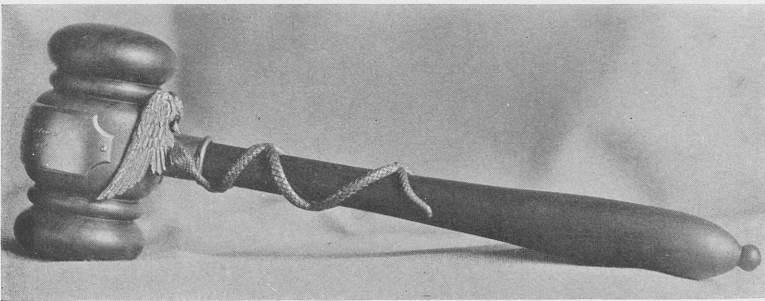
Pathologist—Historian

cited the contributions of Gurdon Buck, which gained for him the title of Father of Intralaryngeal Surgery; of Solis-Cohen, the Father of the Literature of Laryngology in America and of organized instruction in the art; of Clinton Wagner, the pioneer organizer of the laryngological societies of the world; of Sass, whose introduction of the spray apparatus created a revolution in the treatment of the upper air passages; of Lefferts, who perfected the teaching of undergraduates and first instituted the collecting, reviewing and publishing of current laryngological bibliography and founded the first journal devoted to that specialty; of Roe, the Father of

Intranasal Surgery; of Bosworth, the Father of Rhinology, who, acting on the suggestion of Catlin, demonstrated the evils of nasal obstruction and advanced principles for their relief; of French, who perfected the art of laryngeal photography; of Abbe, who first applied radium to the treatment of intralaryngeal growths; of John Mackenzie, the pioneer investigator of laryngeal and nasal neuroses; of O'Dwyer, who, supplementing Green, established the great physiological principle of the tolerance of the larynx to the continued presence of a foreign body and, acting upon this principle, devised methods from which have been developed some of the greatest advances of the present day.

In the pioneer work of these great contributors and others who have succeeded them, we have indisputable evidence that the fundamental principles of laryngology, as we know it today, were born of the genius of our fellow-countrymen, most of whom have been Fellows of this Association. The record is one of which we may well be proud. May the zeal which inspired them in the heroic accomplishment of their beneficent gifts to humanity be a source of perpetual inspiration to ourselves.

Throughout its career the attitude of the Association toward the outside world has been modest and self-contained; so much so that many European contemporaries have little knowledge of its existence and less of its past and present influence. No time for urging its better recognition could be more auspicious than this.



THE GAVEL

Presented to the Association by

SAMUEL JOHNSTON
JACOB HENRY HARTMAN

JOHN NOLAND MACKENZIE
DAVID BRYSON DELAVAN

(1911)

Executive Sessions
1928

FIRST EXECUTIVE SESSION

TUESDAY, MAY 1, 1928

THE first Executive Session of the Fiftieth Annual Congress of the American Laryngological Association was called to order by the President, Dr. D. Bryson Delavan, at the Hotel Raleigh, Washington, D. C., at the close of the first Scientific Session.

Dr. Charles W. Richardson introduced the following Resolution:

"RESOLVED, That the American Laryngological Association, in session assembled, in the City of Washington, regrets to learn that the Senate Finance Committee proposes to increase the tax on physicians under the Harrison Narcotic Law. As the Harrison Narcotic Law is not essentially a tax-producing bill, we request that no action be taken in such legislation."

This Resolution was duly seconded and unanimously passed and Dr. Richardson was asked to attend to the transmission of this resolution to the Senate Finance Committee.

The following were elected to Fellowship:

Honorary Fellow: Dr. Thomas R. French, Brooklyn, N. Y.

Emeritus Fellow: Dr. Algernon Coolidge, Boston, Mass.

Active Fellows: Dr. Joseph C. Beck, Chicago, Ill.; Dr. Duncan Macpherson, New York, N. Y.; Dr. Robert Sonnenschein, Chicago, Ill.; Dr. H. Marshall Taylor, Jacksonville, Fla.; Dr. Wm. P. Wherry, Omaha, Neb.

The President appointed Dr. J. Payson Clark and Dr. Gordon Berry members of the Auditing Committee.

The Nominating Committee was elected by the Association as follows: Drs. Ross H. Skillern, Harris P. Mosher, Henry L. Swain, Hill Hastings and Burt R. Shurly.

The President called attention to the collections of Mr. Victor Mueller, of Chicago, exhibited in the adjoining room, representing the complete, entire history of the origin and development of the bronchoscope, stating that Mr. Mueller has literally scoured the world to collect this really remarkable exhibit. There are

specimens there which had been loaned to him by institutions in Europe and it is really one of the most instructive and remarkable examples of thoroughness on the part of an intelligent collector that could be seen and worthy of the study and appreciation of the Association from every point of view. Mr. Mueller was then introduced to the Association and thanked by Resolution for preparing this exhibit for the semi-centennial meeting of the Association.

ANNUAL BUSINESS MEETING

WEDNESDAY, MAY 2, 1928

THE Annual Business Meeting of the Association was held at the opening morning session of the second day of the Congress.

REPORT OF THE SECRETARY

The Secretary reports that the Forty-ninth Annual Congress of the Association was held at the Hotel Chelsea, Atlantic City, on May 23, 24 and 25, 1927, with the registration of sixty-five Fellows. Dr. Chevalier Jackson, President of the Association, was in the Chair. Guests contributing to the programme were: Dr. Georges Portmann, of Bordeaux, France; Prof. van den Wildenberg, of Louvain University, Belgium; Dr. Willy Meyer, New York City; Dr. Thomas McCrae and Dr. Willis F. Manges, of Philadelphia.

The Secretary has the painful duty of reporting the following deaths since the last meeting of the Association: Dr. J. Solis-Cohen, Philadelphia, Honorary Fellow and Founder; Dr. Hanau W. Loeb, St. Louis, Active Fellow; Dr. Allen B. Thrasher, Cincinnati, Active Fellow; Dr. James E. Logan, Kansas City, Active Fellow; Dr. R. Norris Wolfenden, Kent, England, Corresponding Fellow.

At present, including those Fellows elected at the First Executive Session, the Fellowship list numbers ninety-five Active Fellows and fifteen Associate Fellows.

The Annual Meeting of the Council was held in New York City on January 14, 1928. The following Members of the Council were present: Drs. D. Bryson Delavan, Charles W. Richardson, George Fetterolf, Joseph H. Bryan, J. Payson Clark, Lee Wallace Dean, Chevalier Jackson and George M. Coates.

It was decided to hold the Semi-Centennial Meeting of the Association at the Hotel Raleigh, Washington, D. C., on May 1, 2 and 3, 1928, in conjunction with the Congress of American Phy-

sicians and Surgeons. Sir St. Clair Thomson, of London, was invited to be the guest of honor at this meeting and Dr. Delavan was requested to prepare a paper devoted to an historical presentation of the progress of laryngology during the past fifty years and Dr. Harris P. Mosher a paper giving the part played by laryngology and the Association in the recent World War.

The following were elected to Associate Fellowship: Dr. Thomas Roy Gittins, Sioux City, Iowa; Dr. Henry M. Goodyear, Cincinnati, Ohio; Dr. Frederick Thayer Hill, Waterville, Maine; Dr. De Forest Clinton Jarvis, Barre, Vt.; Dr. John Joseph Shea, Memphis, Tenn.

Dr. Harris P. Mosher and Dr. Ross H. Skillern were reappointed delegates to the Board of Otolaryngology for a term of five years, and Dr. Charles J. Imperatori was reappointed Abstract Editor for the ensuing year.

The Secretary was authorized to furnish credentials to delegates attending the International Congress in Copenhagen, Denmark, July 30 to August 3.

The Second Meeting of the Council for 1928 was held on Monday, April 30, at the Hotel Raleigh, the following Members of the Council being in attendance: Drs. D. Bryson Delavan, Charles W. Richardson, Hill Hastings, George Fetterolf, J. Payson Clark, Lee Wallace Dean, Chevalier Jackson and George M. Coates.

Announcement was made of the death on April 5, 1928, of Dr. James E. Logan, an Active Fellow, of Kansas City.

The Casselberry Prize of \$500 was awarded to Dr. Ralph A. Fenton and Prof. Olof Larselle for research work and a thesis entitled "Embryology and Neurohistology of the Sphenopalatine Ganglion Connections—A Contribution to the Study of Otalgia."

The Council recommended to the Association that the future meetings of the Congress of American Physicians and Surgeons should be held every fifth year instead of every third year as at present and that the Delegate of the Association to the Executive Committee of the Congress should be instructed to vote for such a change.

Respectfully submitted,

GEORGE MORRISON COATES,

Secretary.

The report of the Secretary was accepted and ordered placed on file.

The Auditing Committee, Drs. Clark and Berry, reported that they had examined the books of the Treasurer and found them correct. This report was accepted and placed on file.

TREASURER'S REPORT TO APRIL 18, 1928

The financial affairs of the Association comprise four funds, the General Fund, the deRoaldes Fund, the Casselberry Fund and the Johnston Fund. They will be reported on in that order.

GENERAL FUND

Receipts

Balance in bank at last report	\$3235.43
Interest on bank deposit	62.28
1927 Dues:	
5 Active Fellows	\$125.00
1 Associate Fellow	15.00
	<hr/>
	140.00
1928 Dues:	
79 Active Fellows	\$1580.00
16 Associate Fellows	240.00
	<hr/>
	1820.00
Sale of <i>Transactions</i>	597.60
Cost of check collection paid by Fellow25
Refund on bill overpaid by Treasurer15
	<hr/>
Total	\$5855.71

<i>Expenditures</i>	
Stenographer, 1927 Meeting	\$215.88
Stereopticon, 1927 Meeting	65.00
Dinner expenses, 1927 Meeting	38.50
Secretary's expenses, printing, etc.	222.60
Treasurer's expenses, printing, etc.	14.54
Treasurer's surety bond	45.87
Secretary's honorarium	300.00
Abstract Editor's honorarium	50.00
Treasurer's honorarium	100.00
Assessment by Congress of American Physicians and Surgeons	44.00
Photographs of de Roaldes medal	3.00
Printing and mailing 1927 <i>Transactions</i>	1186.59
Flowers for Dr. Solis-Cohen's funeral	15.00
	<hr/>
	\$2300.98

Even a casual study of these figures brings out several matters of interest. The total expenses for the past fiscal year amounted to about \$2300.00. The total income for the year was approximately \$2600.00, this in spite of a \$5.00 reduction in the annual dues of the Active Members which resulted in a decrease in receipts of about \$450.00. So that, even with this loss of income, the Association ends the year with an unspent balance for the year of about \$300.00. When the sum is added to the surplus in the treasury at the end of last year, the Association is left in the cheerful financial position of all bills paid and a comfortable balance in bank of about \$3500.00.

TRUST FUNDS

De Roaldes Fund

The only change in this Fund from last year is the normal increase in the amount of accumulated interest.

<i>Receipts</i>	
Original legacy	\$500.00
Accumulated interest	368.07
	<hr/>
	\$868.07
<i>Expenditures</i>	
None	

Casselberry Fund

In 1924 \$3000.00 Philadelphia and Reading Coal and Iron Co. 5's were purchased for this Fund by your Treasurer after consulting with experienced financial advisers. The market value of these bonds has recently been declining, so after again obtaining skilled advice the bonds were sold in March, 1928, at the current market price, 96. The general opinion was that while they might and probably would continue to pay their coupons, certain conditions in the coal business, for example, labor troubles, the increasing use of fuel oil, hydro-electric power competition, central heating, were such that it would be sounder to take a loss now than face the possibility of a greater loss in the future. As these securities had been purchased at par, the sale at 96 represents a loss of 4 points per bond, or a total of \$120.00 for the three bonds.

The original Casselberry bequest was \$5000.00. By action of the Association in 1926 this was increased to \$6000.00 by addition to the principal of \$1000.00 of unexpended income. As the present accrued interest (\$1583.77) in the fund is ample to allow of it, the Treasurer suggests that he be authorized to add to the proceeds of the sale of the Coal and Iron bonds (\$2880.00) sufficient money, approximately \$120.00, to allow of the purchase for the account of the fund of \$3000.00 proper and approved bonds to take the place of those recently sold.

Receipts

Invested principal	\$3000.00
Uninvested principal	2880.00
Accumulated interest	1583.77
	<hr/>
	\$7463.77

Expenditures

Broker's commission on sale of 3 bonds	\$6.00
	<hr/>
Balance	\$7457.77

Johnston Fund

The accumulated interest in this Fund has grown to quite useful proportions. As the Association has decided that the income from

Dr. Johnston's gift is subject annually to appropriation to some acceptable cause, you will be interested to know that at present \$472.81 awaits such disposal.

<i>Receipts</i>	
Original legacy	\$5000.00
Accumulated interest	472.81
	<hr/>
	\$5472.81
<i>Expenditures</i>	
None	
Balance	\$5472.81

SUMMARY OF ASSETS AND LIABILITIES

<i>Assets</i>	
General Fund:	
Balance in bank	\$3554.73
Unpaid dues:	
Active Fellow 1927, 1 \$ 25.00	
Active Fellows 1928, 12 240.00	
Associate Fellow 1928, 1 15.00	280.00
	<hr/>
	\$3,834.73
DeRoaldes Fund	868.07
Casselberry Fund	7,457.77
Johnston Fund	5,472.81
	<hr/>
	\$17,633.38
<i>Liabilities</i>	
Unpaid bills	None

Respectfully submitted,

GEORGE FETTEROLF,
Treasurer.

The report of the Treasurer was accepted and ordered placed on file.

REPORT OF THE LIBRARIAN

Dr. Joseph H. Bryan, Librarian, begged leave to report that 21 unbound volumes had been received and deposited in the Library

of the Surgeon-General of the Army. The office of the Librarian is simply a perfunctory one at present and the Library, as suggested in the Presidential address yesterday, should be made a feature of the Association, which it is not now. The volumes as received are deposited in the Surgeon-General's office, where they are available for use but are never used. It would seem that the Library could be made much more serviceable if it could be developed and placed somewhere more accessible to the Members, in some such place as the Academy of Medicine in New York.

Respectfully submitted,
J. H. BRYAN,
Librarian.

In the discussion of Dr. Bryan's report, Dr. Dunbar Roy moved that a Committee of three, consisting of the present Librarian, Dr. Joseph H. Bryan, as Chairman, Dr. D. Bryson Delavan and one other Fellow from New York City to be appointed to look into the matter of establishing an official Library for the Association, either in the New York Academy of Medicine or in Washington, and to report at the next Annual Meeting. This motion was carried.

The report of the Librarian was accepted and ordered placed on file.

REPORT OF THE ABSTRACT EDITOR

The Abstract Editor has the honor to report that all the abstracted papers and discussions of the Forty-ninth Congress of the Association were sent to the Editor-in-Chief of the *Archives of Otolaryngology*, September 20, 1927, and published in that Journal in Vol. VI, November, 1927.

Galley proofs were received the early part of October and mailed to the following journals for publication:

Dr. Gunnar Holmgren, Editor. *Acta-Oto-Laryngologica, Hospital Sabbatsberg*, Stockholm, Sweden.

Prof. Fernand Le Maitre, Editor. *Archives Internationales de Laryngologie, Otologie, Rhinologie et Broncho-Oesophagoscopie*, 120 Avenue Victor Hugo, Paris, France.

Herr. Prof. Dr. H. Hajek, Editor. *Monatsschrift für Ohrenheilkunde*, Mahlerstrasse-4, Vienna, Austria.

Dr. Logan Turner, Editor. *The Journal of Laryngology and Otology*, Edinburgh, Scotland.

Dr. Thomas G. Atkinson, Editor. *The Eye, Ear, Nose and Throat Monthly*, Chicago, Illinois.

Of the American Journals, the following published the transactions completely: *The Archives of Oto-Laryngology* and the *Eye, Ear, Nose and Throat Monthly*.

The Journal of Laryngology and Otology of Edinburgh, *The Archives Internationales de Laryngologie, Otologie, Rhinologie et Broncho-Oesophagoscopie* of Paris, and the *Zentralblatt für Hals-Nasen Ohrenheilkunde* of Vienna, published the abstracted transactions in part.

The honorarium of \$50.00 was received from the Treasurer and the necessary expenses paid.

Respectfully submitted,

CHARLES J. IMPERATORI,

Abstract Editor.

REPORT OF THE COMMITTEE ON CONTROL OF CANCER

Summary Report of Work for the Year 1927-1928

The year just closed will long be remembered in the history of the Society as having witnessed the completion of the million dollar endowment fund which the Society undertook in November, 1925, to establish as a means of insuring the minimum running expenses of the national organization.

The money has been placed in the hands of a trustee. At intervals of every ten years a committee will be appointed by the presidents of a number of universities and scientific institutions to consider whether the interest shall continue to be paid to the Society. If, by reason of some important discovery or other cause, it becomes unnecessary for the Society to continue to carry on work for the control of cancer, the interest will be devoted to some other object in the health field.

The Executive Committee has voted a budget for the coming year of \$76,120. This budget was passed as a minimum. It

represents the work which it is believed can best be done with the money which is assured. Other undertakings which are proposed can be undertaken, in addition, if the money to pay for them can be secured.

The efforts for the coming year are to be applied in three principal directions: (1) To the instruction of the public; (2) to work with health departments; (3) to work with the organized medical profession.

The aim of the program is, as the work of the Society has always been, to accomplish two immediate objects: (1) The instruction of the public in the practical facts which should be universally known concerning the prevention, symptoms and treatment of cancer; (2) the improvement of the medical service which is available for the prevention and cure of the disease. For the coming year it has been decided to place the emphasis upon the improvement of the medical service which is needed.

An important event of the year has been the recognition by official public health administrators that systematic work against cancer, in accordance with a definite and carefully made plan, should be done by state and local health departments.

Already Massachusetts, New York City and Detroit have officially been doing good work in this direction. Pennsylvania and North Carolina are now going to follow and there are a number of states and cities in which efforts for cancer control are about to be made by health departments and the organized medical profession.

The Society's work throughout the United States has been prosecuted, as formerly, largely through the field organization which the Society has possessed for many years. There are 52 state and provincial chairmen. Of these there are 29 who are active. The work of 8 places them in what we may call Class A. There are 3 in Class B and the remainder are in Class C.

During the past year the position of field representative made vacant by the resignation of Dr. William F. Wild, has been filled through the appointment of Dr. Raymond V. Brokaw. Dr. Brokaw's sound training as a physician and as an official public health administrator, was reinforced by a course of postgraduate study at the Memorial Hospital in New York, before he went out

on the road. During the past year he has visited 36 states and covered about 32,000 miles of railroad.

Beginning March 1, an additional field representative, in the person of Dr. J. W. Cox, has joined the staff. Dr. Cox has had valuable experience in medical and public health work and will aid in maintaining the mutually helpful relations which now exist between the field organization and the national headquarters.

Among the notable undertakings which should be mentioned as having taken place during the last year, is the establishment of the New York City Committee, with permanent headquarters and a salaried staff. One of the accomplishments of that Committee was a period of intensive educational activity carried on in coöperation with the national headquarters in the autumn of 1927.

Through the coöperation of the great metropolitan newspapers, a series of sixteen articles was printed by them, on as many days, in the morning and evening dailies of New York City. Finding that this method of publication met with success in New York City, an attempt was immediately made to obtain a much wider publication of the bulletins. The records show that the articles have been printed in every state in the Union, and have been carried in a total of 503 newspapers with an aggregate circulation of 10,425,000 copies. Making an allowance of four readers to every paper, as is usual, it appears that this educational material was put into the hands of about 42,000,000 people.

Respectfully submitted,

D. BRYSON DELAVAN,

Chairman.

On motion, received with thanks.

REPORT OF BIOGRAPHER AND HISTORIAN

Mr. Chairman, the Biographer and Historian has in certain years found his place almost a sinecure. On other occasions he has been almost overwhelmed by the number of memorials necessary for him to prepare, and as those memorials are often of the older men, and as those older men are the older friends, and as among the older friends there are many who are very close to us, the position of Biographer and Historian is not one of unmingled happiness.

I have placed upon the blackboard the pictures of all of our departed friends this year, with the exception of Dr. R. Norris Wolfenden, and that picture I have been unable to obtain.

With the number we have before us, I think it would be to the advantage of everyone, and especially to the Biographer and Historian, if we would not go into laborious and elaborate detail with regard to these matters this morning. They can be printed in the *Transactions*. But I do want to give you some adequate sketches of these very good friends who have left us this year.

The first of these is Dr. Jacob Da Silva Solis-Cohen. I give you his middle name because he was very proud of it. It was a fine old name and he loved it.

On May 4, 1910, in Washington, this Association celebrated the fiftieth anniversary of the entrance upon the practice of medicine of Dr. Cohen and on that occasion presented a loving cup to him in recognition of his distinguished services to laryngology and in commemoration of the fiftieth anniversary of his graduation in medicine. Dr. James E. Logan was President of the Association that year.

I take it for granted that you all have a pretty clear idea of the career of Dr. Cohen. You know pretty well what he did, and some of you know what he was. Those who do not have certainly missed something in not having had the privilege of his acquaintance.

Dr. Cohen passed through a period of years in which the decline of life came slowly upon him, until he numbered, I think, ninety-four years. I never came to Philadelphia without calling upon him and of all the associations of my life I remember none that was so full of inspiration, so full of a peculiar, uplifting sense of moral betterment than that association with Dr. Cohen. His views were pure-minded. His attitude toward others was generous, and he displayed a sweetness of character and a beauty of sentiment which would have done credit to the oldest of the prophets.

It is not easy to place in clear language the sentiments which one may have with regard to such an association, but I regard my friendship for Dr. Cohen and his for me as one of the most beautiful features of my life.

D. BRYSON DELAVAN,
Biographer and Historian.

REPORT OF THE NOMINATING COMMITTEE

The Nominating Committee reported through Dr. Ross H. Skillern the names of the following gentlemen to serve as Councilors for the ensuing year:

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

Dr. Robert Clyde Lynch, New Orleans, La.

Dr. Francis P. Emerson, Boston, Mass.

Dr. George M. Coates, Philadelphia.

Dr. George Fetterolf, Philadelphia.

Dr. Joseph H. Bryan, Washington, D. C.

Dr. Lee Wallace Dean, Iowa City, Iowa.

Dr. Greenfield Sluder, St. Louis, Mo.

Dr. Chevalier Jackson, Philadelphia.

Dr. D. Bryson Delavan, New York City.

This report was accepted and ordered placed on file.

REPORT OF THE AMERICAN BOARD OF OTOLARYNGOLOGY

Dr. Ross H. Skillern reported for the Board that there had been four meetings held during the past year, one each in Washington, Spokane, Detroit and Memphis, at which about 370 men were examined. Of this number, 321 passed. It was noted that the type of men applying for examination seemed to be improving in every way. Particular mention was made of the fact that the movement was very generally supported by the older men in the specialty, as an instance of which it was stated that only eight Fellows of the Association had so far failed to accept the invitation to receive certificates of the Board.

In the discussion of this report, a motion was made by Dr. Emil Mayer that the Secretary of the Association be instructed to ask those members who had not yet applied for certificates of the Board to do so in order that the American Laryngological Association might be fully represented. This motion was seconded by Dr. Shambaugh and was unanimously carried.

MISCELLANEOUS BUSINESS

The Constitutional Amendment recommended by the Council was unanimously approved by the Association as follows:

To Amend Article VI by adding Paragraph 12: "In case of the death of the Secretary, Treasurer, Librarian or Historian, or of illness sufficiently serious to interfere with the performance of their duties by any of these officers, the President is directed to appoint an Active Fellow to fill the vacant office until the next annual meeting of the Association."

The recommendation of the Council, made at the second meeting, that the Association recommend to the Congress of American Physicians and Surgeons that meetings be held every fifth instead of every third year as at present, and that the delegate of the Association to the Executive Committee of the Congress be instructed so to vote, was unanimously carried.

Dr. D. Bryson Delavan then presented to Dr. Chevalier Jackson the deRoaldes Medal which was accepted by Dr. Jackson with a speech of appreciation. (See page 216.)

EXECUTIVE SESSION

THURSDAY, MAY 3, 1928

THE final Executive Session convened at 12.45, Thursday, May 3, 1928, at the Hotel Raleigh, Washington, D. C. The ten Directors of the Association nominated by the Committee on Nominations were elected and organized as follows for the ensuing year:

Dr. Charles W. Richardson, President;
Dr. Robert Clyde Lynch, First Vice-President;
Dr. Francis P. Emerson, Second Vice-President;
Dr. George M. Coates, Secretary;
Dr. George Fetterolf, Treasurer;
Dr. Joseph H. Bryan, Librarian,

and as additional members of the Council, Drs. Lee Wallace Dean, Greenfield Sluder, Chevalier Jackson and D. Bryson Delavan.

The newly-elected President, Dr. Charles W. Richardson, was conducted to the Chair and Dr. D. Bryson Delavan introduced him with the following remarks:

Dr. Richardson, I congratulate you on your election to this office, and in making my own little valedictory, which I hope you will permit me to do, may I say that with this hour we pass the most important milestone in the history of the Association. We enter upon a new era, the era of the second half-century of our existence.

May I give a final message, sir, based upon the experiences of the past, and with full and confident hope and expectation of the era which is before us?

In the first place, may you, sir, and may the Association from now on, as has been the case before, cherish and sustain the old principles of action and of effort which have influenced and guided the Association. May the Association advance the scientific interests of laryngology in the future as it has done in the past,

and may it enter upon the new possibilities of general usefulness and of special attention to investigations of hitherto unsettled questions relating to common ailments of importance which lie before it and which up to the present time have been strangely, and, by our Association at least, almost inexcusably neglected. There is a great field before the Association for that. The pace has been set. The way has been opened. The ideas have been advanced by other associations and other bodies of medical men. Let us take up that matter of the investigative work directed toward the common ailments with which we have to deal.

And, sir, above all things, no one knows better than you do, and certainly no one knows better than I do, the most important element, the most important feature, the most beautiful feature of this Association, and that is the friendships which it has engendered in the past and which it is going to further engender in the future. To me, the friendships which I have made in the American Laryngological Association have been among the most precious things of my life. I wish you as much joy from them as I have had.

I congratulate you on being in the Presidential chair, and I congratulate the Society.

Dr. Richardson replied as follows:

If a man had not been impressed with the importance of the hour and the importance of the position that has fallen upon him in taking over the Presidency of this Association, leading from this honored President back to the beginning of its era, he would be overwhelmed by the kindly words and the admirable advice given to his follower by our noted friend and ex-president.

I do not enter this office with any misapprehension as to the importance of the position I am undertaking nor of the question of my competency to fill it, and I assure you, gentlemen of this Association, that I shall exert all my efforts to make the beginning of this new era one of the great years of this second half-century which we are just entering upon. I beg of you, one and all, to give me that encouragement, that support, that efficiency in your efforts which will make my year of service at least a good trailer to that of the former President.

I thank you. As I have said before, it is a joy to be a member

of this Association. It is a great honor to be its President and I thank you for conferring this honor upon me.

DR. GOLDSTEIN: Mr. President, the close of the fiftieth annual celebration of the existence of the American Laryngological Association with this session is a fitting time, I think, for us to express as a body our sincere appreciation of, to renew our love for, and to compliment seriously and honestly the splendid efforts, the tremendous devotion, and the kindly, graceful spirit of the retiring President, and I move, Mr. President, that a vote of thanks, expressed by the Fellows arising, be given to Dr. D. Bryson Delavan.

The motion was seconded by several, and carried unanimously by a rising vote.

DR. DELAVAN: Mr. President and Gentlemen, I think it would be strange if I did not feel a little wave of emotion. How well I remember that year 1881 when I was admitted to the Association and at once elected as its Secretary, and my misgivings as to whether I would be able to carry on the Secretaryship. And how well I remember those other years, forty-seven of them, every one of which, with very few exceptions, saw me present at these annual meetings. I have enjoyed them and have gone home stimulated and refreshed and encouraged by them.

How I have cherished the friendships I have made here. I cannot speak of them. And how I cherish your friendship, and look forward to the continuance of it—I do not know how long. We are not vouchsafed to live forever in this world; but I hope, as long as my mind remains to me, I shall have the same reason for affection for the Association that I have had during all these years.

I cannot express to you sufficiently my very deep sense of gratitude for all that you have done for me at this meeting, and to those who have preceded you for all the things they have done for me at every other meeting I have attended.

I am sure of the future success of the Association. There is no reason in the world why we should not find quite enough in laryngology to keep ourselves busy. I am sure of the success that will attend you in the coming year, for you have as President a man who since he has come into the Association has been devoted to its interests, a gentleman who has shown distinguished attention on

every occasion when the Association has met in his native city and on all other occasions when it has met outside his native city he has attended its meetings. With all my heart, I bespeak your earnest interest and your earnest efforts in the welfare of the Association.

Again I thank you, and fall into the obscurity which comes to the retired presidents, not only of the United States, but presidents in general.

Upon motion, duly made and seconded, the meeting adjourned

THE DINNER

The Semi-Centennial Dinner of the Association was held at the Hotel Raleigh on the evening of Wednesday, May 2, 1928. Dr. D. Bryson Delavan acted as toastmaster and addresses were made by Sir St. Clair Thomson, the guest of honor of the Association, and the following Fellows: Dr. Charles W. Richardson, President-elect, Dr. Max A. Goldstein, President of the American Otological Society, Dr. Norval H. Pierce, Dr. Hill Hastings, Dr. Frederick T. Hill, Dr. Thomas R. Gittins, Dr. Henry M. Goodyear, Dr. DeF. C. Jarvis and Dr. John J. Shea. The dinner was very successful and was attended by seventy-one Fellows, the most largely attended dinner in the history of the Association. The following Fellows attended:

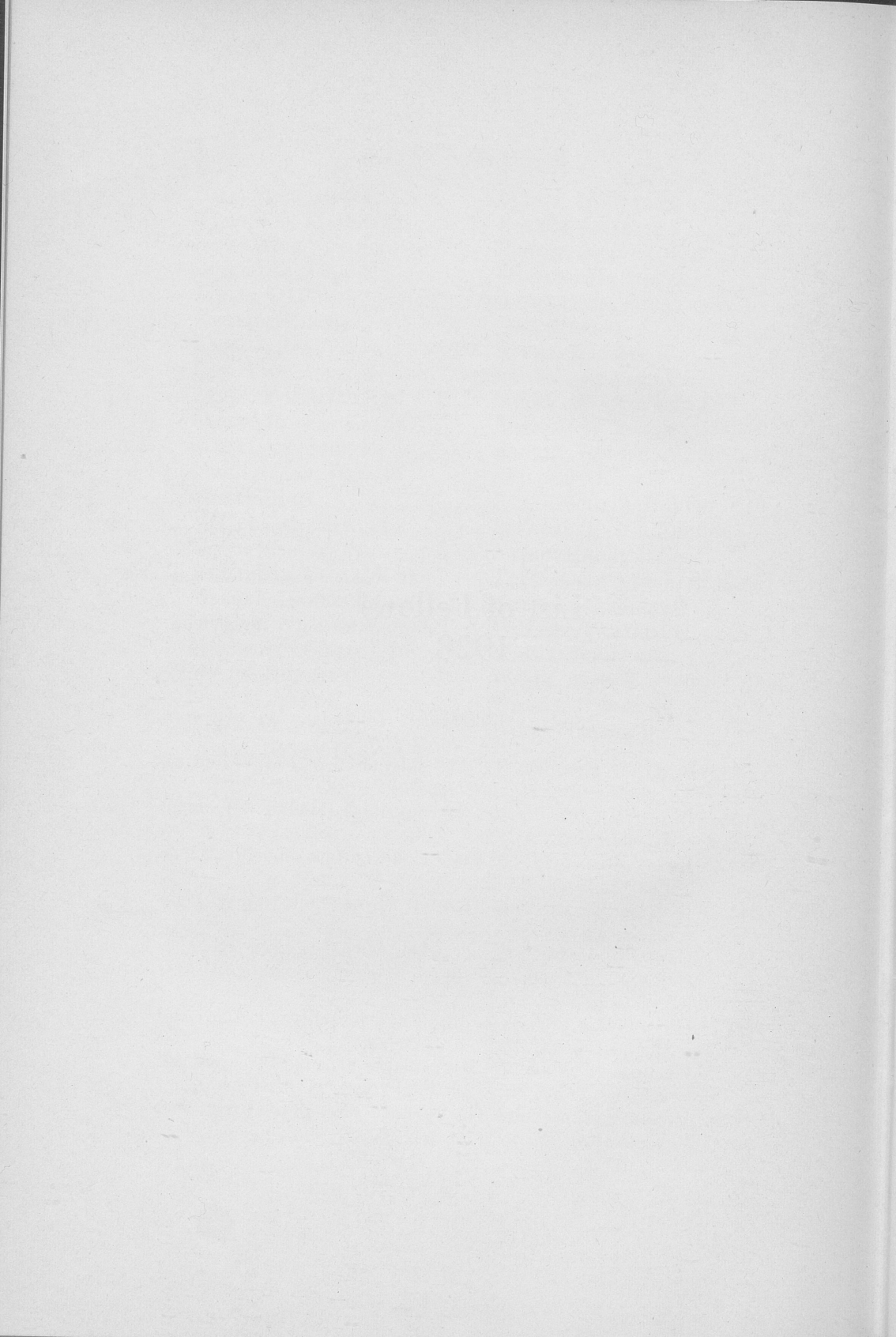
SIR ST. CLAIR THOMSON
BABBITT, JAMES A.
BARNES, HARRY A.
BARNHILL, JOHN F.
BERRY, GORDON
BIRKETT, HERBERT S.
BRYAN, JOSEPH H.
CARMODY, THOMAS E.
CHAMBERLIN, WILLIAM B.
CLARK J. PAYSON
COATES, GEORGE M.
COFFIN, LEWIS A.
DEAN, LEE WALLACE

DELAVAN, D. BRYSON
DENNIS, FRANK L.
EMERSON, FRANCIS P.
FAULKNER, E. ROSS
FENTON, RALPH A.
FETTEROLF, GEORGE
FORBES, HENRY HALL
GITTINS, THOMAS ROY
GOLDSMITH, PERRY G.
GOLDSTEIN, MAX A.
GOODYEAR, HENRY M.
GREENE, JOSEPH B.
HASTINGS, HILL

HILL, FREDERICK T.
HURD, LEE MAIDMENT
IMPERATORI, CHARLES J.
INGERSOLL, JOHN M.
JARVIS, DeFOREST C.
KENYON, ELMER L.
KING, JAMES JOSEPH
LAW, FREDERICK M.
LEWIS, FIELDING OTIS
LYNCH, ROBERT CLYDE
MACKENTY, JOHN E.
MACPHERSON, DUNCAN
MAYER, EMIL
McCULLAGH, SAMUEL
McGINNIS, EDWIN
McKIMMIE, OSCAR A. M.
MOSHER, HARRIS P.
MULLIN, WILLIAM V.
MYERSON, MERVIN C.
MYLES, ROBERT C.
NEW, GORDON B.
NEWHART, HORACE
ORTON, HENRY BOYLAN

PIERCE, NORVAL H.
PORTER, CHARLES T.
PROETZ, ARTHUR W.
RENNER, W. SCOTT
RICHARDSON, CHARLES W.
ROY, DUNBAR
SAUER, WILLIAM E.
SEWELL, EDWARD CECIL
SHAMBAUGH, GEORGE E.
SHEA, JOHN JOSEPH
SHURLY, BURT R.
SKILLERN, ROSS H.
SONNENSCHN, ROBERT
SPENCER, FRANK ROBERT
SWAIN, HENRY L.
TAYLOR, HERMON MARSHALL
THEISEN, CLEMENT F.
WHERRY, WILLIAM P.
WHITE, FRANCIS W.
WHITE, LEON E.
WILSON, J. GORDON
WOOD, GEORGE B.

List of Fellows
1928



LIST OF FELLOWS

1928

Attendance during last five years shown by figures following each name.

Asterisk (*) indicates year paper was read.

Active Fellows

1917. ARROWSMITH, HUBERT, 170 Clinton Street, Brooklyn, New York, 1921, '22, '24, '25, '26, '27.
1923. BABBITT, JAMES A., 1912 Spruce Street, Philadelphia, Pennsylvania, 1923, '24*, '25, '26, '27, '28.
1915. BARNES, HARRY ALDRICH, 520 Commonwealth Avenue, Boston, Massachusetts, 1920, '24, '27*, '28.
1908. BARNHILL, JOHN F., 408 Penway Building, Indianapolis, Indiana, 1922, '24, '27, '28.
1928. BECK, JOSEPH C., 2551 North Clark Street, Chicago, Illinois, 1928.
1921. BERRY, GORDON, 19 Elm Street, Worcester, Massachusetts, 1921*, '22, '23, '24, '25, '26, '27, '28*.
1893. BIRKETT, HERBERT S., 1190 Mountain Street, Montreal, Canada, 1920, '21, '22*, '23, '25, '26, '27, '28*.
1925. BLAIR, VILRAY P., 400 Metropolitan Building, St. Louis, Missouri, 1922, '23*, '25*, '28*.
1891. BRYAN, JOSEPH H., 303 Stoneleigh Court, Washington, D. C., 1920*, '21, '22, '23, '24, '25, '26, '27*, '28.
1913. BUTLER, RALPH, 2007 Chestnut Street, Philadelphia, Pennsylvania, 1920*, '21, '23, '24, '27.
1915. CANFIELD, R. BISHOP, Ann Arbor, Michigan, 1921, '22.
1927. CARMODY, THOMAS E., 806 Metropolitan Building, Denver, Colorado, 1924, '26, * '27, '28.
1917. CHAMBERLIN, WILLIAM B., Osborn Building, Cleveland, Ohio, 1920, '21*, '22, '26, '27*, '28.
1897. CLARK, J. PAYSON, 71 Marlborough Street, Boston, Massachusetts, 1920*, '21, '22, '23, '24*, '26, '28.
1902. COAKLEY, CORNELIUS G., 20 East Fifty-third Street, New York, 1920, '21, '22*, '23, '24, '25, '27.

1917. COATES, GEORGE MORRISON, 1721 Pine Street, Philadelphia, Pennsylvania, 1920, '21, '22, '23, '24, '25, '26, '27, '28.
1905. COFFIN, LEWIS A., 114 East Fifty-fourth Street, New York, 1920, '21, '22, '23, '25, '26, '27, '28.
1913. COFFIN, ROCKWELL A., 350 Commonwealth Avenue, Boston, Massachusetts, 1920, '21, '22*, '24.
1913. DABNEY, VIRGINIUS, 1633 Connecticut Avenue, Washington, D. C., 1921*, '22, '24*, '25, '27*, '28*.
1918. DEAN, LEE WALLACE, Iowa City, Iowa, 1920*, '21*, '22, '23, '24, '25*, '26, '27*, '28.
1881. DELAVAN, D. BRYSON, 30 East Sixtieth Street, New York, 1920*, '21*, '22*, '23*, '25*, '26*, '27*, '28*.
1926. DENNIS, FRANK LOWNDES, Ferguson Building, Colorado Springs, Colorado, 1925*, '26, '27, '28.
1921. EMERSON, FRANCIS P., 520 Commonwealth Avenue, Boston, Massachusetts, 1921, '22, '23*, '24, '26, '27*, '28.
1919. FAULKNER, E. ROSS, 101 East Fifty-eighth Street, New York, 1920, '21, '22, '23*, '25, '27, '28.
1926. FENTON, RALPH ALBERT, 806 Medical Arts Building, Tenth and Taylor Streets, Portland, Oregon, 1923, '25*, '26, '28.
1914. FETTEROLF, GEORGE, 2010 Spruce Street, Philadelphia, Pennsylvania, 1920, '21, '22, '23*, '24, '25, '26, '27, '28.
1922. FORBES, HENRY HALL, 40 East Forty-first Street, New York, 1922, '25*, '27, '28.
1897. FROTHINGHAM, RICHARD, 666 Madison Avenue, New York.
1922. GOLDSMITH, PERRY G., 84 Carlton Street, Toronto, Ontario, 1922*, '23*, '24, '26, '28.
1913. GOLDSTEIN, MAX A., 3858 Westminster Place, St. Louis, Missouri, 1920, '21, '22, '25*, '26, '27, '28.
1898. GOODALE, JOSEPH L., 258 Beacon Street, Boston, Massachusetts, 1920, '21, '22*, '23, '24, '26.
1905. GRAYSON, CHARLES P., 262 South Fifteenth Street, Philadelphia, Pennsylvania, 1921.
1906. GREENE, D. CROSBY, JR., 23 Bay State Road, Boston, Massachusetts, 1920*, '21*, '22, '23, '24*, '25, '26, '27.
1917. GREENE, JOSEPH B., 305 Haywood Building, Asheville, North Carolina, 1921, '22, '23*, '24, '26, '27, '28.
1905. HALSTED, THOMAS H., 405 Fayette Park, Syracuse, New York, 1920, '21, '23, '24, '25, '26.
1903. HARRIS, THOMAS J., 104 East Fortieth Street, New York, 1921, '22, '24*, '25, '26, '28.

1915. HASTINGS, HILL, 306 Medical Office Building, 1136 West Sixth Street, Los Angeles, California, 1921*, '24, '27*.
1919. HURD, LEE MAIDMENT, 39 East Fiftieth Street, New York, 1921, '23, '25, '26*, '28.
1925. IGLAUER, SAMUEL, 400 Pearl Market Bank Building, Cincinnati, Ohio, 1926, '27.
1920. IMPERATORI, CHARLES JOHNSTONE, 17 East Thirty-eighth Street, New York, 1921*, '22, '24*, '25*, '26*, '27*, '28.
1904. INGERSOLL, JOHN M., 1700 South Bayshore Lane, Miami, Florida, 1920, '21, '22, '23, '24, '25, '26, '27, '28.
1907. JACKSON, CHEVALIER, Graduate Hospital, Nineteenth and Lombard Streets, Philadelphia, Pennsylvania, 1921*, '22*, '23, '24*, '25*, '27*, '28.
1918. KENYON, ELMER L., 104 South Michigan Boulevard, Chicago, Illinois, 1922, '24*, '28.
1921. KERNAN, JOHN D., JR., 156 East Seventy-ninth Street, New York, 1921*, '22, '25, '26, '27.
1927. LARGE, SECORD HERBERT, 2323 Prospect Avenue, Cleveland, Ohio, 1924*, '25, '26.
1914. LEVY, ROBERT, Metropolitan Building, Denver, Colorado.
1918. LEWIS, FIELDING OTIS, 259 South Seventeenth Street, Philadelphia, Pennsylvania, 1921*, '22*, '23, '25*, '28.
1925. LILLIE, HAROLD I., Mayo Clinic, Rochester, Minnesota, 1923*, '24*, '25, '26*, '28.
1911. LOCKARD, LORENZO B., Metropolitan Building, Denver, Colorado.
1915. LYNCH, ROBERT CLYDE, 632 Maison Blanche Building, New Orleans, Louisiana, 1920*, '21, '22, '23, '24*, '26, '28.
1914. MACKENTY, JOHN E., 111 East Sixty-first Street, New York, 1920*, '21, '22*, '23*, '25*, '26*, '27*, '28*.
1928. MACPHERSON, DUNCAN, 114 East Fifty-fourth Street, New York, 1928.
1896. MAYER, EMIL, 666 West End Avenue, New York, 1921, '22, '23, '24, '27, '28.
1921. McCULLAGH, SAMUEL, 71 Park Avenue, New York, 1921*, '22, '23*, '25, '26*, '27, '28.
1927. MCGINNIS, EDWIN, 104 South Michigan Boulevard, Chicago, Illinois, 1924, '25*, '26, '27, '28.
1913. McKIMMIE, OSCAR A. M., 1301 Massachusetts Avenue, N. W. Washington, D. C., 1921*, '22, '25, '28.
1904. MOSHER, HARRIS P., 828 Beacon Street, Boston, Massachusetts, 1920, '21*, '22, '23*, '24, '25, '26, '27, '28*.

1925. MULLIN, WM. V., Cleveland Clinic, Euclid Avenue at Ninety-third Street, Cleveland, Ohio, 1923, '24*, '25, '26, '27, '28*.
1914. MUNGER, CARL E., 81 North Main Street, Waterbury, Connecticut, 1921, '27.
1901. MYLES, ROBERT C., 123 East Fifty-third Street, New York, 1923, '25, '28.
1922. NEW, GORDON B., Mayo Clinic, Rochester, Minnesota, 1922, '24, '25*, '26*, '28*.
1926. NEWHART, HORACE, Donaldson Building, Minneapolis, Minn., 1923, '25*, '26, '28.
1903. PACKARD, FRANCIS R., 302 South Nineteenth Street, Philadelphia, Pennsylvania, 1920, '21, '22, '23, '24, '25, '26.
1906. PIERCE, NORVAL H., 307 North Michigan Avenue, Chicago, Illinois, 1920*, '21, '22, '23, '24, '25, '26*, '27*, '28.
1927. PROETZ, ARTHUR WALTER, Beaumont Building, St. Louis, Missouri, 1924, '25*, '26*, '27, '28.
1908. RANDALL, B. ALEXANDER, 311 South Twentieth Street, Philadelphia, Pennsylvania, 1920*, '21, '22, '23, '25, '28.
1903. RENNER, W. SCOTT, 341 Linwood Avenue, Buffalo, New York, 1920, '22, '24, '26, '28.
1884. RICE, CLARENCE C., 52 Park Avenue, New York.
1905. RICHARDS, GEORGE L., 124 Franklin Street, Fall River, Massachusetts, 1920, '21, '24, '27, '28.
1902. RICHARDSON, CHARLES W., 1337 Connecticut Avenue, Washington, D. C., 1920*, '21, '22*, '23, '25, '26*, '27, '28.
1913. ROY, DUNBAR, Grand Opera House Block, Atlanta, Georgia, 1921*, '22, '23, '26, '28.
1921. SAUER, WILLIAM E., 537 North Grand Avenue, St. Louis, Missouri, 1921, '23, '25, '28.
1923. SEWALL, EDWARD CECIL, 3515 Pacific Avenue, San Francisco, California, 1924, '26*, '28*.
1907. SHAMBAUGH, GEORGE E., 122 South Michigan Boulevard, Chicago, Illinois, 1920*, '22, '23, '24, '26*, '27, '28.
1909. SHURLY, BURT R., 62 Adams Avenue W., Detroit, Michigan, 1920, '21*, '22, '24, '25*, '26, '27*, '28.
1919. SKILLERN, ROSS H., 1811 Spruce Street, Philadelphia, Pennsylvania, 1920*, '21*, '22*, '23, '24, '25, '26, '27, '28.
1909. SLUDER, GREENFIELD, 3542 Washington Avenue, St. Louis, Missouri, 1920*, '21, '22*, '23*, '25.
1908. SMITH HARMON, 150 East Sixty-second Street, New York, 1920, '21, '22*, '23, '25, '26, '28.

1928. SONNENSCHNEIN, ROBERT, 1928.
1926. SPENCER, FRANK ROBERT, Physicians' Building, Boulder, Colo., 1923, '24*, '26, '27*, '28.
1924. STEIN, OTTO J., 30 North Michigan Avenue, Chicago, Ill., '25*, '28.
1911. STOUT, GEORGE C., 2015 Walnut Street, Philadelphia, Pennsylvania, 1922, '23, '25, '27, '28.
1889. SWAIN, HENRY L., Colonial Building, 195 Church Street, New Haven, Connecticut, 1920, '21*, '22, '23, '24, '25, '26, '27, '28.
1928. TAYLOR, HERMON MARSHALL, 111 West Adams Street, Jacksonville, Florida, 1924, '25*, '26, '27, '28.
1903. THEISEN, CLEMENT F., 172 Washington Avenue, Albany, New York, 1920*, '23*, '24*, '28*.
1892. WAGNER, HENRY L., 518 Sutter Street, San Francisco, California, '26.
1892. WATSON, ARTHUR, W., 2013 Locust Street, Philadelphia, Pennsylvania, 1921, '23, '25, '27.
1928. WHERRY, WILLIAM P., 620 Bankers' Reserve Life Building, Omaha, Nebraska, 1924, '25*, '26, '27, '28.
1925. WHITE, FRANCIS W., 74 West Fifty-eighth Street, New York City, New York, 1922, '23*, '25, '26, '27, '28.
1924. WHITE, LEON E., 390 Commonwealth Avenue, Boston, Massachusetts, 1924*, '26*, '27*, '28.
1908. WILSON, J. GORDON, 5755 Kenwood Avenue, Chicago, Illinois, 1920, '21, '22, '24, '25, '26, '28.
1922. WISHART, DAVID J. G., 47 Grosvenor Street, Toronto, Canada, '26.
1905. WOOD, GEORGE B., Suite 504, Physicians' Building, Northeast corner Twentieth and Chestnut Streets, Philadelphia, Pennsylvania, 1921, '22*, '23*, '25*, '28.

Associate Fellows

1923. BARLOW, ROY ALEXANDER, care of Jackson Clinic, Madison, Wisconsin, 1923, '24*, '27, '28.
1926. CLERF, LOUIS H., 128 South Tenth Street, Philadelphia, Pennsylvania, '25, '27*, '28.
1928. GITTINS, THOMAS ROY, 401 Davidson Building, Sioux City, Iowa, 1928.
1928. GOODYEAR, HENRY M., 556 Doctors' Building, Cincinnati, Ohio, 1928.

1928. HILL, FREDERICK THAYER, Professional Building, Waterville, Maine, 1928.
1928. JARVIS, DE FOREST CLINTON, Room 7, Quarry Bank Building, Barre, Vermont, 1928.
1925. KING, JAMES JOSEPH, 40 East Forty-first Street, New York, New York, 1925, '26*, '27, '28.
1927. LUKENS, ROBERT M., 1923 Spruce Street, Philadelphia, Pennsylvania, 1927, '28.
1923. MCKINNEY, RICHMOND, 1052 Madison Avenue, Memphis, Tennessee, 1923, '24*, '26*, '27.
1927. MYERSON, MERVIN C., 198 Lincoln Place, Brooklyn, New York, 1927, '28*.
1927. ORTON, HENRY BOYLAN, 24 Commerce Street, Newark, New Jersey, 1927, '28.
1927. PORTER, CHAS. T., 520 Commonwealth Ave., Boston, Mass., 1927, '28.
1928. SHEA, JOHN JOSEPH, 1018 Madison Avenue, Memphis, Tennessee, 1928.
1927. TOBEY, HAROLD G., 270 Commonwealth Avenue, Boston, Mass., 1927.
1925. TUCKER, GABRIEL, Thirty-fourth and Spruce Streets, Philadelphia, Pennsylvania, 1925, '26*, '27*.

Honorary Fellows

1928. FRENCH, THOMAS R., 469 Clinton Avenue, Brooklyn, New York.
1910. MOURE, E. J., 25 bis Cours de Verdun, Bordeaux, France.
1914. THOMSON, SIR ST. CLAIR, 64 Wimpole Street, W., London, England.
1921. WRIGHT, JONATHAN, Windy Rock, Pleasantville, New York.

Corresponding Fellows

1901. COLLIER, MAYO, Kearsney Abbey, Kent, England.
1893. DESVERNINE, CARLOS M., 52 Cuba Street, Havana Cuba.
1920. FERRERI, GHERARDO, University di Roma, Rome, Italy.
1901. GRANT, SIR JAMES DUNDAS, K.B.E., 148 Harley Street, London, W 1, England.
1919. KELLY, ADAM BROWN, 26 Blythswood Square, Glasgow, Scotland.
1926. LAW, FREDERICK M., 576 Fifth Avenue, New York City, New York.
1921. LE MAITRE, FERNAND, Avenue Victor Hugo, 120 (XVI), Paris, France.

1902. LERMOYEZ, MARCEL, 20 bis Rue de la Boétie, Paris, France.
1903. MCBRIDE, P., 20 South Drive, Harrowgate, England.
1919. MCKERNON, JAMES F., 636 Fifth Ave., New York.
1896. MACDONALD, GREVILLE, Wildwood, Haslemere, England.
1894. MACINTYRE, JOHN, 179 Bath Street, Glasgow, Scotland.
1920. MACKENZIE, DAN, 61 Wimpole Street, Cavendish Square, London, W 1, England.
1896. MYGIND, HOLGER, 31 Havnegade, Copenhagen, Denmark.
1919. PATERSON, DONALD ROSE, 15 St. Andrew's Crescent, Cardiff, Wales.
1919. ROGERS, JOHN, JR., 177 East Seventy-first Street, New York.
1894. SAJOUS, C. E. DEM., 2043 Walnut Street, Philadelphia, Pennsylvania.
1924. SCHAEFFER, J. PARSONS, Jefferson Medical College, Philadelphia.
1896. SCHMIEGELOW, ERNST, 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, Lyme Regis, Dorset, England.

Emeritus Fellows

1914. BROWN, J. PRICE, 106 South Drive, Toronto, Canada.
1922. COBB, FREDERICK C., Riverview, Gloucester, Massachusetts.
1928. COOLIDGE, ALGERNON, 198 Beacon Street, Boston, Massachusetts.
1918. FARLOW, JOHN W., 127 Bay State Road, Boston, Massachusetts.
1924. FREER, OTTO T., 81 East Elm Street, Chicago, Illinois.
1927. HARDIE, T. MELVILLE, 30 N. Michigan Boulevard, Chicago, Illinois.
1918. HINKEL, F. WHITEHALL, 28 Norwood Avenue, Buffalo, New York.
1926. HOPKINS, FREDERICK E., 146 Chestnut Street, Springfield, Massachusetts.
1927. HUBBARD, THOMAS, 234 Michigan Street, Toledo, Ohio.
1912. LINCOLN, WILLIAM, 1054 Rose Building, Cleveland, Ohio.

Benefactors

ARTHUR W. DE ROALDES.
WILLIAM E. CASSELBERRY.
SAMUEL JOHNSTON.

PAST OFFICERS

Presidents

(Year of Election)

1879. Louis Elsberg	1904. C. C. Rice
1880. J. Solis-Cohen	1905. J. W. Gleitsmann
1881. F. I. Knight	1906. A. W. de Roaldes
1882. G. M. Lefferts	1907. H. S. Birkett
1883. F. H. Bosworth	1908. A. Coolidge, Jr.
1884. E. L. Shurly	1909. J. E. Logan
1885. Harrison Allen	1910. D. Braden Kyle
1886. E. Fletcher Ingals	1911. James E. Newcomb
1887. R. P. Lincoln	1912. George A. Leland
1888. E. C. Morgan	1913. Thomas Hubbard
1889. J. N. Mackenzie	1914. Alexander W. MacCoy
1890. W. C. Glasgow	1915. G. Hudson Makuen
1891. S. W. Langmaid	1916. Joseph L. Goodale
1892. M. J. Asch	1917. Thomas H. Halsted
1893. D. B. Delavan	1918. Cornelius G. Coakley
1894. J. O. Roe	1919. Norval H. Pierce
1895. W. H. Daly	1920. Harris P. Mosher
1896. C. H. Knight	1921. Harmon Smith
1897. T. R. French	1922. Emil Mayer
1898. W. E. Casselberry	1923. J. Payson Clark
1899. Samuel Johnston	1924. Lee Wallace Dean
1900. H. L. Swain	1925. Greenfield Sluder
1901. J. W. Farlow	1926. Chevalier Jackson
1902. J. H. Bryan	1927. D. Bryson Delavan
1903. J. H. Hartman	

Vice-Presidents

1879. F. H. Davis	J. O. Roe
1880. W. C. Glasgow	W. Porter
1881. E. L. Shurly	E. F. Ingals
1882. C. Seiler	S. Johnston
1883. S. W. Langmaid	W. H. Daly
1884. J. H. Hartman	G. W. Major
1885. H. A. Johnson	J. N. Mackenzie
1886. E. C. Morgan	S. W. Langmaid
1887. J. N. Mackenzie	C. E. DeM. Sajous
1888. W. C. Glasgow	C. E. Bean
1889. E. Holden	J. H. Hartman
1890. J. O. Roe	S. Johnston
1891. M. J. Asch	J. C. Mulhall
1892. S. Johnston	W. E. Casselberry
1893. J. C. Mulhall	S. H. Chapman
1894. C. C. Rice	

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
1921. Dunbar Roy	Robert C. Lynch
1922. George Fetterolf	Lorenzo B. Lockard
1923. Hubert Arrowsmith	Joseph B. Greene
1924. Ross H. Skillern	Gordon Berry
1925. John E. Mackenty	Robert Levy
1926. Lewis A. Coffin	William V. Mullin
1927. Charles W. Richardson	Hill Hastings

Secretaries and Treasurers

1879. G. M. Lefferts	1895. H. L. Swain
1882. D. B. Delavan	1900. J. E. Newcomb
1889. C. H. Knight	1911. Harmon Smith

Secretaries

1912. Harmon Smith	1919. J. M. Ingersoll
1918. D. B. Delavan	1920. George M. Coates

Treasurers

1912. J. Payson Clark	1923. George Fetterolf
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Librarians

1879. F. H. Bosworth	1903. J. H. Bryan
1883. T. R. French	

PAST MEMBERS

DeceasedHonorary Fellows*

- *1915. Bosworth, Francke H., New York City.
- 1914. Cohen, J. Solis-, Philadelphia, Pennsylvania.
- *1893. De Roaldes, Arthur, New Orleans, La.
- *1914. De La Sota Y Lastra, Ramon, Seville, Spain.
- *1880. Garcia, Senor Manuel, London, England.
- *1878. Johnston, Samuel, Baltimore, Md.
- *1914. Lefferts, George Morewood, Katona, N. Y.
- *1883. MacKenzie, John N., Baltimore, Md.
- *1883. Mackenzie, Sir Morell, London, England.
- *1910. Massei, Ferdinand, Naples, Italy.
- *1879. Oliver, H. K., Boston, Mass.
- *1909. Semon, Sir Felix, Great Missenden, England.
- *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.
- *1897. Luc, H., Paris, France.
- *1880. Meyer, Wilhelm, Copenhagen, Denmark.
- *1881. Thornton, Pugin, London, England.
- *1880. Whistler, W. McNeil, London, England.
- *1894. Wolfenden, R. Norris, Kent, England.

Emeritus Fellows

- *1914. De Blois, Thomas Amory, Boston, Mass.
- *1914. Gleitsmann, Joseph W., New York City.
- *1912. Knight, Charles H., New York City.
- *1923. Leland, George A., Boston, Massachusetts.
- *1922. MacCoy, Alexander W., Philadelphia, Pa.
- *1914. Porter, William, Ocean Springs, Miss.
- *1924. Rhodes, John Edwin, Chicago, Ill.
- *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.
- *1904. Berens, T. Passmore, New York City.
- *1924. Bigelow, Nolton, Providence, R. I.
- *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.
- 1918. Cox, Gerard H., New York.
- 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.
- *1901. Freeman, Walter J., Philadelphia, Pa.
- *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.
- *1893. Hope, George B., New York City.
- *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.
- 1913. Loeb, Hanau W., St. Louis, Missouri.
- 1897. Logan, James E., Kansas City, Missouri.

- *1888. Lowman, John H., Cleveland, Ohio.
- *1919. Lynah, Henry L., New York City.
- *1879. McBurney, Charles, New York City.
- *1885. McSherry, H. Clinton, Baltimore, Md.
- *1898. Makuen, G. Hudson, Philadelphia, Pa.
- *1881. Major, G. W., Montreal, Canada.
- *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.
- 1892. Thrasher, Allen B., 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.

