Deafness and discharge from the ear : the modern treatment for the radical cure of deafness, otorrhœa, noises in the head, vertigo, and distress in the ear / by Samuel Sexton ; assisted by Alexander Duane.

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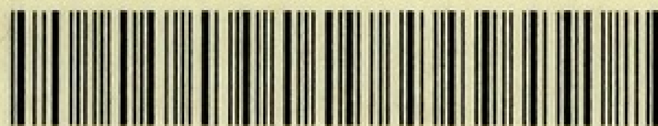
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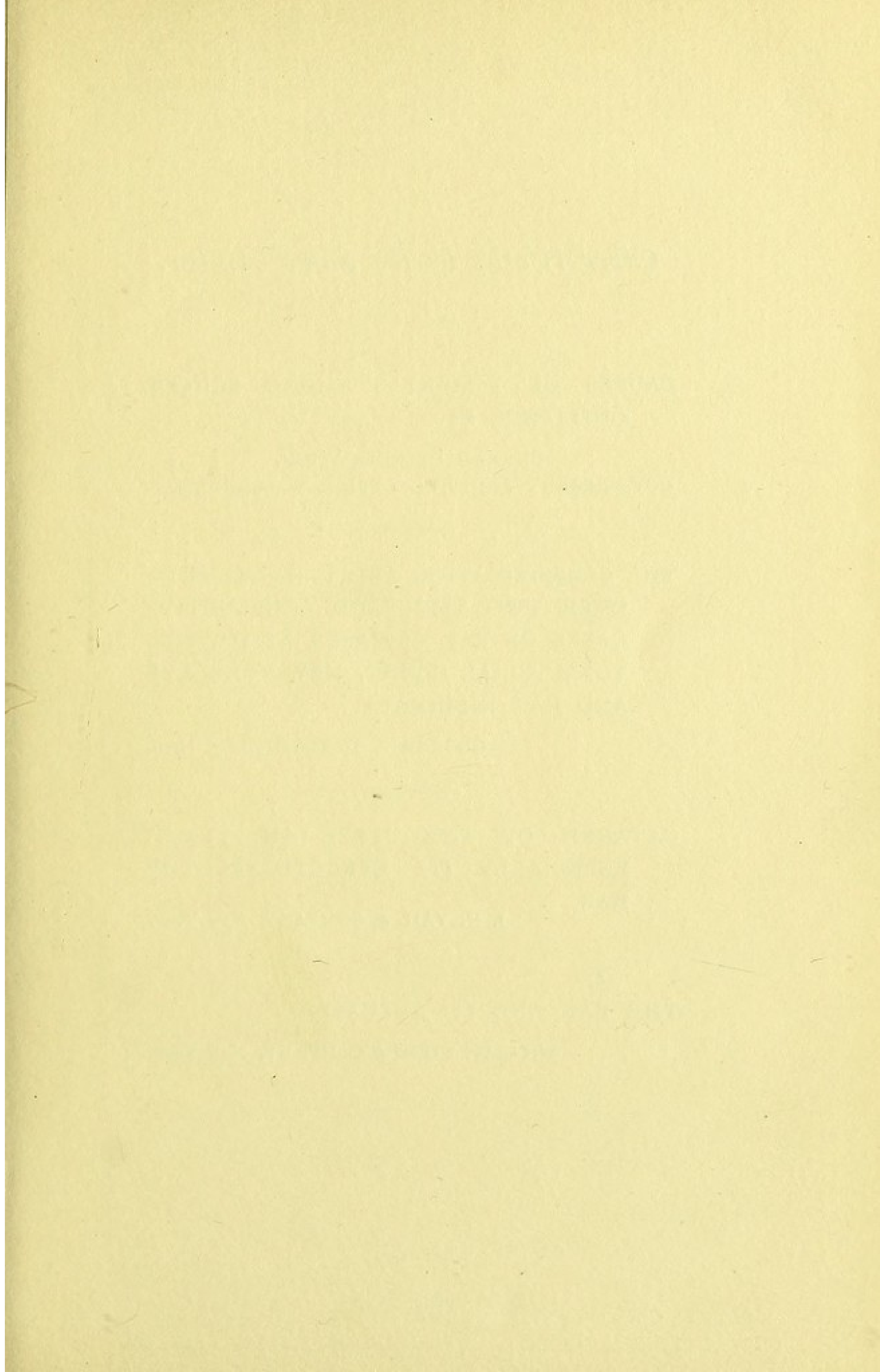

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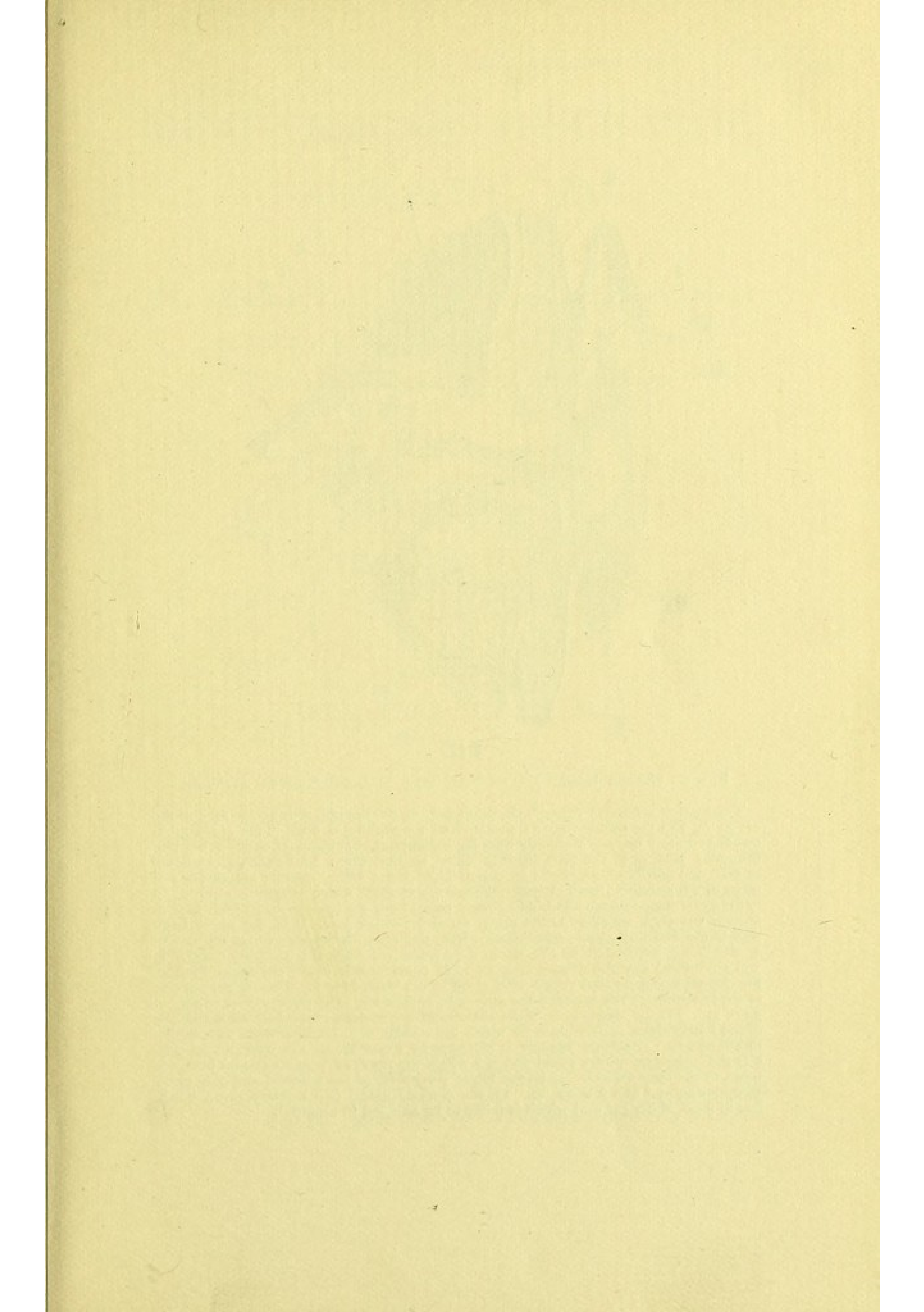

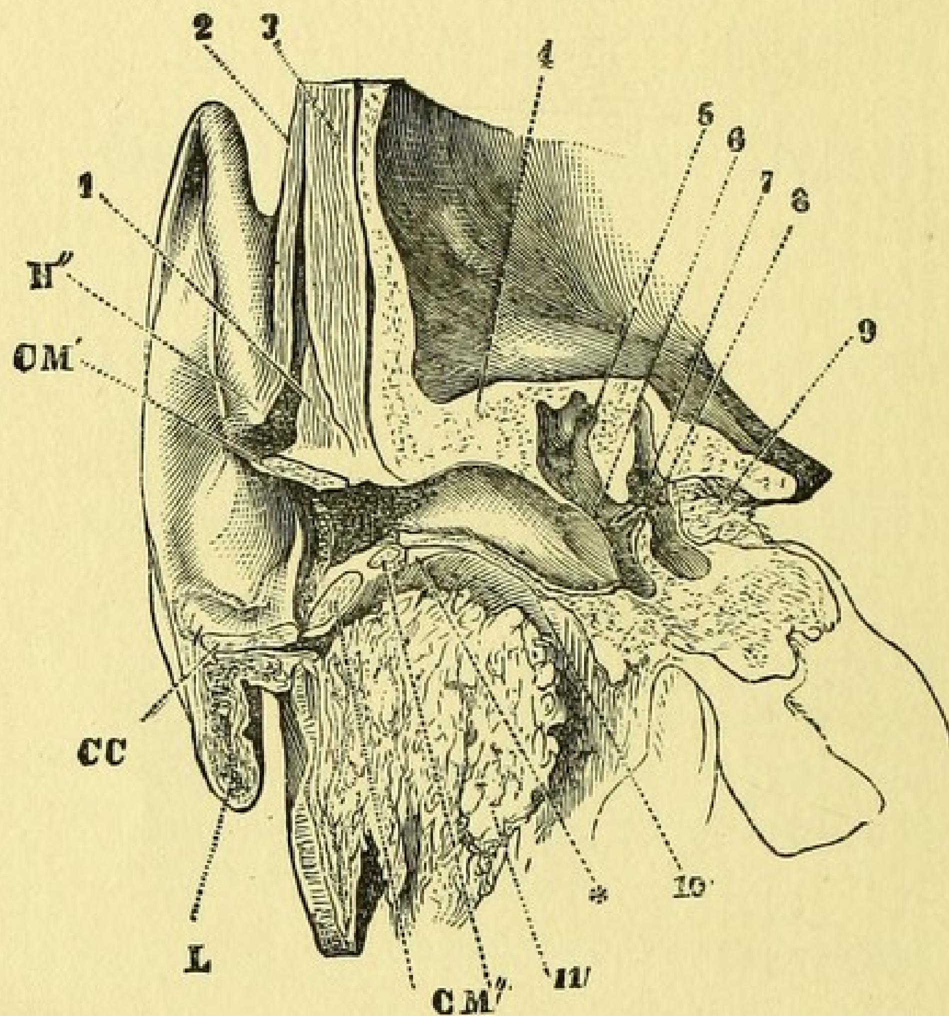

FIG. 1. (AFTER HENLE.)—THE EAR SEEN IN LONGITUDINAL SECTION.

The section is carried through the front part of the auricle, cutting the lobe of the ear at *L*, and the cartilaginous framework of the auricle at *CC*. This cartilage is connected more or less intimately with the incomplete cartilaginous rings which line the outer portion of the tube leading down to the drum (the external auditory canal), and which are shown in section at *CM′* and *CM″*. 1 and 2 are sections of some of the muscles (more or less rudimentary in man) which move the auricle. 3 is the great temporal muscle which passes down from the temple and which just in front of the ear is attached to the upper tip of the lower jaw. 4 is the upper bony wall of the auditory canal, separating it from the brain-cavity above. 5, the cavity of the drum, separated by the drum-membrane (6) from the auditory canal. It will be noticed that the drum-cavity extends considerably above the upper limit of the drum-membrane and comes very close to the brain-cavity. This upper portion of the tympanic cavity is called the attic, and is shown in transverse section in Fig. 2, page 21. 7 is the stapes (one of the ossicles of the middle ear) which closes in one of the two orifices, or windows, by which the middle ear communicates with the internal ear, 8. The other window is closed in by a membrane, the inner drumhead. 9 is the internal auditory canal through which the nerve of hearing passes from the brain to the internal ear. 10 is the lower bony wall of the external auditory canal terminating at * in a fibrous lip. 11, the parotid gland (the salivary gland which lies in front of the ear and which is liable to be affected in mumps).

with the compliments of
Samuel Sexton

DEAFNESS AND DISCHARGE FROM THE EAR

THE MODERN TREATMENT FOR THE RADICAL CURE OF DEAFNESS, OTORRHŒA, NOISES IN THE HEAD, VERTIGO, AND DISTRESS IN THE EAR

BY

SAMUEL SEXTON, M.D.

AUTHOR OF "THE EAR AND ITS DISEASES," ETC., ETC.

ASSISTED BY

ALEXANDER DUANE, M.D.

SECOND EDITION

NEW YORK

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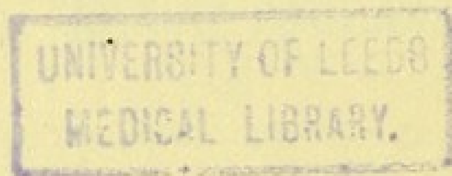

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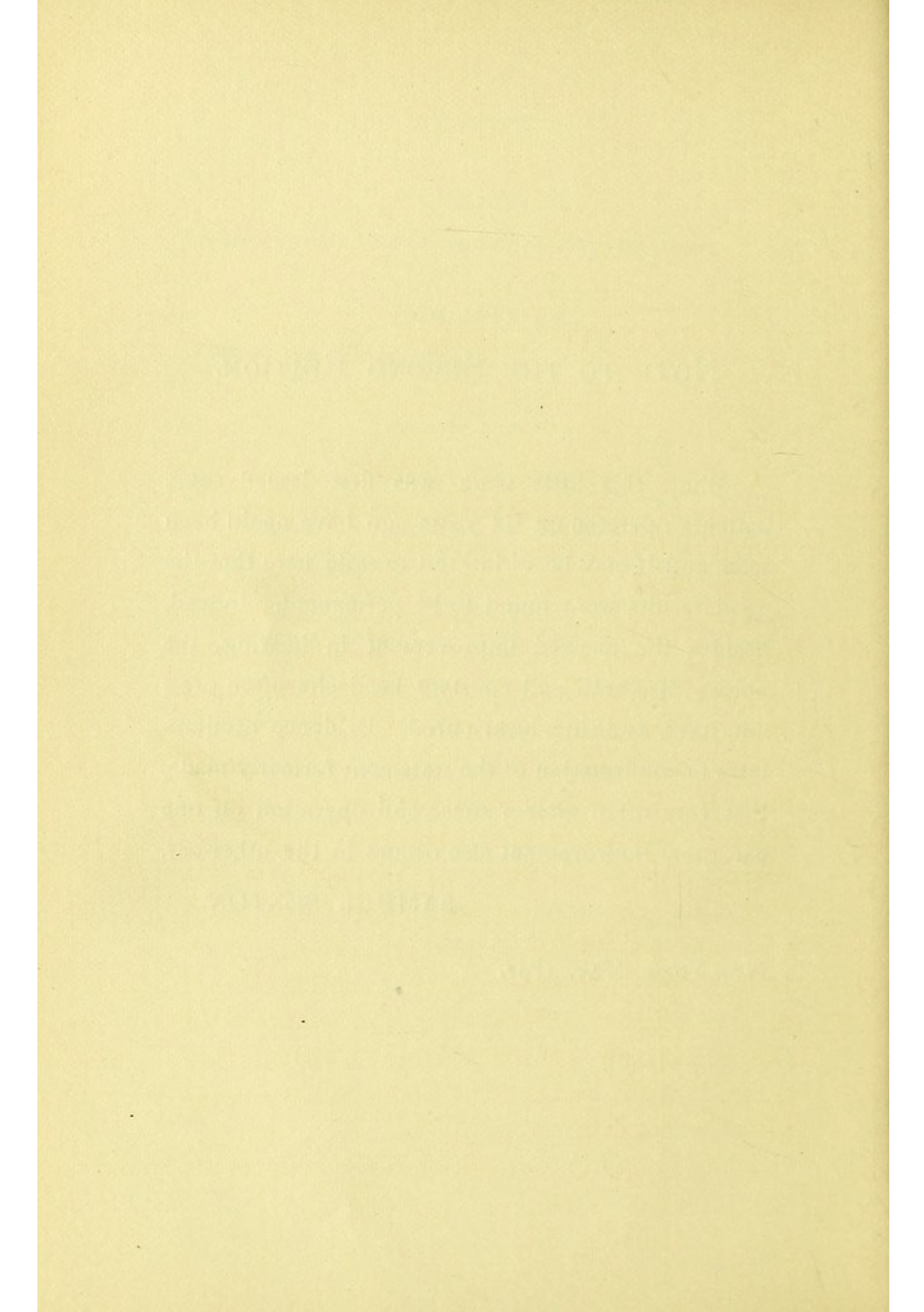
Note to the Second Edition.

Since this little work was first issued some patients operated on six years ago have again been seen, and it may be of interest to state here that the good results were found to be permanent. Indeed, besides the marked improvement in hearing, the noises, dizziness, and constant headache often present, have, as a rule, been cured. Evidence accumulates in confirmation of the statement formerly made, that very often after a successful operation on one ear, great improvement also occurs in the other ear.

SAMUEL SEXTON.

New York, May, 1892.



INTRODUCTORY NOTE.

I HAVE requested Dr. Duane to prepare these pages for publication, with the object of giving information concerning the modern treatment of ear diseases by radical measures to numerous inquirers, specially those whose letters I have not the necessary time at my disposal to answer, and, indeed, could not answer satisfactorily within the limits of ordinary correspondence. This treatment of the ear is based upon modern surgical principles; but, like other advances in science, where ancient customs are displaced, it has met with strenuous opposition in some quarters and conservative indifference in others. It is believed, however, that a careful study of the subject will convince the sceptical of the merits of rational treatment, when contrasted with ancient methods, whose chief interest lies in their antiquity.

I have already presented the results of my

own experience in this direction, during the past six years, to otologists in this country and abroad, namely, in a paper read at the meeting of the American Otological Society in 1886, one before the British Medical Association in 1889, and one at the Tenth International Medical Congress in Berlin, 1890; also in an article on the "Operation for the Relief of Deafness, Noises in the Head, and Vertigo, due to Chronic Catarrh of the Drum of the Ear," published in the *Archives of Otology*, April, 1891. From those sources the matter for the present work, for more general use, has been principally derived, though many details as to indication for operations and treatment, derived from recent experience, are for the first time here made public. From a perusal of the work, including the history of many cases treated in private practice, it will be seen that the results of treatment of aural disease in the manner described may be predicted with the same degree of certainty as in other departments of surgery.

SAMUEL SEXTON, M.D.

NEW YORK, October, 1891.

PREFACE.

The following paper is largely based upon one read in the summer of 1890 before the Tenth International Medical Congress, held in Berlin, and also upon an article which appeared in the *Archives of Otology* for April, 1891. The former, which was for the most part taken up with a statement of the reasons justifying the treatment of chronic affections of the middle ear by operation, and the indications to be observed in carrying out such treatment, was received with marked approbation by both the American and the German members of the Otological Section of the Congress; and in the discussion upon the subject not a little evidence was adduced by the various speakers in support of the views promulgated. This was peculiarly gratifying to the author, not only because of the substantiation thus given to opinions which he had himself adopted only after long and careful

study, but also because they showed that the opposition which existed in some places, outside of Germany, to this radical departure in aural practice was beginning to die out. He had, however, been already led to suppose that this would be the case; for, while at first the proposition to relieve chronic suppuration and chronic catarrh of the middle ear by an operation had encountered almost universal disapproval at home, physicians, and more particularly specialists in ear-diseases, when their attention was called to the principles upon which the operation is based, were compelled to acknowledge that theoretically it was justifiable; and afterward, as the results obtained by Dr. Sexton and others were from time to time reported, many of these same doubters were forced to admit that, practically too, the treatment by operation was a vast improvement over the old time-honored and time-consuming methods. Among those who have been led to believe in the operation, and practise it, are some of the most distinguished otologists of this country and of Europe.

Nevertheless, there are still many—their number, to be sure, daily decreasing—who have not sufficiently examined into the sub-

ject to satisfy themselves of the expediency, and, in many cases, even the necessity, of the operation. There are, indeed, some who, even yet, with a bigotry almost savage in its intensity, oppose the rational surgical treatment of the ear demanded by the advances everywhere else made in surgery, and who even go so far as to attempt the intimidation of persons seeking other means than the meddlesome and unavailing ancient treatment in vogue, by representing such operations on the ear as dangerous. We have specially in mind an instance where, after many years' faithful attendance at the doctor's office, for deafness, and finally for noises in the head also, which were constantly getting worse, it was at last confessed to the patient that the long and troublesome treatment had been of no avail. And when an opinion was sought as to the advantages of an operation, the sufferer was told that it was useless and hazardous to her hearing and health, nay, even her *life*. Fortunately for the patient she was not to be deterred by this cruel dismissal from trying the only means offering any hope of relief, and as her desperate condition demanded speedy action a distinguished surgeon was at once consulted. On being assured by him

of the safety of the operation recommended in her case, without frittering away more valuable time she determined to act on his advice, and the operation was successfully performed on both ears.

It is hoped that the accompanying brochure will demonstrate beyond question the great advantage which this new procedure possesses over the old-time methods, and the exceedingly satisfactory character of the results which it insures.

DEAFNESS AND DISCHARGE FROM THE EAR.

CHAPTER I.

HISTORY OF FORMER OPERATIONS UPON THE EAR, AND THE REASON FOR THEIR FAILURE.

As early as the latter part of the last century Sir Astley Cooper, in England, and Himly, in Germany, recommended and practised excision of a small portion of the drum-membrane for deafness due to thickening and rigidity of this membrane and of the other structures of the middle ear. The success of these operations was at first most favorable. But, unfortunately, it was not permanent, the deafness and other distressing symptoms, which had been relieved by the excision of the membrane, returning after a little while and becoming as bad as ever. The reason of this nullification of the good effects of the operation

was that the excised membrane in every case became reproduced and the original condition was thus restored. Finding that all attempts to prevent this process of regeneration were ineffectual, Sir Astley Cooper and Himly—the two pioneers in the operation—were reluctantly compelled to abandon it, and to go back to the old palliative measures. And, until within the last thirteen years, a similar experience has generally befallen all who have followed in their footsteps. For, while many, discouraged by the total failure of the ordinary methods of treatment, resorted eagerly to any procedure that promised a radical cure, they too found that their successes, brilliant at first, were subsequently nullified by the regeneration of the parts removed and the consequent recurrence of the symptoms. Much ingenuity was expended in trying to obviate this unfortunate tendency to regeneration, which was justly regarded as a fatal drawback to the operation; and a great number of procedures, more or less formidable and painful, were devised with this end in view. Removal of a portion of the membrane, together with cauterization of the edges of the wound, burning a hole in the membrane with sulphuric acid or with the galvano-cautery, repeated

puncturing of the membrane, chiselling off of a portion of the bony ring to which the drum-head is attached, the insertion of eyelets and tents in artificially made perforations to keep them open, are some of the methods which have been employed for this purpose. All these attempts, however, have, for the most part, been nugatory; and, discouraged by the continual lack of success, surgeons were finally led to abandon the operation and it fell almost completely into disrepute.

But there were still a few who did not yield to this feeling of despair, and who felt confident that in a well-devised surgical procedure was yet to be found the salvation of those who by the inefficiency of the ordinary methods of treatment were condemned irremediably to deafness. The number of these unfortunates is so great, and the use of the ordinary remedies, even though kept up for months and years, is so thoroughly ineffectual, that it was natural for aurists to persevere in their search for some means of arresting the disease at once and permanently. At length success crowned these efforts. Kessel, Lucae, Schwartze, Kretschmann, Urbantschitsch, and others, in Europe, and Sexton and Burnett, in America, have devised and per-

fected operations which in their own hands and in the hands of others have yielded the most gratifying results—gratifying, that is, not only in the satisfactory character of the immediate effects of the operation, but also in the permanency of the benefit that is secured. The number of operations known to have been done already mounts up into the hundreds, and the statistics of the large number that has been published show such a great preponderance of successes that the operation must at once take its place among those whose performance is not only justifiable, but, in many cases, is imperatively required.

The reason why the operation, as at present performed—and in this connection we speak more particularly of that variety of it in regard to which we have personal knowledge, namely, the one devised and performed by Dr. Sexton—is more successful than the ones formerly done, is that the regeneration of the membrane is either completely prevented, or, if regeneration does take place, a secondary operation is readily performed, and almost always successful. In a very considerable proportion of the cases there is no tendency to reproduction whatever. The superiority of the new operation to the old

in this important regard is undoubtedly ascribable to the following causes: 1, The thoroughness of its performance, the entire drum-membrane and either one or two of the ossicles (malleus, or malleus and incus) being removed; 2, the extreme care taken, both during its performance and afterward, to avoid any manipulation that would in the least degree tend to injure or irritate the drum. This latter point is of vital importance, and without doubt many of the former failures were due to its non-observance; the very means that were taken to prevent recurrence (cauterization and the insertion of eyelets) absolutely favoring reproduction by the irritation which they caused. This fault is avoided in the present operation, at the same time that it is made as thoroughgoing as possible. Its success, in fact, is owing to the same principles that have made all the great operations of modern surgery successful, namely, great boldness in the execution combined with extreme care in the details.

CHAPTER II.

THE MODERN OPERATION, WHAT IT IS.

BRIEFLY described, the operation, as performed by Dr. Sexton, is as follows: The patient is first completely anæsthetized, so as not only to be entirely free from pain but also to remain perfectly still during the operation. For this purpose the A.C.E. mixture (a mixture of alcohol, chloroform, and ether) has been found in most cases to answer best, inducing anæsthesia quickly and without discomfort, and showing much less tendency to excite nausea than ether alone. The patient being brought fully under the influence of this agent, the room is darkened and the field of operation is brilliantly illuminated by a lantern, containing an incandescent electric light, attached by a head-band to the surgeon's forehead. The "field of operation," it may be mentioned in passing, is an extremely small one; for all the manipulations are carried on within the narrow limits of the ex-

ternal auditory canal, the calibre of which is still further lessened by the introduction of the tubular ear-speculum. This is a surprise to many patients, whose conception of the importance of an operation is largely determined by the extensiveness of it, and who hence have a sort of crude idea that any procedure to be effectual must involve considerable chiselling and gouging in and about the ear, manipulations taking a good deal of time for their performance and producing more or less external wounding and mutilation. No doubt a confusion between this operation and that for opening the mastoid is in part responsible for these notions. Those who entertain them are agreeably disappointed to find that the entire operation, after the induction of anæsthesia, occupies from three to ten minutes; that the instruments employed are far from formidable in appearance, being extremely light and delicate; that whatever is done with them is done within the narrow limits of the speculum introduced into the ear, out of sight of everyone except the surgeon; that at most, usually, only a dozen drops of blood, in cases of chronic catarrh, are lost during the operation; and that when it is all done, there is no visible external wound, nor, indeed, any sign

whatever to indicate that the ear has been tampered with, nor any, or but slight, pain experienced.

The separate steps of the operation are, in fact, quite few in number and quite simple; nevertheless, for their proper performance they require great delicacy of manipulation and an accurate acquaintance with the conditions met with both in the normal and abnormal state. The first thing to be done is to get the drum-membrane (6, Fig. 1; 4, Fig. 2) out of the way. This is effected by making a circular sweep with a delicate knife, specially devised for the purpose, which separates the membrane from its attachments all round. Then the incus (anvil—*Ib*, *Il*, Fig. 2) is disjointed from the stapes (stirrup-bone—7, Fig. 1), and removed or not, according to the indications of the case. The third step consists in the removal of the malleus (hammer—*Mcp*, Fig. 2), when, except for the careful cleansing and dressing of the parts, the operation is complete. Simple as this description sounds, and simple and speedy as the whole procedure seems to the bystander, it will be readily understood that it requires considerable dexterity for its performance. All the manipulations are carried on within a circle

scarcely more than one-third of an inch in diameter, and deep down at the bottom of the

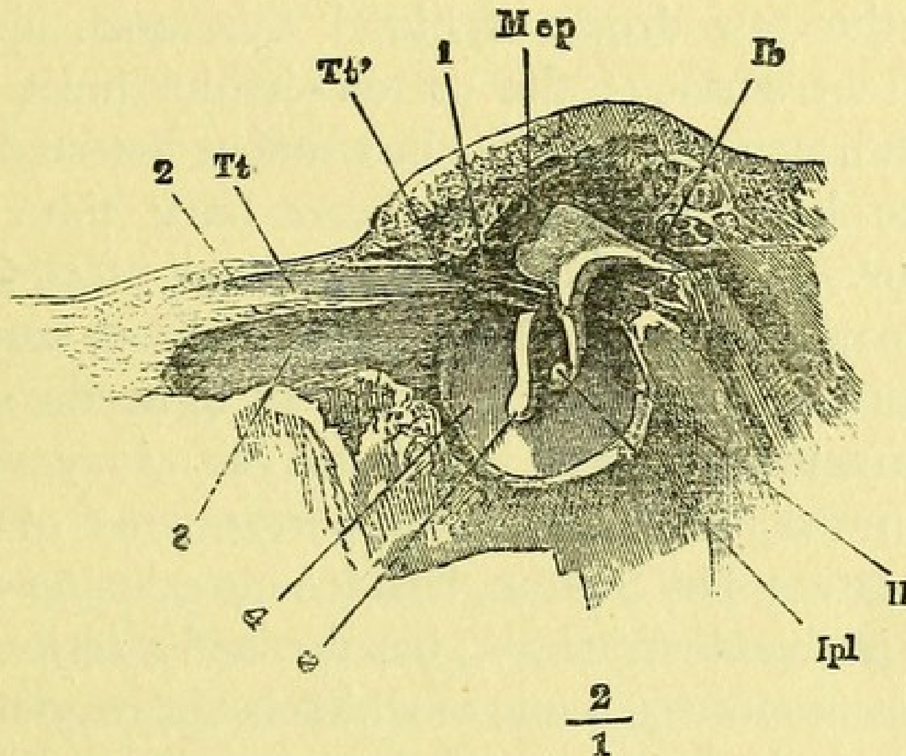


FIG. 2. (AFTER HENLE.)—VIEW OF THE RIGHT DRUM-MEMBRANE FROM WITHIN. (MAGNIFIED 2 DIAMETERS.)

Behind and toward the observer is the incus or anvil, consisting of a quadrilateral upper portion or body, which articulates with the head of the malleus (*Mcp*); of a short process, *Ib*, which is attached to the wall of the drum-cavity; of a long process, *Il*, which hangs down vertically; and of a lenticular process, *Ipl*, which articulates with the stapes (see Fig. 1). In front of, and partly concealed by, the incus is the hammer or malleus, of which are seen the head, *Mcp*, and the handle *. The latter is fixed in the tissue of the drum-membrane (4) so as to participate in its vibrations, which are through it communicated to the incus, and through this again to the stapes and the internal ear. It will be noticed that the body of the incus and the head of the malleus lie altogether above the drum-membrane, occupying that upper recess of the drum-cavity which is called the attic. The attic is shut off by the ossicles as well as by various fibrous bands and other structures, from the lower part (or atrium) of the drum-cavity, and hence when there is any inflammatory swelling secretions can readily accumulate there and stagnate. It will be seen how by removal of both ossicles, or even of the malleus alone, the drainage of this cavity can be effected. The black band marked 1, passing between the incus and malleus, is the chorda tympani nerve; 2 is a partition separating the Eustachian tube, 3 (which runs to the throat), from a canal lodging a muscle, *Tt*, *Tt'*, which is attached to the handle of the malleus.

narrow, and sometimes crooked, auditory canal. The parts concerned are exceedingly minute, often requiring a magnifying-glass for

their satisfactory inspection. Considerable quickness of movement is demanded in wiping off the few drops of blood that ooze upon the cut surface; the cotton-holder must be withdrawn and another instrument inserted at once before the oozing can have time to recur. To do this at the bottom of such a narrow passage as the external auditory canal, illuminated only by a beam of light thrown from one's forehead, is not always an easy task.

In order to facilitate the performance of the operation, Dr. Sexton, besides introducing the use of the electric light, has devised a series of instruments, each one of which is appropriated to a particular stage of the operation. With these the proper manipulations can be done with more ease and certainty, and with less risk of injuring or displacing adjacent parts.*

The operation above described, if conducted with care and skill, yields highly satisfactory results. For the patient, there is very little that is formidable about it. Apart from the moderate discomfort attending the use of the anæsthetic, he suffers almost no inconvenience. There is no pain of consequence after

* The description of these instruments (which are made by W. F. Ford, of New York), as well as a more detailed account of the operation itself, is to be found in Dr. Sexton's The Ear and Its Diseases.

the operation, and in the course of a day or two he may be up and about again, attending to his business. For the surgeon, the operation is a rather more weighty affair. It is one which makes considerable demands upon his skill, his steadiness, and his knowledge. He must have a clear idea of just what he proposes to do, and must be prepared to do it unhesitatingly. On the other hand, he must be equally careful to do no more than is necessary. He must scrupulously avoid injuring any other parts than those which he aims to remove, and hence must perform all the steps of the operation with the utmost gentleness. He must endeavor to secure complete asepsis. Absolute cleanliness is a *sine qua non.* In addition, he must know precisely what he is dealing with ; have an accurate knowledge of the anatomy of the parts, so as to recognize each one as it presents itself to view ; and he must be habituated to working under the peculiar conditions which the operation involves. It is, perhaps, not wonderful, considering all these requisites, that the operation has so far obtained but little currency even among aurists, and that its performance has been confined to the few who have had the patience to thoroughly master its details.

CHAPTER III.

NECESSITY OF THE OPERATION.

THE feasibility of the operation and its comparative simplicity (as far as the patient is concerned) are deducible from the statements just made. These statements rest upon a large number of observations, and may be accepted as conclusively proved. Admitting that the operation is easily done, and is devoid of either risk or special inconvenience to the patient, let us now consider the indications for its performance, what is to be accomplished by the procedure, and how likely are our expectations to be realized?

The answer to these questions is no uncertain one. The unanimous testimony of all competent aurists is that a procedure which shall enable the surgeon to arrest the otherwise inexorable progress of the chronic suppurative and chronic adhesive processes of the middle ear is one of the greatest desiderata. And this is so because these processes are

so common, on the one hand, and are so extremely obstinate, on the other. That they are very common can be appreciated even by the non-professional observer, if he calls to mind the number of cases of "running ears" among his own acquaintances, or of cases of progressive deafness not associated with discharge but aggravated by climatic vicissitudes, and especially by every attack of cold in the head; in other words, the number of cases of chronic purulent and of chronic catarrhal inflammation of the middle ear that he himself has met with. Statistics by professional observers show the fact of this frequency still more strongly. Out of 2,100 consecutive cases of ear disease, of all sorts, seen by Dr. Sexton in dispensary practice in the year 1885, 886 belonged to these two categories. In the year 1890, 214 cases of chronic purulent and 518 cases of chronic catarrhal inflammation were treated in one dispensary alone (the Ophthalmic and Aural Institute) in New York City. And these figures, large as they are, certainly give an inadequate estimate of the real prevalence of these two conditions. For while patients with acute inflammation usually hasten to a physician to get relief from the severe pain from which they suffer, and

while those who have foreign bodies or impacted wax in the canal are also in most cases driven to seek aid by the uncomfortable sensations, the sudden deafness and the consequent fright which these accidents give rise to, those who are afflicted with chronic deafness, whether with or without suppuration, often never once make application for medical assistance. Either their symptoms are not severe enough for that, and they content themselves with the use of domestic remedies or patent medicines; or, in the case of a purulent affection, they take no steps toward checking it, having imbibed the very common notion that such a procedure would be highly injurious;* or, their disease having become inveterate and still advancing in spite of all they do for it, they grow discouraged and believe that it is incurable by any means, and that it is a waste of time and money to consult a physician. In this last-mentioned view they are, to a certain extent, justified, for they see their less sceptical companions, who have gone to physicians, and who have undergone years and

* This idea is by no means confined to the laity, many patients telling us that their family physician has advised them to let the ear run, saying that it would do no harm, would clean out the system, would cure itself in time, etc. It need scarcely be added that such a *laissez faire* is attended with the most disastrous consequences.

years of treatment for similar affections, but little better off than themselves; for these disorders, which are so exceedingly common, are also extremely refractory to treatment. Every year thousands of these cases are brought to the dispensaries and to our private offices; and, in the vast majority of them, we are compelled to confess that by ordinary means we can do little to arrest the progress of their deafness or to alleviate the distressing noises from which they suffer, or, in many cases, even permanently check the discharge. It is no uncommon thing for us to see patients of this sort who have made the round of all the ear specialists and have faithfully carried out the prescribed treatment week after week, and month after month, and who yet seem to be almost at the point from which they started. The most various kinds of treatment—syringing; astringent, caustic, and antiseptic applications; the insufflation of powders, the application of electricity, the inflation and stimulation of the middle ear by means of air or vapors passed through the Eustachian tube, or treatment of the throat —all have been tried, and all have ultimately failed to cure the disease. Nor is this at all strange when we consider the conditions in-

volved. In suppuration of the middle ear the morbid processes are frequently carried on in a region altogether beyond the reach of our applications. That is, they are located in that small upper portion of the tympanic cavity which, being shut off like an upper story from the larger space below, has been aptly termed the attic of the tympanum. (See Figs. 1 and 2.) Here the outlet for pent-up secretions being very small, the discharge has no chance to flow off freely but stagnates and decomposes, while our syringing and our applications are exhausting all their effect upon the more accessible, and perhaps comparatively healthy, structures beneath. A similar state of things exists in the case of chronic non-suppurative or catarrhal disease of the middle ear, in that here, too, we are dealing with morbid conditions which are inaccessible to our sight and touch. For the whole morbid process is carried on behind the drum-membrane, and while we can diagnosticate the nature of the former more or less completely by the condition of the latter, we cannot, of course, get any direct view of the changes that are going on, nor can we bring our remedial agents into contact with the parts diseased, even when applied to the

throat. At most we can, by inflation through the Eustachian tube (3, Fig. 2), hope to render the membrane a little more mobile or exert some slight mechanical effect upon the turgid tissues and perverted secretion of the middle ear. But in the class of cases that we are just here speaking of—the inveterate, progressive cases of catarrhal deafness—these measures, which at best are crude and unsatisfactory, fail altogether. The cases progress in spite of them, and about as fast as if no treatment had been employed. This fact, discouraging as it is, is well known to those who have had even the most limited experience in aural surgery. The chronic suppurative, and especially the chronic catarrhal, cases of middle-ear disease are the opprobrium of the otologist.

It is hence not surprising that otologists should be almost unanimous in their opinion as to the utility of the operation and the indications for its employment, in case it should be demonstrated to be successful. No one, in fact, who has become convinced from his personal experience of the incurability of these chronic cases by all ordinary methods of treatment could hesitate to recommend any procedure which holds out a reasonable prospect

of a radical cure. But it is in regard to this very point, *i.e.*, the probability that any permanent good will be effected by the operation, that many still remain in doubt. The recollection of the many previous attempts and failures to secure this object, coupled with the natural conservatism which looks with dread upon the introduction of any surgical procedure for the relief of what has been regarded as a non-surgical condition, is doubtless responsible for this attitude. If, however, it can be shown that the operation accomplishes all that is claimed for it, and is at once safe, efficient, and attended with but slight disagreeable consequences to the patient, persistence in this attitude is no longer conservatism but obstinacy, and is as much to be condemned as unwarranted haste in adopting novel and untried expedients. It will be the aim of the following pages to prove, by illustrative cases, how advantageous the operation is. In regard to these cases it must be borne in mind that they are but few out of many similar ones, and that they hence are not to be looked upon as mere isolated instances of lucky cures, but as illustrative, and very fairly so, of the benefits accruing from the operation in the great majority of cases in

which its performance is indicated. It is conceded that the operation, like any other, may be abused and be done recklessly and unadvisedly, without due regard to the indications. In such cases it deservedly fails. But the fault is then in the operator, not the operation. When the latter is done with a proper consideration of the indications presented by the particular case, it may be confidently stated to be not only a feasible, but also a very beneficial procedure. What these indications are we shall now proceed to consider.

CHAPTER IV.

THE OPERATION IN CHRONIC CATARRH OF THE MIDDLE EAR.

In this condition, which is also called dry, sclerotic, hyperplastic, proliferous, or adhesive inflammation (or catarrh) of the middle ear, the mucous membrane is at first swollen and thickened, afterward hardened and atrophic; the chain of bones (malleus, incus, and stapes —Figs. 1 and 2) becomes rigid, and finally more or less ankylosed, the Eustachian tube may be either more or less occluded or unduly patulous, and in many cases newly formed bands of fibrous tissue stretch across the drum-cavity, binding the tympanic structures together, and by the traction they exert upon these structures rendering them even more rigid than before.

Owing to the changes in calibre in the Eustachian tube, and other causes, the elastic tension of the air in the tympanic cavity is altered. Partly because of this altered

tension, partly because of the traction made by the shrinking bands of newly formed tissue, and the contracture of the sclerosing membranes of the drum, the chain of ossicles becomes rigid and no longer amenable to the action of sound-waves and may impinge strongly against the fluid of the labyrinth. The drumhead itself undergoes special changes, often becoming very thick and rigid, or, in some cases, unduly thinned and flaccid. In some of the earlier cases of middle-ear catarrh the drum is found greatly obstructed with thickened, granular-looking tissue.

These changes, when once they have appeared, are generally progressive, growing steadily worse and worse. As they increase, the symptoms to which they give rise increase in like measure. These symptoms are mainly deafness and the presence of noises in the ear (tinnitus). The former, beginning with a moderate hardness of hearing, may increase to an inability to distinguish all sounds save the very loudest. The tinnitus may exhibit all the varieties of singing, buzzing, roaring, or pulsating sounds in the ear, and may ultimately become so pronounced, and so continual as to make the patient's life a burden

to him, and, in his own words, almost drive him insane. Another very distressing, although less frequent symptom, is vertigo ; and among the curious symptoms occasionally present is the very annoying one of autophony (the perception of one's own voice, usually altered in pitch and intensity, by transmission through the tissues of the head).* All these symptoms, as we have said, tend to grow steadily worse, and that, too, in spite of all treatment hitherto applied for their relief. Inflation of the middle ear by Politzer's method, or by catheterization, is of service in the earlier stages, by restoring the normal pressure within the drum-cavity, and probably also by exercising, as it were, the still mobile portions of the transmitting mechanism (drum-membrane and ossicles) and favorably modifying the conditions of their circulation. But the relief thus afforded is hardly ever more than temporary. The difficulty returns, and finally, when the structural changes have advanced to a certain point, the ossicles and membrane either become so fixed, or in some

* The distressing sensations in the head, due to the tinnitus, vertigo, etc., sometimes lead the patient to fancy himself a victim of cerebral disease, such as tumor of the brain, and this conviction may plunge him into a state bordering on melancholia.

cases relaxed, that inflation has no further good effect. The ossicles and membrane, in fact, instead of being the vehicles for the transmission of sound, have now become absolutely obstacles to its transmission. And that marked improvement really results from their removal, that the ear is absolutely better off without them than with them, has been, in some measure, recognized from the time of Sir Astley Cooper down to the present day. Politzer says: "The artificial perforation of the membrana tympani, if means could be found to keep it permanently open, would therefore be advisable, 1, in abnormal thickening or extensive, firm calcification of the membrana tympani; 2, in fixture of the malleus and incus by immediate ligamentous union with the walls of the tympanic cavity; 3, in great, irremovable strictures and adhesion of the Eustachian tube (Cooper); 4, in excessively loud subjective noises, if they cannot be alleviated by the methods of treatment already detailed." The number of cases embraced under these categories is, it may be noticed, sufficiently large; and if the operation were restricted to these cases alone, it would still find a wide range of usefulness. But the operation of which Politzer speaks

consists merely in making an opening in the membrane, and could have but little effect in that great number of additional cases in which the ossicles are rigid from ankylosis. In the modern radical operation the rigid, and therefore unserviceable, ossicles are removed, and with them all symptoms due to their ankylosis. Hence this operation has a much wider range of application than that even of which Politzer speaks. In fact, it may confidently be said of it that it is indicated in all cases which display a tendency to progression, and in which the subjective symptoms are referable mainly to the obstruction existing in the middle ear, and not to any marked implication of the labyrinth. As the liability of this implication of the inner ear becomes greater as the disease of the middle ear advances, and as the damage done in the middle ear itself becomes more and more irreparable the longer the disease is allowed to run its course, the obvious deduction is that the operation should be done as early as possible. And, in fact, experience has shown that the earlier it is done, the more satisfactory are the results, especially as regards deafness. The same remark applies, although to a less extent, to the effect of age upon the result of

the operation, more brilliant success attending its performance in the case of young and middle-aged persons than in the very aged. Nevertheless, it does often yield good results even in the aged and the very deaf; and, moreover, in these cases, even where it does not afford much improvement of the hearing, it very frequently relieves the tinnitus and the vertigo—symptoms which may be so intense that, as the author says in one of the papers mentioned at the head of this article, they cause the patient to regard his deafness as of altogether secondary consequence, and make him anxious to have the operation performed for their relief alone. Its performance for this object is perfectly justifiable in view of the excellent results obtained and the great satisfaction that the patient derives from it. Children having catarrhal deafness suffer much less from annoying subjective symptoms, and in them the operation is mainly indicated when there is a rapidly progressive decrease in hearing-power—a downward tendency which cannot be arrested by the customary treatment. For, even in the very young, cases occur in which the disease cannot be arrested by any of the local measures ordinarily employed, nor by the most skilfully directed general treatment;

and in these the operation will also be found to be necessary, and should not be too long deferred. In any case, to put off the operation, when once it is clearly indicated, is simply to lessen by so much the chances of its success when it is done. Hence the persistence in temporizing measures after experience has demonstrated their futility cannot be too strongly condemned. Indeed, to go on month after month with the same round of routine measures; to keep on treating the throat and the nose long after pronounced structural changes have taken place in the middle ear; to persist in blowing air through the Eustachian tube when the latter is already quite pervious, or, in many cases, is even abnormally patent; to squander time in the application of electricity, certainly seems to be the height of absurdity. For these measures *are* futile; in the great majority of cases they do no lasting good. But worse than that, they not only do no good, but by allowing the disease to progress and grow steadily worse they do actual harm. For, audacious as it may seem to stigmatize forms of treatment so universally adopted as both useless and harmful, the fact, nevertheless, remains, corroborated by the experience of all otologists, that no improvement

does accrue from their continued employment; and furthermore, it is obvious that if they are used in place of a sort of treatment that is really efficient, they are actually obstructions thrown across the patient's path toward recovery. That in the operation of excision we do have an efficient remedy, we shall hope to prove presently by a statement of the results obtained. If these results simply consisted in a maintenance of the *status quo*, they would still, in view of the naturally inexorable progress of the disease, require the performance of the operation, and that, too, at as early a date as practicable, in order to preserve the greatest possible amount of hearing power, and prevent the extension of the affection. But, as a matter of fact, the hearing is not only retained at its former height, but is frequently, nay, generally, permanently increased; the tinnitus and other disagreeable symptoms are relieved, and, in fact, the patient is not only kept from getting worse, but is made permanently better. Hence there is even more reason for doing the operation as early as possible, and not wasting time in the use of temporizing measures, which simply allow the disease to get worse and worse all the time.

The following cases are illustrative of the results obtained in this class of affections :

Case I.*

Lady, twenty-two years of age. Deafness coming on for five or six years, and now so great that she cannot hear words shouted at her from a distance of four feet. Also troubled with tinnitus, vertigo, and headache. Subject to colds in the head and has chronic pharyngitis.

Operation (August 1, 1887).—On August 3d, low voice † could be heard at a distance

* This case, with the two following, is cited in Dr. Sexton's The Ear and Its Diseases.

† The tests for hearing mentioned above, *i.e.*, those indicated by the expressions low voice, ordinary conversation, loud voice, shouting, etc., are of course only relative. The measurements given in the text indicate the distance at which Dr. Sexton's voice could be heard under the different conditions expressed by these terms. Another observer's voice might have been heard at a greater distance, and, obviously, tests made with such a voice could not be used in making comparisons with Dr. Sexton's tests. Moreover, the hearing distance, even when always taken by the same observer, varies greatly in accordance with attendant conditions, such as the greater or less noisiness of the room, the degree of concentration of the patient's attention, the character of the words spoken, etc. In making the tests we must of course make sure that the ear not under examination is kept perfectly closed, a condition which is not always observed. We must also make sure that the patient is not, consciously or unconsciously, reading the words from our lips. After all, the best test is afforded by the patient's own experience. He can, for instance, easily determine whether the improvement obtained by operation is

of five feet, ordinary voice at ten feet, and loud voice at twenty feet, in the operated ear. On September 2d, condition still further improved, low voice being heard at ten feet. Patient last seen in 1890; no diminution of the improvement gained by the operation.

Case II.

Male, forty-two years of age. Deaf since an attack of typhoid fever at the age of thirteen; since the age of twenty-two cannot hear ordinary conversation at all. Now hears words spoken in the ordinary tone of voice only when the lips are brought almost into contact with the ear.

Operation (January 4, 1888).—The following day such sounds as the rattling of dishes, noises in the street, etc., were heard for the first time in many years, and that with absolutely painful intensity. The ultimate result (permanent up to the date of writing, July, 1891) was that he could hear ordinary voice at three feet, loud voice at ten.

sufficient to enable him to carry on a conversation under conditions formerly impossible, or to hear speech in a theatre or church at a greater distance than he had been used to before the operation. Judged by this criterion, the improvement in some of the cases cited was much greater than the mere tests would indicate.

Case III.

A lady, thirty-three years of age. Deaf for seven years, and now so much so that she can hear very loud voice in her right ear at from five to ten feet. Noises in the ears very annoying.

Operation (January 12, 1888).—Afterward, could hear ordinary voice at five feet, moderately loud voice at twenty feet; the hearing for high-pitched sounds of all kinds shows an even greater ratio of improvment. The noises in the ears disappeared entirely. This state of improvement—the degree of which, as tested by the patient's ability to carry on ordinary conversation with a comfort unknown before, is but imperfectly indicated by the above-mentioned tests—has persisted to the present time.

Case IV.*

Mrs. A——, aged forty-six, New York, came . . . over two years ago with a most distressing history. For ten years she had gradually been getting more and more deaf, specially in the left ear. About one year

* The following histories (from Cases IV. to X. inclusive) are taken *verbatim* from the article by Dr. Sexton in the Archives of Otology before mentioned.

ago she became decidedly more deaf in the right ear. Having now been over six years under special treatment, and constantly getting worse, she was greatly discouraged. The noises and beating in the head and ears had, indeed, become unbearable; in the left ear it was like the confused din of a machine-shop. This severe form of tinnitus having existed for many months, and having been led to believe that her case was hopeless, she felt that if no relief was obtained she would lose her mind. It was in this state that, after consulting her family physician, Dr. J. D. Bryant, about the matter, she came to the writer to avail herself of the benefit of an operation on one or both ears. On examination the following conditions were found to exist:

Hearing.—The tuning-fork on teeth not heard in the ears, but sounds like a bell in the head. Plain, ordinary voice could be heard about three feet only in either ear when short familiar sentences were used, but general conversation, with more than one person, was impossible. Owing to the deafness and noises in her head and ears only a most unbearable and confused tumult of noises could be heard at theatrical or musical entertainments.

She heard best in noisy vehicles, railway-cars, and the like.

The drumheads were lustreless; the left was retracted and somewhat irregular, the latter condition, perhaps, a result of otitis media in infancy. Both drums were affected by chronic catarrhal inflammation.

I removed the drumhead and malleus from the left ear, March 25, 1889. The incus and stapes lay beyond the range of vision, and were left. Soon after regaining consciousness she heard a clock striking, which had been inaudible to her for a long time.

On the fifth day patient came to my office, hearing gradually becoming more clear and the noises diminishing. There was a slight disturbance in sense of taste.

Reproduction of the drumhead began early in April and the opening in the course of some months almost closed, the granulating process being attended by more or less discharge. The results of this operation were so gratifying that on June 5, 1890, I performed the same operation on the right ear, which subsequently took about the same course the left one had done. The case was not seen during my absence in Europe for the summer, but when examined in October both drum-

heads were almost reproduced by new-formed tissue, small openings only remaining in either. An attempt was made to maintain more free openings by treating the new membranes with traumaticin in which salicylic acid had been dissolved. The effect of this was to enlarge the openings somewhat, but they constantly showed a tendency to reproduce themselves. I finally restricted the patient's diet very much for some weeks, and then, after deadening the sensibility of the reproduced membranes with a ten per cent. solution of cocaine, cut them away, and there has been no return. When examined in March, 1891, the openings were large and the drums dry.

The patient is now able to enjoy social life again: can keep up conversation in the drawing-room or at the dinner-table without effort. The opera and theatre are once more a source of pleasure, though at the latter she cannot sit farther from the stage than the sixth row of orchestra chairs. The distressing noises in the head and ears no longer exist. In a word, since the operations she has resumed her former position in family and social life generally, and enjoys the best of health.

CASE V.

Mr. de C——, of New York, aged thirty-two, was seen in 1888. First experienced deafness eight years ago, but it did not seriously inconvenience him until four years ago, since which time he has consulted many specialists both in this country and in Europe, generally receiving a discouraging prognosis. The left ear was first affected; the right ear has been getting worse for two years, markedly so within the past twelve months. Patient was an active member of the Stock Exchange for ten years previously to 1886. He took cold easily, and has had dental irritation. His temperament is nervous. He became much run down while in active business, and the deafness contributed greatly to increase his despondency, since, being very musical, it interfered with musical pursuits. The right drumhead porcelain-like in color, yet translucent enough to allow the long process of the incus to be seen through it. The left was humid and dull in look.

Hearing.—In the left ear hears loud voice at five feet, but at twenty feet shouted words are not distinguishable; watch, $\frac{6}{33}$. Right ear: hears ordinary voice, if plain, five to

eight feet, loud voice at twenty feet; watch, $\frac{6}{33}$.

His general condition delicate; subject to colds and headaches.

On January 2, 1890, removed drumhead and malleus of left ear, and separated the incus from the stapes. The chorda tympani was divided.

January 3d.—Feels well; is sitting up. Hearing in operated ear: plain ordinary voice at five feet, rather loud at eight feet; watch, $\frac{2}{33}$.

January 10th.—Seen at my office. Drum-cavity clear; slight disturbance in taste. Hears low ordinary voice in left ear at five feet; ordinary voice, at ten feet; plain, ordinary, at twenty feet; watch, $\frac{c}{33}$.

January 17th.—Reproduction of the drumhead began, the margin widening all around as usual in such cases, with granulation and slight secretion.

February 18th.—The reproduction seemed complete, but on manipulating the parts a large crust came away, leaving a large opening in the drumhead. The tendency to closure was for several months met by widening the opening slightly with the knife under cocaine, and treating the parts with a solution

of acid salicylic in traumaticin, under cocaine, until a firm film was found over the parts. This, when removed after a few weeks, left a large permanent opening. When last seen, February, 1891, the drumhead was absent, and hearing was still good. The patient has also very much improved in general health.

Case VI.

Mr. C. C. M——, of Fairport, N. Y., was first seen by me on March 15, 1889. Had been almost totally deaf in the right ear since having otitis with earaches as a sequence of scarlet fever in childhood. The hearing of the left ear has been defective for past seven years, due to chronic catarrh. He has for many years been overworked and subject to bad colds. There was a sense of pressure and fulness in the right ear. Examination of the right ear discloses a cicatricial retracted drumhead; the malleus is displaced, its neck presenting below the margin of the auditory plate; the attachment of the tensor tympani muscle is visible. When the drumhead is touched with a probe a sound is produced like the crumpling of parchment.

The left drumhead is lustreless and succulent in appearance.

Hearing.—Right ear, ordinary voice heard, when spoken half-inch from the ear, at one foot scarcely at all.

Left ear, ordinary conversation heard at one inch if plainly spoken, at one foot hears a word now and then if familiar sentences are used. At three feet hears shouting with difficulty.

The tick of watch not heard in either ear. He does not have much tinnitus, but on over-exertion becomes dizzy. Hears best in a noise, but when tired hears badly, and on some days can scarcely hear at all.

March 16th.—Under ether, removed drum-head and malleus from the right ear. The incus and stapes were not visible, being enveloped in cicatricial tissue. No attempt was made to remove the incus.

On going down to breakfast the morning after the operation, an altered sense of taste was noticeable, but this gradually disappeared in the course of a few months.

When examined at my office on March 18th, the drum of operated ear was dry, and the sense of pressure and fulness absent. He could hear ordinary voice at from three to five feet and loud voice at twenty feet.

When last seen, September 25, 1890, there

was no tinnitus or other sensations in the right ear. The improvement in hearing for conversation remained, and the tick of a watch was audible on contact. The drum was dry and white in color, and there was no reproduction of the drumhead. His general health was excellent.

Case VII.

Miss D——, of Florida, aged fifty-two. Four years ago, after having "malarial" fever, for the cure of which large doses of quinine were taken (for two consecutive days, sixty to eighty grains daily), she experienced great ringing in the ears, which has continued more or less ever since, and from that time her deafness was marked. From 1860 until 1872 she was an invalid, having suffered from nervous prostration, and was treated by Dr. Brown-Séquard for hysterical torticollis of the left side. Has had much dental irritation. Both external auditory canals were sodden and exfoliating from long use of glycerin. The drumheads are dull and humid in appearance.

Hearing.—In left ear hears ordinary voice at two feet. In right ear hears low, plainly spoken voice at three or four feet, but it

seems muffled. At twenty feet loud voice badly heard using both ears ; in fact, not much better at ten feet. There is a wave-like murmur in addition to the ringing, and at times a friction-sound in the ears. Her own voice seems so loud to her that she speaks in a low tone.

November 5, 1890.—At Dr. Janvrin's private hospital removed drumhead, malleus, and incus from the left ear.

There was slight purulency for a short time, but the drum soon became dry.

When she left for her home early in December she was feeling well and could hear in the operated ear ordinary voice at four feet, loud voice at ten feet, and fairly well at twenty feet. The tinnitus was decidedly better. The absence of undue tension in the operated ear was a source of great comfort.

Case VIII.

Miss C——, aged twenty-two years. Has been more or less on the verge of invalidism ever since childhood. After having typhoid fever at the age of fourteen years experienced a "queer feeling" in the right ear, and was treated for a long time by several specialists. Since the age of seven years was kept closely

at school in this country, and in her sixteenth year was taken abroad and spent five years at pretty hard study, including music, with intervals of travelling. The latter was, perhaps, as exhausting as the former.

Was in Europe again in 1890, and overworked herself again both mentally and physically. Spent a month at the Paris Exposition, and afterward had *la grippe* for another month. As a result of overwork she had become exceedingly neuropathic, and very much distressed about the right ear, which has become quite deaf, and also the seat of most disagreeable noises. She has scarcely left her bed for the past three months. The noises in the right ear are constant. There is a sound like a "sea-shell," and when she is nervous there are occasional "explosions" like the sudden escape of steam, along with a disagreeable sense of pressure in the ear. The noises often vary. For the past five years the right ear has constantly grown worse, though some of the time under special treatment for the ear or nose.

In the left ear, sixteen months ago, a sense of fulness was experienced, lasting three months, and succeeded by tinnitus now and then, similar to the right ear. She has some

"dead" teeth, and has not cut any of the wisdom teeth.

The right drumhead is dull and porcelain-like in color, the malleus handle prominent. The left drumhead is clear but not brilliant.

Hearing.—Right ear, ordinary voices six inches. Watch $\frac{6}{33}$. Left ear normal, even hyperacute for voice and watch.

May 6, 1890.—Removed the right drumhead, malleus, and incus; the ossicles were pretty firmly ankylosed, and the incus, which was removed first, came away with some difficulty. The drum-cavity was dry and white in appearance.

Hearing for ordinary voice in right ear a few hours after the operation twenty feet, low voice at fifteen feet, and noises began to diminish on the second day.

Patient seen in November. Hearing unchanged, and tinnitus so slight as to not cause any annoyance. There was no reproduction of the drumhead, and the drum was white and dry. The general health was improving.

Case IX.

Miss U——, of New York, aged thirty. First seen late in the year 1886. Has always had hay-fever for six weeks every summer and

is scarcely ever free of head colds. Has been deaf since childhood in both ears, the left being first affected. At age of twelve years was seen by a London aurist, and has consulted many other specialists on both sides of the Atlantic since that time, but all of them finally said they could do her no good and she is, therefore, willing to try any operation that promises success. It is much more difficult for her to converse with others in consequence of a high degree of myopia, since she is thus deprived the aid of lip-reading. Tinnitus exists mostly in the left ear. There is a sense of discomfort in the left ear, and relief is sought by constantly rubbing it. The deafness is greater in damp weather and during the existence of head colds. Hears better in the noise of a ball-room or street-car. At fifteen feet hears familiar sentences spoken in a very loud tone of voice; unfamiliar sentences scarcely heard at all. Hears a König rod vibrating 35,000 per second held close to ears, but does not detect the ticking of a watch on contact. Cannot follow general conversation close by where more than one person is speaking.

January 4, 1887.—With application of a minute quantity of sulphuric acid removed

posterior segment of the right drumhead, after which hearing was greatly benefited, the tinnitus in operated ear ceasing. At the opera, dining-table, and in general conversation she heard very well. Test for the voice showed that ordinary conversation could be understood at fifteen feet, and the tick of a watch at 1½ inches. The drumhead, however, gradually closed up again in nine months and the deafness returned, a result that would have occurred probably within a few weeks had not the parts been reopened from time to time.

November 5th.—The drumhead and malleus of the right ear were removed, when hearing again improved as before. There was much difficulty in keeping the drumhead from reproducing. At times it was cut away and, when borne, treated with collodion or traumaticin in which salicylic acid was dissolved. Finally, in May, 1888, the drumhead was found to be entirely absent, and good hearing has remained ever since. It was found necessary, in order to accomplish this result, for the patient to practise abstemiousness in diet, and she lived much in the open air, especially during summer. In consequence of this improved hygiene she was

exempt from the usual severe form of hay-fever and seldom had any head colds.

The good results obtained by the operation on the right ear induced the patient to have the left ear treated in the same manner. Accordingly, on April 29, 1890, I removed the drumhead, malleus, and incus from the left ear. In a few days the drum was found white and clear, and ordinary voice could be heard at five feet, and if plainly spoken at twenty feet. The tendency to reproduction was slight and soon ceased, leaving a large opening. When last seen, in February, 1891, patient heard about as well in one ear as the other, though probably from habit of using the right ear almost exclusively for a long time, she fancies it is the better ear. Ordinary voice is now heard in the right ear from ten to twenty feet, and in the left nearly as well. The watch is heard in both ears at less than an inch.

The sense of taste was unaffected at any time. Patient has escaped hay-fever for past two summers. She can hear very well at the theatre when occupying an orchestra chair six rows from the front, and from her box, which is situated almost opposite the stage, can enjoy the opera satisfactorily.

Case X.

Mr. H——, aged forty-two, New York, came to see me October 10, 1890. Been noticeably deaf for six years. Was informed by a distinguished authority a few months ago that nothing could be done for his case. Patient's business is regulating the tone of piano-fortes. Since becoming deaf he finds his work very difficult, and sometimes impossible altogether. Regulating the treble (upper register) is the most difficult, because as he sits at the instrument the right ear is presented to that side; the middle register (as would be expected) is the easiest. Hunting for the source of jingles and noises makes him very nervous, since he is unable to locate their source. Has severe tinnitus in right ear, like escaping steam. Last December he had a severe fall upon the head, causing concussion of the brain. Since then he is vertiginous, and has lost sense of taste and smell.

The drumheads look fairly well, though the right one is somewat dry and parchment-like. Hearing: right ear, ordinary voice, four inches; the left, much better—a whisper at three feet. November 9, 1890, removed

drumhead, malleus, and incus from the right ear. There was some increase of tinnitus and vertigo at first, but in a few weeks the drum became dry, *the noise ceasing entirely*. There is slight tingling in the tongue. Hearing in operated ear: low voice at two feet; loud voice at twenty feet. In about a month the drumhead almost entirely reproduced and hearing diminished. He was, however, able to resume his occupation successfully. Early in 1891 the drumhead was found closed, all but a small opening. The new drumhead being removed, it was found that he could hear ordinary voice at ten feet—a result truly surprising when it is compared to the test made soon after the operation. This opening has remained permanent. The dizziness that followed the fall, over a year ago, remains to some extent, but the tingling has disappeared from the tongue.

Case XI.

Married lady, thirty-seven years of age, came February 6, 1891. Seven years ago caught a severe cold, as a result of which had pain in the right ear for several days. Ever since has had deafness in that ear, varying in amount but gradually growing worse, so that

now she cannot hear conversation with the right ear. Has had a very distressing roaring noise in the right ear for over a year. For two years has suffered from vertigo, having at first two or three attacks a week; now sometimes has three or four a day and is never free from them for more than a week at a time. In addition, she has a constant sense of discomfort in the head and any sustained exertion such as listening and talking, makes her feel weak and impels her to steady herself by holding on to a chair or some other support. Feels dizzy if she lies on the right side. Nine months ago fell in the street, striking her head and bruising it badly. Three months ago, caught cold in left ear and has had deafness in it off and on ever since. Moreover, the noise, from which she had suffered but slightly in this ear before, now became aggravated, resembling in character and intensity the roaring tinnitus heard in the right side. Patient hears worse in a noise. She is fond of music, but owing to her deafness cannot enjoy the opera, the orchestra, or the piano. She is very neuropathic, very much run down, and while she has weighed one hundred and sixty-two pounds, now weighs only one hundred and

twenty-three. Has been the round of the specialists and has undergone a great variety of treatment, some of which was "heroic" in character. Has been treated for catarrh of the stomach, for liver disease, for blood-poisoning, for tumor of the womb, and for consumption of the bowels. After undergoing a dietetic course of treatment for catarrh of the stomach her weight fell to one hundred pounds. Has experienced no benefit, but rather the reverse.

Both auditory canals are of good size. Both drum-membranes are thin and lustreless and the incudo-stapedial joint is well seen in both. The right membrane is relaxed, especially in the posterior-inferior quadrant, and some fibrous bands are visible running from the tip of the manubrium through the membrane. In the right ear hears plain ordinary voice at ten inches; low voice badly even when the mouth is put close to the ear. In the left ear hears plain ordinary voice at twenty feet. The watch is not heard at all in either ear.

Operation (February 15, 1891).—Membrana tympani, incus, and malleus removed. Operation not followed by pain or any other disagreeable symptoms whatever. There was slight alteration of the sense of taste, lasting,

however, only a few days. On February 19th heard the church music next door for the first time in many years. On February 24th it was noted that the ear was dry and free from discharge, that there had been no noise or vertigo since the operation, and that the hearing was improved. On March 4th caught a severe cold while menstruating and had a slight vertiginous attack, brought on by a sudden movement of the head, but this passed off in a short time. On March 12th heard plain, ordinary voice in the right ear at two feet. In April reports that she has had no recurrence of the head symptoms, that there is but very slight tinnitus, and that she has not been so well in years. Her appearance is that of one in excellent health. There is a free opening in the membrane. In the right ear hears plain, ordinary voice at fifteen feet and can hear the watch on contact. Says that she can now hear well half-way back in the theatre. At last accounts, on November 16th, this notable state of improvement in the local condition and in the general health was perfectly maintained.

CHAPTER V.

THE OPERATION IN CHRONIC DISCHARGE OF THE MIDDLE EAR.

In the condition which has just been described there is but one indication to be fulfilled, namely, to remove certain disagreeable symptoms, or at all events prevent their becoming still more aggravated, by removing the pathological conditions which give rise to them. How far this indication is satisfied by the performance of the operation, can be gathered from a perusal of the foregoing reports of cases treated by this method. These, we believe, will be found to demonstrate satisfactorily the sufficiency of the operation and the necessity for its performance, even when undertaken with the sole object of relieving symptoms and so making the patient's existence more comfortable. An operation done with this end in view is assuredly justifiable when the risk and discomfort that it entails are as slight and the advantages

that it secures are as great as in the cases just enumerated. But there is another series of cases in which the operation is indicated, not merely for the relief of local symptoms, however distressing, but in order to do away with a condition which is a source of danger to life itself. We refer to cases of chronic suppuration of the middle ear; those cases in which a discharge from the ear persists for years, or even for a whole lifetime, in spite of every variety of local treatment. As before remarked, such cases are very common. Every professional man has had an opportunity of seeing a number of them and has treated them according to his lights, and that only too often with but little satisfaction to himself and the patient. Syringing, the use of astringent and antiseptic washes and powders, the removal of polypi, while often useful and sometimes indispensable, yet very frequently fail to cure the disease—the discharge persisting in spite of the employment of each and all of these measures. The reason for this is not far to seek. The site of the disease is very often in the attic, *i.e.*, that upper portion of the tympanic cavity into which the two larger ossicles project, and which is to a great extent cut off by them and the folds and ligaments

attached to them from the remainder of the cavity lying below (see Figs. 1 and 2). When so situated the morbid process is particularly difficult to cure; * because, on the one hand, our remedial agents fail to come into contact with the affected parts, which lie out of reach of our applications, our insufflations, and our washes, and because, on the other hand, free drainage, which is such an essential requisite for the efficient treatment of all suppurative affections, is rendered difficult or impossible.† Moreover, in many of these cases the bones themselves, particularly the malleus, are so hopelessly diseased that their complete removal affords the only chance of a radical cure. In both classes of cases the surgical

* Indeed, it may be broadly stated that these cases are never really cured without an operation. Under various methods of treatment the discharge may be temporarily arrested, but the condition persists and the symptoms almost invariably recur after a longer or shorter period of apparent cure. In a few cases a real cure has been produced spontaneously by the extrusion of one or both of the two large ossicles; nature in this instance accomplishing the same result that is attained by the operation and in much the same way. Accordingly, this exception to the general rule, that attic cases are incurable, simply serves to show that the removal of sources of irritation and the establishment of free drainage, no matter how they are brought about, are efficient remedies for the disease.

† This fact will become clear from an inspection of Fig. 2, in which the space above the drumhead is evidently to a great extent cut off from the parts below by the head of the malleus, *Mcp*, and the body of the incus.

indication is perfectly obvious and unequivocal. To remove irreparably diseased parts and to secure a free outlet for morbid discharges have always been recognized as among the prime objects to be attained by surgical treatment. We evacuate pus, whether contained in a boil upon the finger or in an abscess in the brain, we amputate gangrenous limbs, we take away cancerous organs and necrosed bone—in a word, we get everything morbid that we can out of the organism, either by removing it *in toto* ourselves or by giving it a chance to make its escape spontaneously. The only limit to the application of this principle is when the operation inflicts a greater injury or involves a greater danger than that which it removes. But in the present case the danger of the operation is practically nil, the discomforts attending it are insignificant, and the function, so far from being impaired, is in many cases actually improved, and that often notably. On the other hand, if the operation is not performed, the disease keeps on, the discharge continues, and, what is more important, the patient is frequently exposed to a risk of very considerable magnitude. For pent-up discharge always means danger to the surrounding parts ;

and when we consider the close proximity of the brain * to the cavity involved in this disease, we cannot be surprised that meningitis and abscess of the brain are not such very infrequent sequels of suppuration of the middle ear. The disease may also terminate fatally through septicæmia and through hemorrhage due to erosion of the internal carotid artery by sequestra of bone.

In regard to the frequency of these fatal cases Politzer truly says: "The determination of the percentage of cases of suppuration of the middle ear which prove fatal is impossible, because among the great number of cases dismissed as cured or improved many undoubtedly terminate fatally without the knowledge of the physician formerly in attendance. The number of deaths, therefore, recorded by any observer may form but a fraction of the fatal cases which have been widely dispersed and withdrawn from his notice." The danger to life, therefore, is by no means slight, and since this danger is averted by a timely operation which gives exit to the pent-up discharge and at the same time usually removes the cause of the discharge too, the indication for the performance of the operation

* Shown clearly in Figs. 1 and 2.

is a stringent one and not to be evaded by the conscientious physician. But, in addition to the risk of a fatal issue, there are minor, though still considerable dangers attending long-continued suppuration of the middle ear. Such are the supervention of facial paralysis (observed by Dr. Sexton in five out of two thousand one hundred consecutive cases of aural diseases of all kinds seen in dispensary practice), the development of a painful and intractable disease of the mastoid process, and the formation of sinuses and running sores about the ear and in the neck. Such occurrences are quite frequently observed in neglected cases. They, too, can obviously be averted by timely operative interference, which, by radically removing the primary disease, necessarily prevents the development of those untoward sequels that are dependent upon the persistence of the latter. These secondary consequences, being more important as far as life and health are concerned than the primary disease itself, are the main objects of treatment, and hence we may say that the indication in these persistent cases of discharge from the ear is not so much to cure the disease and to improve the function as to prevent the disease spreading to other and more vi-

tally important parts. If, therefore, the operation accomplished only the last-named of these three results, its performance would be amply justified. But, as a matter of fact, it accomplishes all three, and hence its application is even more far-reaching and more urgently demanded than would at first sight be possibly imagined. How far it does fulfil all the indications, namely, to relieve the symptoms, improve the functional condition, abrogate the morbid process, and in so doing remove the possibility of future danger, may, we think, be fairly inferred from the following list of illustrative cases.

Case I.*

Female, aged eighteen years. Discharge from right ear for nine years with history of headaches, vertigo, and "gatherings." Is run down and has nervous irritability attributable to disease. Hears ordinary voice at a distance of ten feet. Cicatricial membrane occluding right auditory canal. Through a perforation in this of about the size of a pin's head purulent matter oozes.

Operation (July 7, 1887).—Cicatricial mem-

* The first three of these cases, along with twenty-six similar ones, are recorded in Dr. Sexton's The Ear and Its Diseases.

brane, malleus, and incus excised. In seven weeks after the operation the discharge had entirely ceased, all the painful local symptoms (vertigo and headache) had disappeared, and the general health was greatly improved. Hears ordinary voice at twenty feet.

CASE II.

Female, aged seventeen. Discharge from both ears consequent upon scarlet fever five years before. Headache, gatherings, etc. No discharge for past three months. In left ear can hear very loud voice or shouting at a distance of ten feet. In this ear there is a very large opening leading through the cicatrized drum-membrane leading into the attic.

Operation (August 4, 1887).—Left membrane with malleus removed. Incus has disappeared spontaneously. The discharge set up by the operation ceased at the end of eight weeks. Hearing improved to such an extent that ordinary conversation is heard at twenty feet.

CASE III.

Female, aged twenty-two. Discharge from both ears for past fifteen years with "gatherings" and a good deal of pain at times.

In the left ear only the upper portion of the drum-membrane is left. In this ear can hear loud voice at a distance of ten feet. Patient run down and has a cough; has, in fact, the aspect of a phthisical subject.

Operation (August 18, 1887).—Remains of left drum-membrane with the malleus and incus removed. In eight weeks the discharge had ceased. Can now hear ordinary voice at ten feet and general health is much improved. This improvement has been permanent.

Case IV.*

Girl, four years of age. Discharge from both ears consequent upon an attack of measles two years before. Matter fetid and sometimes bloody. Both auditory canals ulcerated. Left tympanic cavity contains a polypus. Frequent earaches. After treatment, lasting five months, which resulted in lessening the discharge and improving the condition of the auditory canals, there was still great sensitiveness of the latter.

Operation (May, 1886).—Granulations removed from the right ear with the curette

* This record, with those that follow, is condensed from a report of thirteen cases of Dr. Sexton's, published by Dr. C. J. Colles, in the Deutsche Medicinische Wochenschrift, No. 28, 1889.

and the carious malleus excised. In eight weeks the discharge had ceased completely and thereafter there was no recurrence of it, except under the form of a slight mucous exudation occurring as a temporary consequence of attacks of cold in the head, to which the child was subject. No pain at all in the ear and the general health of the patient improved considerably.

Case V.

Girl, thirteen years of age. Offensive discharge from the left ear for eighteen months, with occasional earache. Swellings form about the ear at times and these are associated with great pain. Only a small portion of the drum-membrane was left, the drum-cavity was partially filled with granulations, and the chain of ossicles was ossified into an immovable mass. Could no longer hear shouting at a distance of ten feet.

Operation (January, 1887).—The remains of the membrane and as much of the ossicles as could be removed were excised. The discharge ceased in five days and the hearing improved so greatly that ordinary conversation was readily audible at a distance of ten feet.

Case VI.

Boy, twelve years of age. Discharge of blood and pus from both ears for several months. Earache. Large losses of substance in both drum-membranes. The discharge in the right ear was checked after a course of treatment lasting six weeks, but the left ear, in which the discharge was very fetid and in which there were firm granulation masses which kept recurring after removal, showed no improvement.

Operation (February, 1887).—Remains of left drum-membrane with malleus and incus (which were both very carious) excised. Within two weeks the discharge had diminished considerably and had lost its purulent character. Two years afterward there was still a slight mucoid discharge ftom this ear, although nothing like the fetid, purulent, and bloody exudation that formerly existed there. No pain, and general condition essentially improved.

Case VII.

Merchant, twenty-four years of age. Discharge in left ear since childhood, associated at times in the winter with pain and the formation of swellings in the region of the

ear. At present discharge very profuse. Has frequent attacks of vertigo. General health very much depressed. Can hear words shouted at a distance of eight to ten feet. The whole lower portion of the drum-membrane is absent and there is a fistulous opening above leading into the attic. The treatment usual in such cases was carried on for some time without result.

Operation (April, 1888).—The remains of the membrane with the carious malleus excised, and the adhesions existing in the tympanic cavity broken up and the pockets formed by them laid open. A few days afterward could hear words uttered in a low conversational tone at a distance of twenty feet. There was no longer any vertigo and the general health improved considerably. Patient afterward wrote that the slight mucous discharge which remained after the operation still persisted, although it was quite insignificant in amount, and that in other respects he was very well.

Case VIII.

Maiden lady, thirty-five years of age. Purulent discharge from left ear since childhood, consequent upon an attack of scarlet

fever. For last twelve years not constantly present. Hears ordinary voice at ten feet, loud voice at twenty feet.

Operation (May, 1888).—The drum-membrane, which was half destroyed, and the malleus were excised. As a result of this there was a permanent cessation of discharge. Only slight improvement of hearing.

CASE IX.

Merchant, thirty-five years of age. Has had a discharge from both ears, which has now ceased. As a result has thin cicatricial membranes closing in the former perforations. In the right ear there is a fistulous opening leading into the attic. Is greatly tormented by tinnitus and has the sensation of a discharge constantly trickling down from the right ear into the throat. Patient nervous and irritable. Has been under treatment for seven years. In the right ear hears loud voice at a distance of twenty feet.

Operation (May, 1888).—Remains of the right drum-membrane excised along with the malleus and incus. Thereupon all the subjective symptoms (tinnitus, sensation of trickling) disappeared. In the right ear could hear ordinary voice at a distance of twenty

feet, and this gain still further improved upon by subsequent treatment.

Case X.

Clergyman, thirty-nine years of age. Discharge from the left ear for many years, associated with swelling about the ear and pain whenever he catches cold. Loud voice heard at twenty feet. Fistulous opening in the upper part of the drum-membrane, from which a polypus projects. The removal of a similar growth two years ago was attended with much general and local benefit. Drum-membrane is cicatricial and adherent to the inner wall of the tympanic cavity.

Operation (June, 1888).—The cicatricial drum-membrane excised, together with the malleus, and all the polypoid growths removed. Cessation of discharge and considerable improvement of subjective condition. Can now hear low voice at twenty feet.

Case XI.

Married lady, forty-two years of age. Discharge from both ears since childhood, consequent upon scarlet fever. Discharge has ceased in the left ear but persists in the right, being evacuated intermittently through

a small opening in a cicatricial membrane which shuts off the attic from the rest of the drum-cavity. Has frequent swellings associated with pain in the region of the right ear. Frequent headache with tendency to vomiting. In the right ear hears loud voice at a distance of ten feet.

Operation (October, 1888). — Cicatricial membrane in the right ear removed, together with the carious malleus. Incus absent. The adhesions lying in the upper part of the drum-cavity broken up and a quantity of foul-smelling pus which had been pent up by them evacuated. As a consequence, the general condition rapidly improved, the headache and other disagreeable symptoms disappeared, and the hearing increased so much that the patient now uses the right ear exclusively and with it can understand ordinary conversation at a distance of twenty feet. All that was left of the discharge is a slight mucous exudation.

The cases above cited give a fair idea of what the operation can do in chronic suppurative disease of the middle ear. They are but a few among many similar cases occurring in the author's practice. Moreover, the very few who in this country have dared to pur-

sue the same line of treatment have achieved similar success and obtained the same brilliant and gratifying results. For example, Dr. Burnett, of Philadelphia, in a paper read before the American Medical Association, gives the following as his conclusions in regard to the value of the operation in cases of this class:

"1. The operation has not failed to stop suppuration in all the cases of chronic otitis media in which the writer has applied it.

"2. In attic cases, with normal atrium,* the sole perforation being in the membrana flaccida,† the operation is the *only* means of cure.

"3. By the operation, in cases of chronic purulent otitis media, in which the sole perforation is in the membrana tensa ‡ and is comparatively small, and while the purulency is limited to the anterior part of the drum-cavity, the suppuration is promptly checked

* *Atrium*, the lower large portion of the tympanic cavity, above which the *attic* lies. See Figs. 1 and 2.

† *Membrana flaccida*, the triangular portion of the drum-membrane lying above the short process of the malleus; the part of the drum-membrane which is in more direct relation with the attic.

‡ *Membrana tensa*, the lower, larger portion of the drum-membrane, which, from the fact of its vibrating upon the impingement of the sound-waves into the ear, is also called the membrana vibrans. It is in direct relation with the atrium.

before it has had an opportunity to attack the posterior portion of the drum-cavity. Thus mastoid inflammation and necrosis, sinus thrombosis, pyæmia, and cerebral abscesses are prevented.

"4. If any hearing exists before the operation it invariably improves after the excision.

"5. Vertigo, headache, tinnitus, and the ordinary attacks of earache from 'gatherings,' so common in chronic otorrhœa in children, are entirely and permanently relieved by the excision of the necrotic remnants of the membrana tympani and the two large ossicles."

CHAPTER VI.

IMMEDIATE AND REMOTE EFFECTS OF THE OPERATION.

As has been before remarked, the operation is attended with very little discomfort. Apart from the nausea due to the anæsthetic (less with the A.C.E. mixture than with ether alone) and occasional slight pain after the operation, the patient suffers but very little inconvenience. In a day or two he is able to go about as usual. Not infrequently there is some slight reactive inflammation following the operation, attended with moderate purulent discharge, which before long subsides, leaving the ear perfectly dry. In a few cases in which suppuration has persisted for a long time and the walls of the tympanic cavity have become more or less carious, so that it is impossible to remove all the diseased parts, a slight discharge may keep up for a considerable time. This, however, is productive of very little inconvenience, the secretion being scanty, thin, and in no way offensive, afford-

ing thus a striking contrast with the profuse, fetid, and disgusting purulent discharge which is so often such a disagreeable feature in these cases, both to the patients themselves and to those about them. Moreover, there being now a free exit for all secretions, the great source of danger formed by the retention of decomposing matter is entirely done away with. In fact, even in cases in which it is impossible to remove by the operation every bit of tissue diseased the parts are still placed by the operation in the best possible condition for subsequent treatment or for the production of a spontaneous cure. The condition, indeed, after the operation is a vast improvement upon that which existed before, both as regards the comfort of the patient, the insurance of immunity from future danger, and the favorable condition in which the parts are placed, that the operation would still be unequivocally indicated, even if the partial cure was all that we could hope to attain in any case. But, as a matter of fact, in most cases the discharge is entirely arrested and the disease is at once and definitely cured. Hence there is even greater inducement for us to undertake an operation which in the great majority of instances does away at once

with an annoying, disgusting, and dangerous condition and in the remaining cases, at all events, secures to the patient comfort and immunity from future peril.

Among our patients, who naturally are ignorant of the structure and relations of the parts constituting the ear, there appears sometimes to exist an idea that by removing the drum-membrane we open up the way to the inner and more vital parts and expose them to the risk of the entrance of foreign bodies, insects, etc. It is scarcely necessary to say anything in refutation of this idea, which, of course, is entirely erroneous. We may, however, say that there is no more risk of foreign bodies, dirt, or insects getting into the ear after the operation than there was before it; and that, moreover, if they do chance to get in, they will cause less irritation than they would if the drum-membrane were intact; the latter reacting more forcibly to irritation than the lining membrane of the tympanic cavity, which after the operation becomes dry and like the skin in structure.* Nor is it at all necessary to protect the exposed

* Of course, the internal ear (8, Fig. 1) is no more exposed after the operation than it was before, being perfectly protected by bony and membranous structures from the action of any external injurious influence.

drum cavity by the insertion of cotton into the ear. Owing to the anatomical relations of the parts, the tympanum is sufficiently protected by its position from injurious influences coming from without. Hence the use of cotton (except to protect the ear in a strong draught of air) is unnecessary and sometimes is prejudicial; as in one of Dr. Sexton's cases in which a cotton plug inserted by the patient in the external canal was driven deeply in and becoming firmly lodged, set up marked symptoms of irritation. Moreover patients not infrequently forget that they have put cotton into the ear, or imagine that they have taken it all out when they have not done so, and the cotton plugs thus left in may become a source of irritation or form the nucleus of a mass of cerumen.

The same thing may be said, and with even more emphasis, in regard to the use of an artificial drum-membrane after the operation. Such a membrane is not only useless, but, like any other foreign body, may do much harm by the irritation which it produces.

There is one point in connection with the after-treatment, where a radical operation has been performed for either deafness or discharge, which cannot be too strongly empha-

sized. *This is to refrain from meddlesome interference with the ear.* Even in the period of reaction occurring after the operation, when many would be tempted to initiate an energetic treatment, Dr. Sexton's experience has led him to confine himself to simple cleansing of the parts when necessary, which thus get well much more quickly than if actively interfered with. But, however this may be, there can be no question that when the parts are healed any kind of tampering with the ear must be absolutely avoided. It would hardly be supposed that a physician would require this admonition, but Dr. Sexton has had under his notice more than one case in which after the operation, which resulted most favorably, and when cicatrization was complete, a condition of inflammation was set up by the manipulations of the attending physician, who made caustic or other irritating applications to the parts—*the inflammation then being ascribed to the operation!* In view of this and similar occurrences the author feels it his duty to reiterate his often repeated watch word of "hands off," and enter his most emphatic protest against such injudicious and injurious tampering with so sensitive an organ when absolutely no indication for it exists.

CHAPTER VII.

SUMMARY AND CONCLUSIONS.

FROM the facts presented in the preceding pages we may draw the following conclusions.

1. The operation of excision of the drum-membrane and ossicles, while demanding considerable skill and judgment on the part of the surgeon, is one that can be performed with readiness, with speed, and with a minimum amount of annoyance or trouble to the patient, either at the time of its performance or subsequently.

2. The operation is indispensable, affording the only means of arresting the progress of deafness due to chronic catarrh and of relieving the noises and other disagreeable symptoms attending the condition, and also affording the only means of checking the discharge in a great many cases of purulent disease of the middle ear and of preventing the serious

and sometimes fatal consequences of this affection.

3. This operation, especially when performed sufficiently early, gives most satisfactory results, relieving the tinnitus, vertigo, and other disagreeable symptoms of catarrhal disease of the middle ear, checking absolutely the discharge in suppurative cases, and at the same time preventing the future development of "gatherings," painful swellings about the ear, earache, and the graver consequences, such as mastoid disease and abscess of the brain; and in both sets of cases usually producing marked improvement of the hearing.

Even in the older and neglected cases the results, although less striking, are very satisfactory, sufficiently so to warrant the performance of the operation even in the old and in the extremely deaf.

4. The results of the operation are permanent. It has been urged by the opponents of it that this is not the case; but the records of the cases cited above, together with many similar ones, prove this objection to be unfounded. For all these cases have been under observation for several years and during this time there has been no retrogression;

the condition of improvement has been permanent.*

5. The operation, which is thus seen to be feasible, indispensable, and productive of permanent and satisfactory results, is indicated in the following cases: In all cases of catarrhal disease of the middle ear (chronic deafness not associated with discharge), in which the disturbance of hearing, the noises in the ears, and the other symptoms are not soon relieved by local and general treatment, the indication being particularly stringent and imperative in those cases which exhibit a marked progressive tendency. In all cases of suppurative disease of the middle ear ("running ear") in which the discharge persists in spite of all that is done for it, or is only temporarily checked by treatment, or in which there are intermittent "gatherings" and swellings about the ear, or in which there is reason to suspect from the fetor of the discharge, from the presence of granulations, or from other circumstances, caries of the bones or involvement of the attic. In both catarrhal and suppurative cases the operation should be

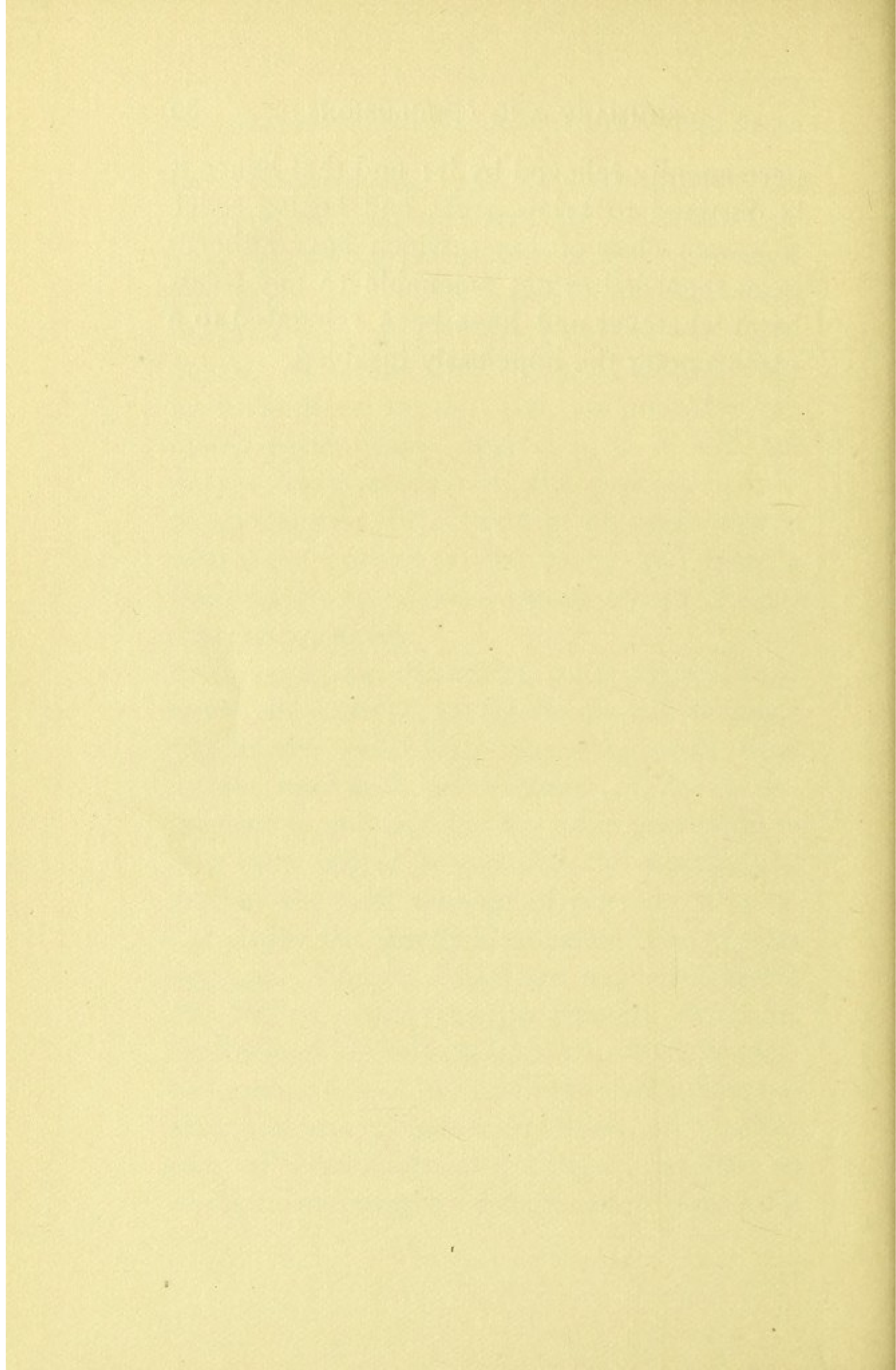
* Lucae, in the summer of 1890, told Dr. Sexton of a case which he had operated upon *twenty-five* years before, in which the good results have persisted up to the present time.

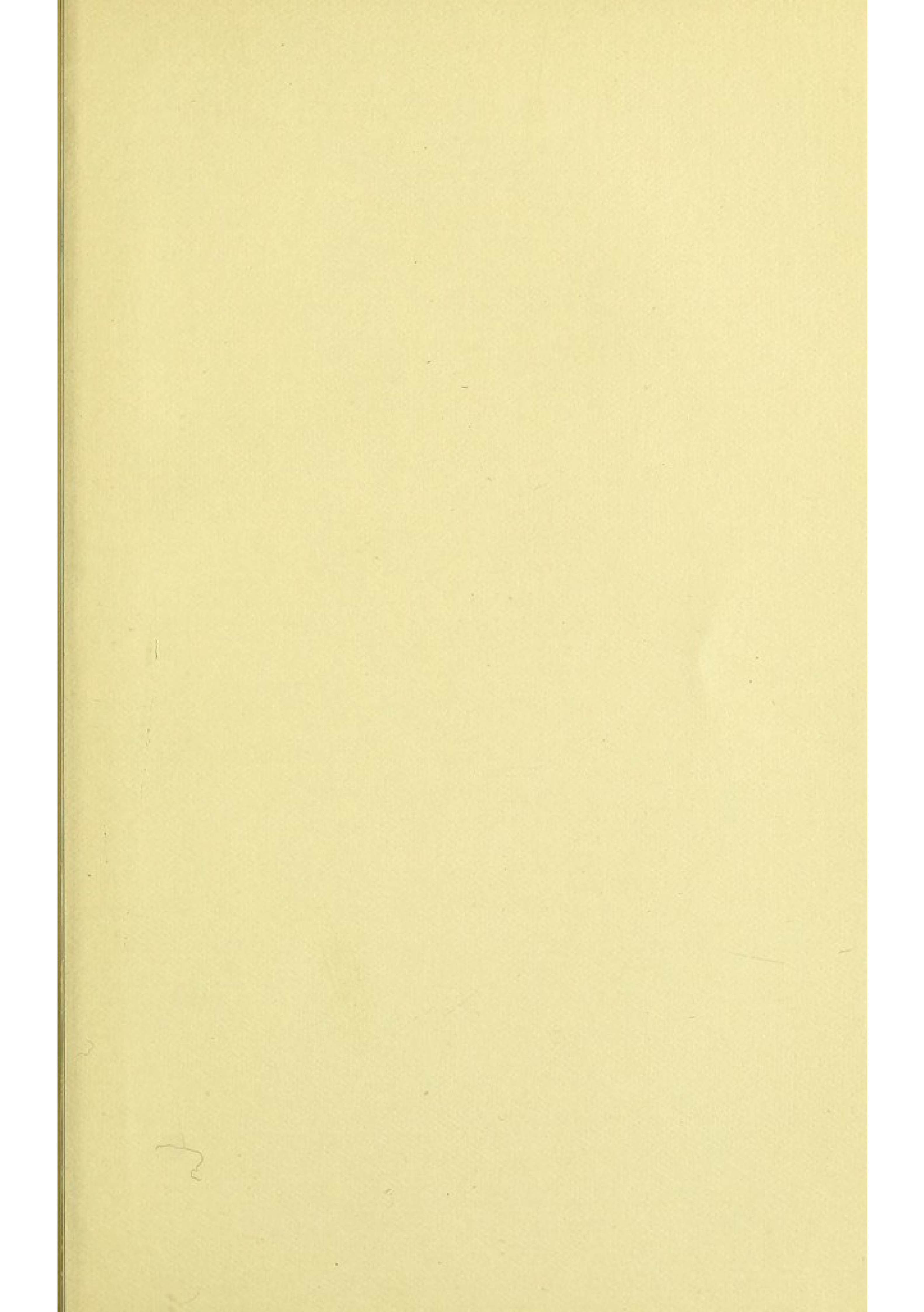
performed as early as possible. In this way alone can the best results be secured; there is much greater chance of preserving a useful degree of hearing and the progress of the disease is much more easily arrested if the operation is performed before any great amount of irreparable damage has been done. Hence, to keep on with palliative measures when experience has already demonstrated their uselessness, and so defer performing the operation until extreme deafness has set in or until the tympanic cavity is irretrievably diseased, must be adjudged to be very bad surgery indeed. The rule of good surgery in regard to this, as in regard to all radical measures, is: As soon as it is indicated, do it at once; waste no time in perfunctory treatment. Nevertheless, we should not be deterred by this dictum from performing this operation in the advanced cases in which, from the failure to perform it at the proper time, the bad functional condition has become greatly aggravated and the structural changes have become very pronounced. Even in these we may hope to secure a measure of benefit that often is quite surprising. So in the advanced catarrhal cases, in which the amount of structural change does not permit

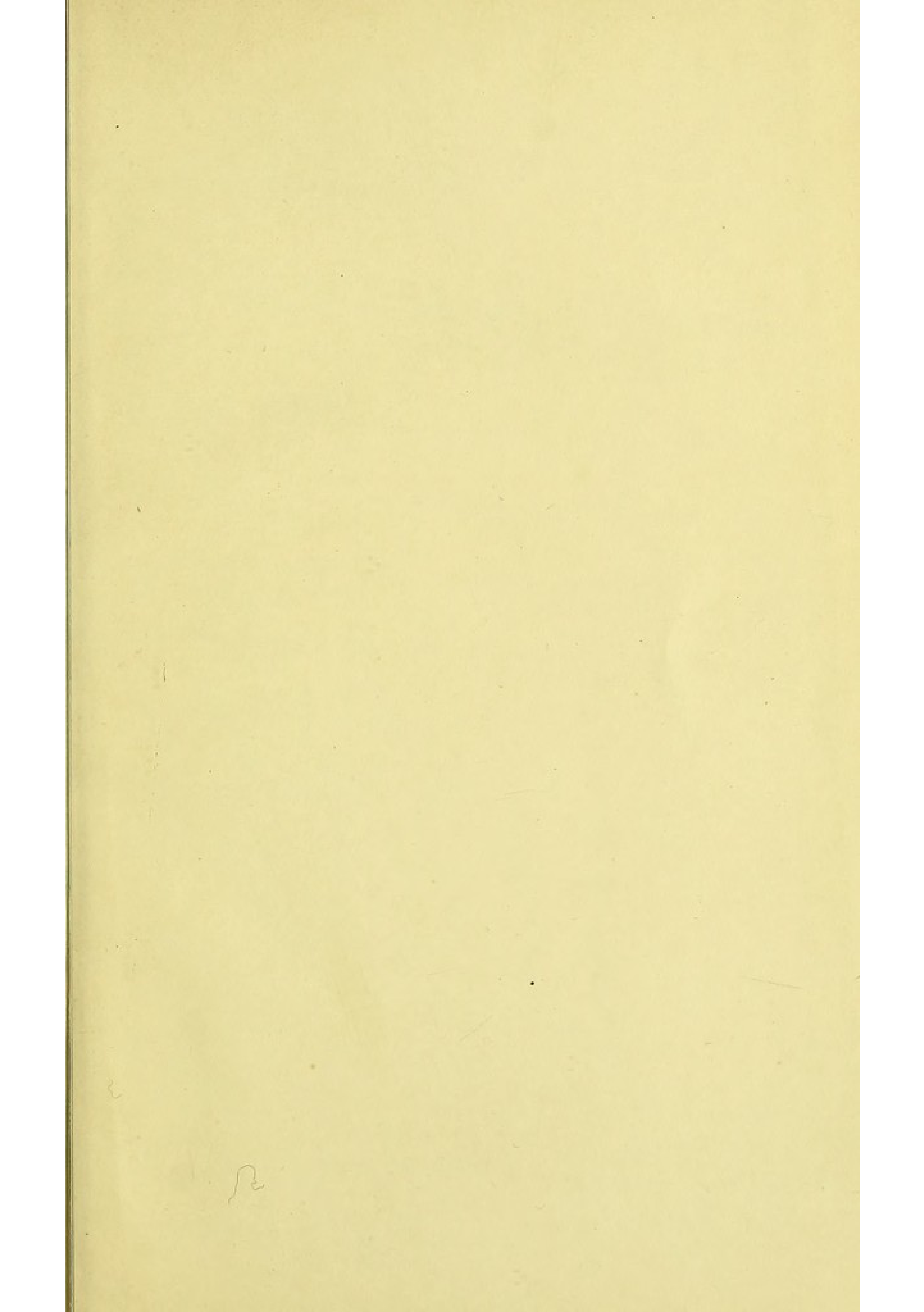
us to hope for any great improvement of the hearing, we still operate, and very successfully too, for the relief of the tinnitus, vertigo, and other symptoms which often make the patient's life a veritable burden to him. Again, in suppurative cases, although the most brilliant results are undoubtedly obtained by an early operation, it is still our duty to operate even in the presence of extensive caries, since there is no other way in which the patient can be cured, and even in these cases we almost always obtain a very satisfactory result.

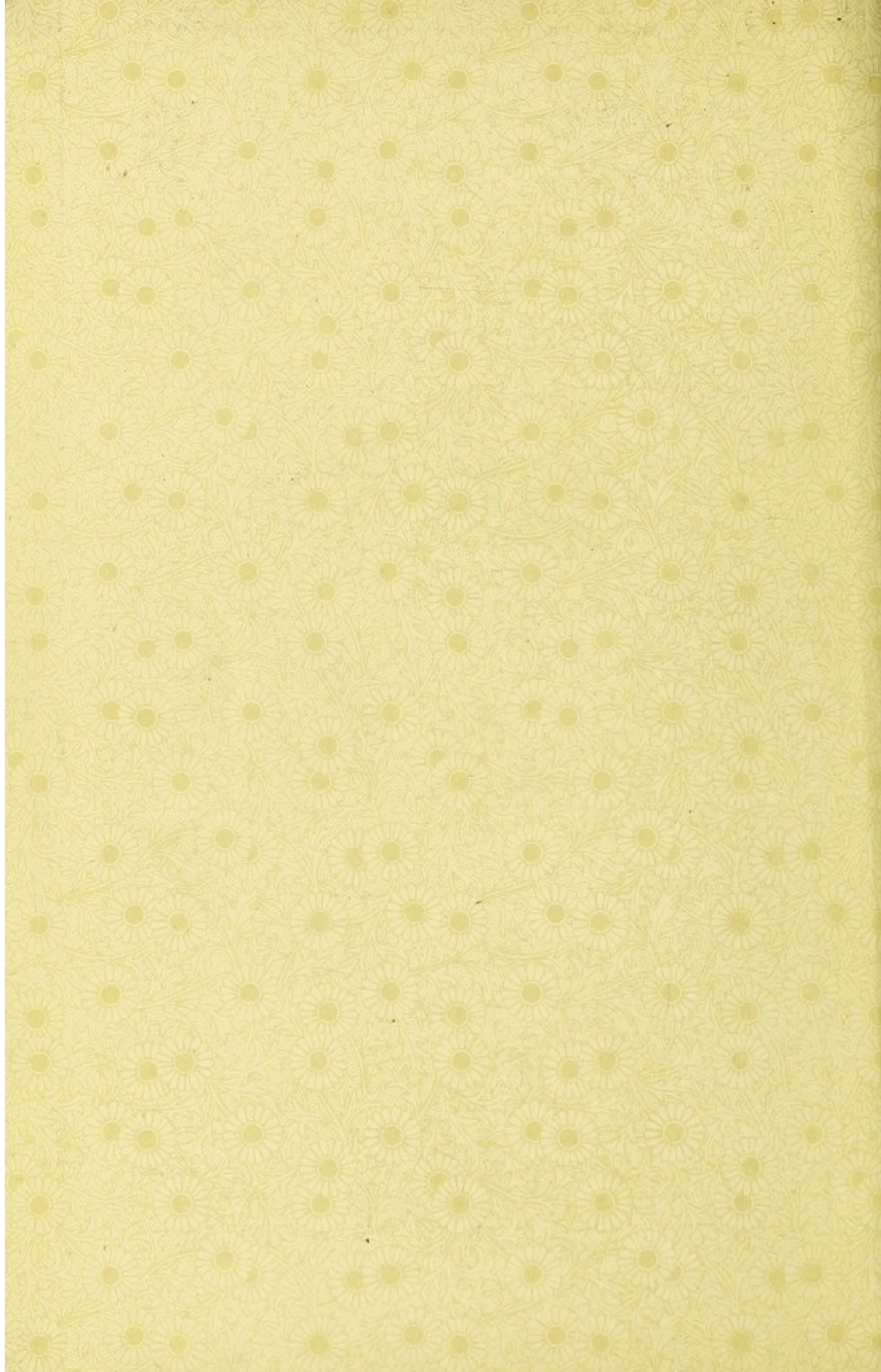
In conclusion the author must avow his belief—fully justified, he thinks, by the evidence which the preceding pages contain—that in the operation for excision of the drum-membrane and ossicles we have presented to us a very potent means for the benefit and cure of the vast number of persons who labor under the manifold afflictions consequent upon the diseases which we have described. He believes that the progressive deafness, the tormenting noises, and the other harassing symptoms of chronic catarrhal inflammation, and the diseased condition, so productive of discomfort and danger, incident to chronic suppurative inflammation are both

permanently relieved by it ; and that hence it is destined to bring great and lasting relief to a vast class of cases which have hitherto been regarded as not amenable to any treatment whatever and have been relegated to a place among the hopelessly disabled.









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