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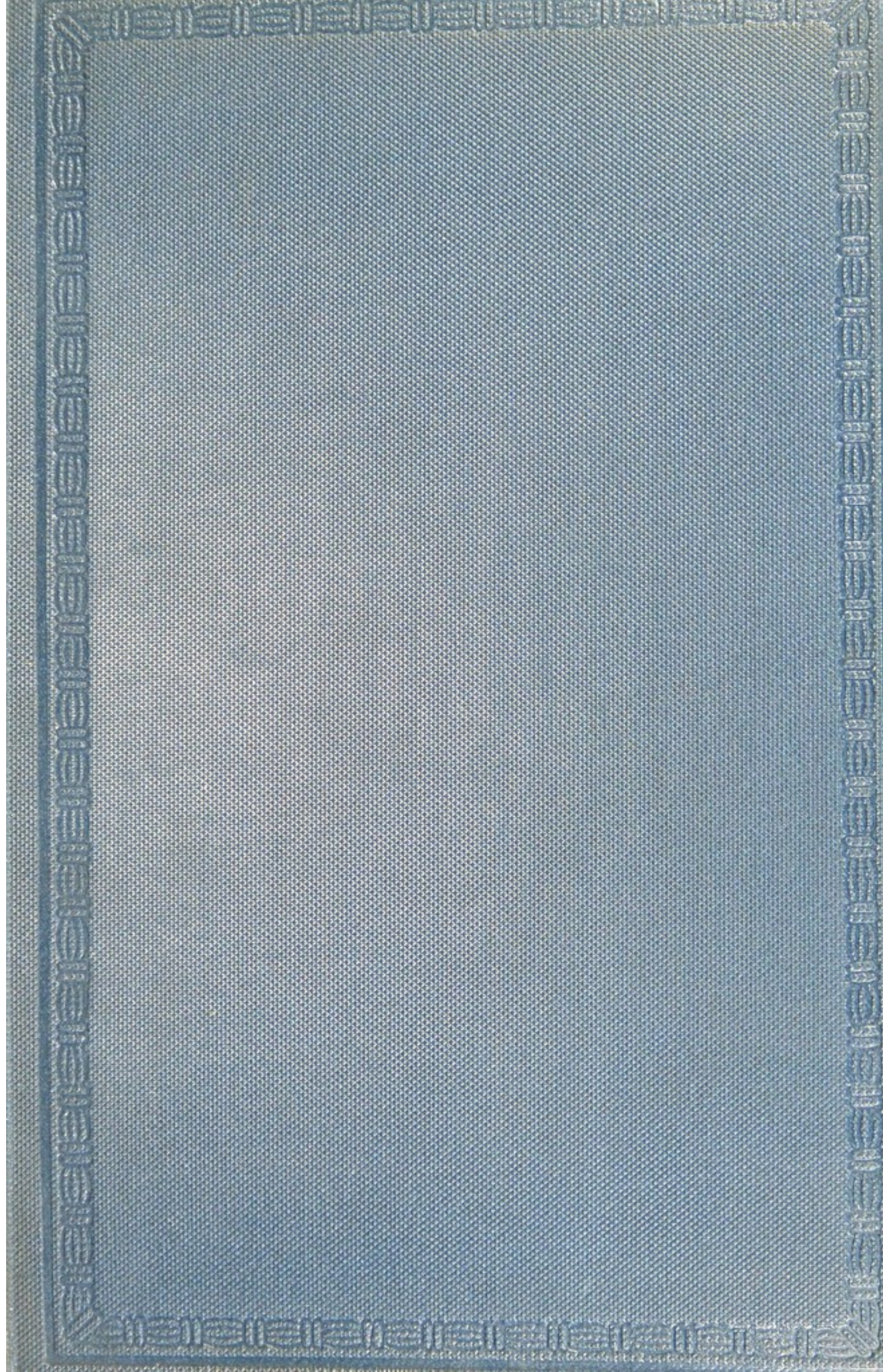
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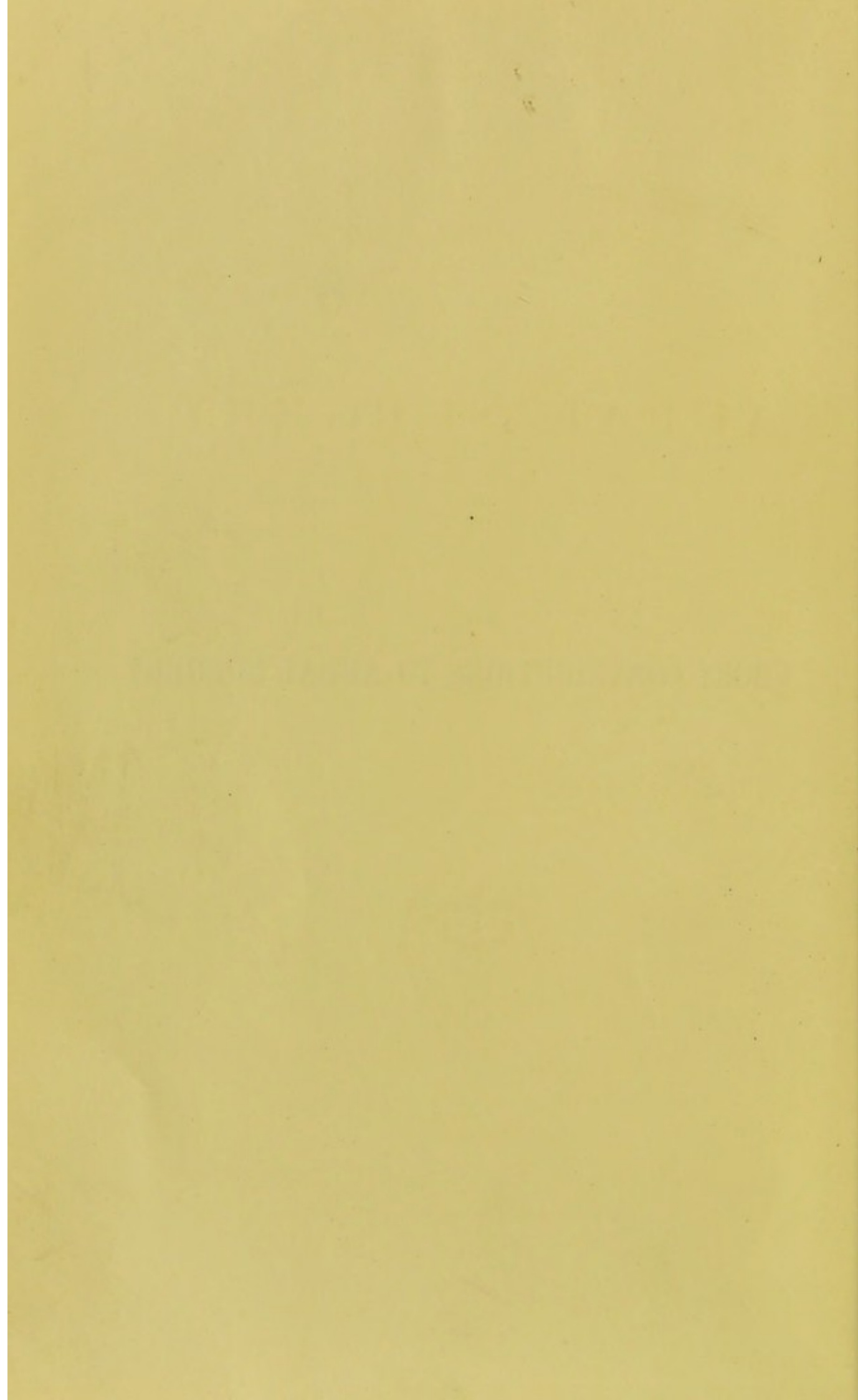
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SHORT CONTRIBUTIONS TO AURAL SURGERY



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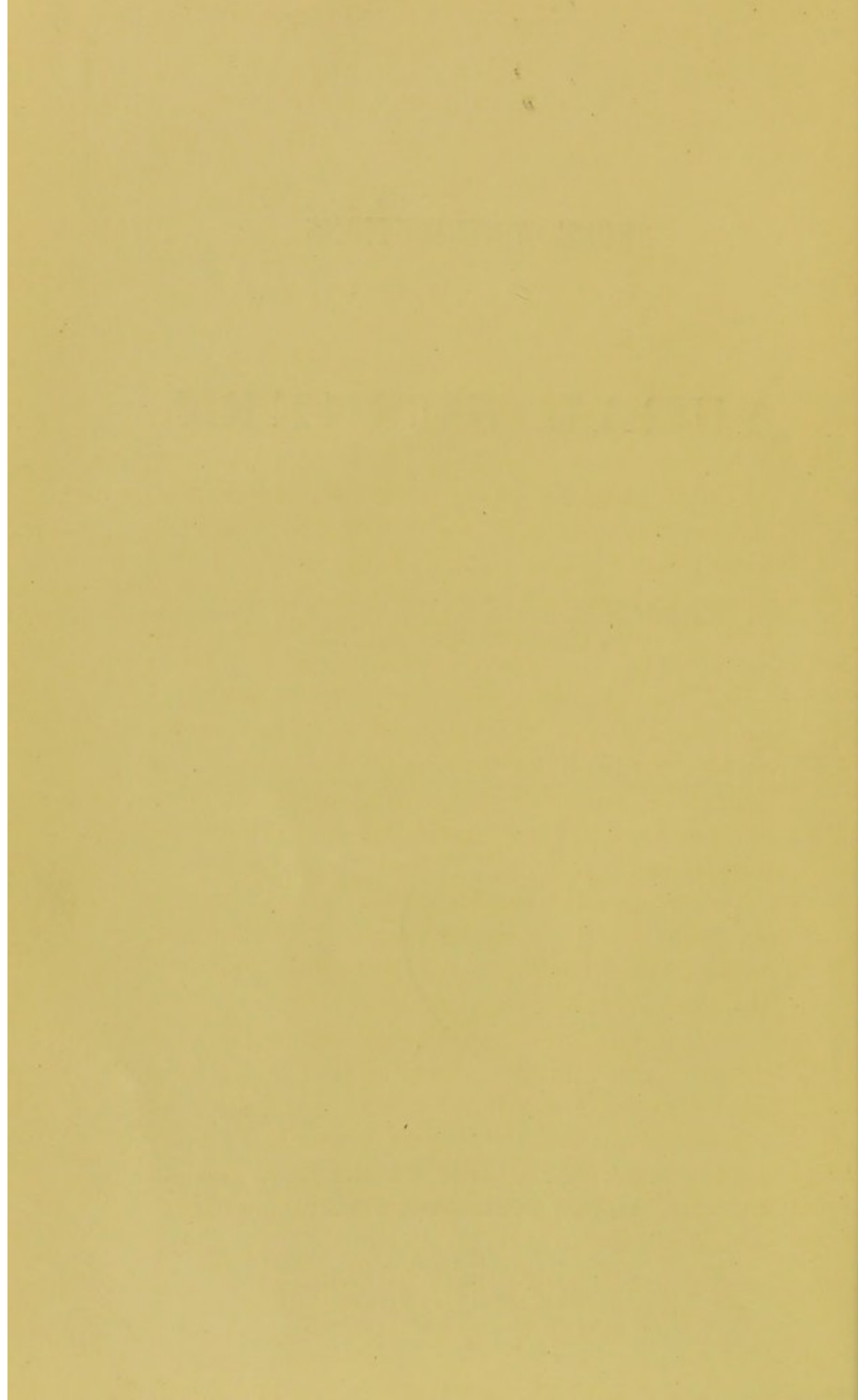
BY
SIR WILLIAM B. DALBY, F.R.C.S., M.B. (CANTAB.)
AURAL SURGEON TO ST. GEORGE'S HOSPITAL

REPUBLISHED FROM "THE LANCET" BETWEEN 1875 AND 1886



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—
1887



P R E F A C E.

As the following Short Contributions to Aural Surgery may be more convenient for reference in a collected form, I now republish them. In no sense whatever do they pretend to be essays, or anything more than brief notes of what seemed at the time worth recording out of the cases which were seen in daily practice.

The time during which these notes appeared are marked by periods when accepted views in regard to diseases of the ear and their treatment became to me modified in some instances, and changed in others. This has been especially noticeable in the following particulars.

The exaggerated importance which was given to alterations in the tympanic membrane as affecting hearing, rather than to the disorganization behind the membrane, *vide* No. IV.

The possibility of establishing in certain cases a permanent opening in the external auditory canal when this has become closed by a cicatrix, *vide* No. III.

The cutting away of exostoses in the external auditory canal by a dental drill; which, so far as I can learn, was not employed for this purpose till I used it in 1874, *vide* No. III.

The two absolutely distinct classes into which fatal cases from ear disease may be divided, *vide* No. IV.*

The remarkable effects of emotional influences on hearing, *vide* No. VII.

The healing and treatment of perforations, *vide* No. VIII.

The educational treatment of incurably deaf children, *vide* No. X.

The removal of adenoid growths from the pharynx, *vide* No. XI.

The consideration of those cases in which perforation of the mastoid cells is necessary are not included in these notes, as this subject is fully dealt with in "Med.-Chi. Trans.," vol. lxii. and lxviii.

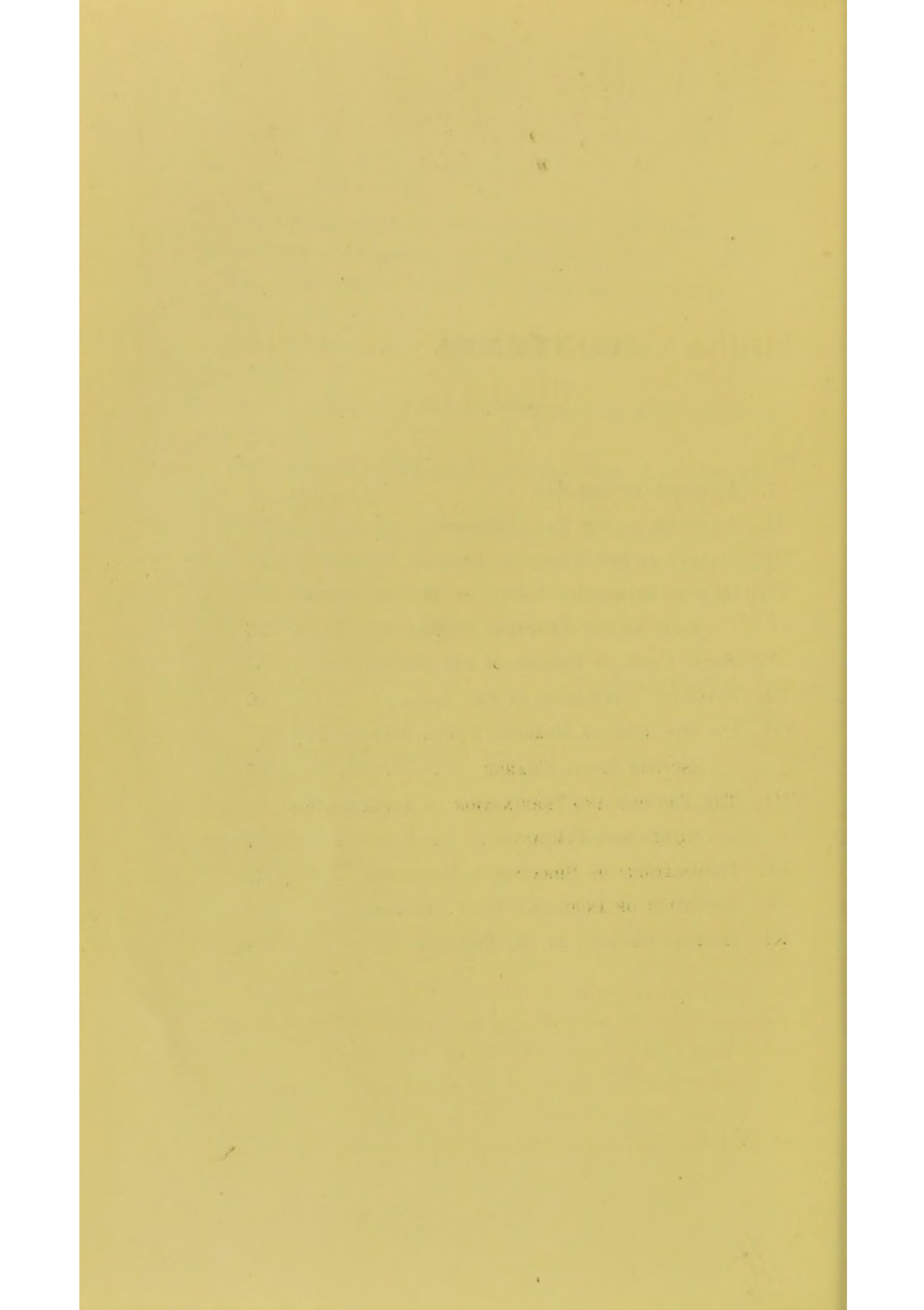
W. B. DALBY.

LONDON, *January*, 1887.

* This formed the subject of a paper in vol. xvi., "Trans. Clinical Society."

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SHORT CONTRIBUTIONS TO AURAL SURGERY.

No. I.—ACCIDENTS TO THE EAR.

May 29, 1875.

By far the most usual accidents to the ear are those which eventuate in a rupture of the tympanic membrane; and there are four ways in which the rupture may be brought about. Firstly, by the violent introduction of a foreign body into the external auditory passage. Secondly, by the sudden compression of air in the middle ear, as in vomiting, or blowing the nose very violently. Thirdly, by the sudden compression of air in the external meatus, as in a box on the ear or an explosion near the ear. Fourthly, by a fall or blow on the head.

In the sixth volume of the "Transactions of the Clinical Society" I have recorded several examples of this accident, and one in which the portio dura in its tympanic portion was wounded. In these two communications attention was directed chiefly to the subsequent healing or non-healing of the perforation, and to the various permanent degrees of deafness which remained. An attempt was made to point out

that it was not altogether impossible to predict with moderate certainty either the future closure or patency of the rupture, as well as the degree of hearing likely to remain; and the latter was shown to vary between hearing so perfect that no failure could be detected, and deafness very nearly total. During the past year the following cases (which will serve as fair illustrations of this accident) have come under my observation.

CASE 1.—In June, 1874, a gentleman aged forty, who had previously had good hearing, whilst picking his right ear with the sharp end of a penholder made of a porcupine's quill, perforated the tympanic membrane. A sudden acute pain was followed by more or less uneasiness, but no loss in hearing power. By the next day a dull pain extended over the right side of the head, and there was considerable deafness. Both these symptoms continued until three weeks after the accident, when I saw him for the first time.

There was a small perforation at the upper part of the anterior section of the tympanic membrane, through which a little air escaped with a moist sound when inflation of the tympanum was practised. The deafness was considerable, and a vibrating tuning-fork placed on the vertex was heard much more loudly on that than on the healthy side. The external auditory meatus was somewhat swollen and tender. After each inflation of the tympanum with the Eustachian catheter a little muco-purulent fluid oozed out through the perforation, and the hearing was by this proceeding distinctly improved.

The treatment consisted in an attempt to keep the

tympanic cavity as free as possible from secretion; and the means to bring this about consisted in the occasional use of the air douche through the catheter twice a week, and the injection (on Gruber's plan) of a few drops of warm solution of soda into the tympanum.* In the course of a month the perforation had healed, but the hearing, although very much improved to what it was in June, was far from perfect. No further change in this respect took place.

If the impaired hearing in this case had been due to the loss of continuity of the membrane, it would have immediately succeeded the accident, and the same would hold good if it had been due to shock. An interval of good hearing, however, followed the accident, and inflammation having been excited in the tympanic cavity, the inflammatory products effused in this situation interfered with the conduction of sound; and this is still further conclusively shown by the fact before alluded to—viz., that vibrations of sound from the tuning-fork placed on the head met with an obstruction on their passage outwards through the tympanum, and so were heard more loudly by the affected ear than by the healthy one.

CASE 2.—In August, 1874, I saw a young gentleman, aged twenty, in reference to an attack of inflammation in the left tympanum, from which he had suffered for five days. He told me that up to three years before he had never had anything wrong with

* A few drops of the solution are placed in the lower naris, and then the patient, with the mouth and nose closed, and head inclined to the affected side, by attempting to make an expiration, forces the fluid up the Eustachian tube into the tympanum.

either ear. At that time, whilst he was sparring, he had a blow on the right ear with the boxing glove. This was succeeded by a sudden pain, a loud noise in the ear, and a few drops of blood from the external meatus. Suppuration followed, and he had had a discharge from the ear ever since.

When I saw him, the membrane had in chief part ulcerated away; he could blow freely through the perforation; there was a slight purulent discharge, and very considerable loss of hearing. This last symptom was afterwards very much relieved by his wearing the cotton-wool form of artificial membrane; and the exposed lining membrane of the tympanum, after being treated with astringents, became more healthy and ceased almost entirely to secrete.

CASE 3.—In the same month (August, 1874) I saw a lady, aged forty-nine, who gave a most clear account of having ruptured the left tympanic membrane whilst violently blowing the nose. At the time of the accident there was acute sickening pain, with a loud report in the ear; and for two or three days afterwards she could blow through the ear with the mouth and nose closed. The rupture healed in a few days; and in the course of a week the hearing, which had suffered considerable impairment, became, although not perfect, sufficiently good for all practical purposes. Curiously enough, some time afterwards a precisely similar accident happened to the right ear. This rupture also healed, but left very great deafness.

This case illustrates how very little the impaired hearing is due *per se* to the loss of continuity of the membrane.

CASE 4.—On October 15, 1874, I saw, in consultation with Dr. Walters, of Reigate, a gentleman who met with the following unusual accident:—On August 12, whilst he was extracting from his gun a cartridge, it exploded. He felt a sudden sharp pain in the right ear; for some hours he had a smarting sensation in it, and found on the same evening that he could blow through it. There were two slit-like longitudinal perforations in the anterior section of the membrane; the lower one had healed, but air passed through the upper one. Neither at the date of his visit to me in October nor at any previous time had the hearing been perceptibly harmed.

When we remember the impairment of hearing which so often follows shock from unexpected explosions near to the ear, one cannot but be led to think that the rupture of the membrane in this case may possibly have been a fortunate circumstance: by this I mean that the force which, had the membrane been stronger, would have impinged on the nervous apparatus and so caused shock, in this instance ruptured the membrane, passed through the perforation, and distributed itself in the cavity beyond.

CASE 5.—In October, 1874, I saw another case where the membrane had been ruptured by an explosion during the Crimean war, whilst the patient, an officer, was standing close to a mortar which, unexpectedly to him, was fired. Acute pain in the right ear, with a little bleeding, immediately followed, attended with great deafness, and he noticed a few days afterwards that he could blow through it. Ever since then there had been a discharge. There was a

large perforation, involving more than half of the membrane. The hearing was generally pretty good, but he was deaf with it if the Eustachian tube of that side became so obstructed during a cold that he could not blow through the perforation.

CASE 6.—On November 9, 1874, a surgeon, aged sixty-four, applied to me under the following circumstances:—Two months previously, when in good health, and with good hearing, during a violent fit of sneezing, he experienced acute pain in the left ear, became suddenly deaf, and was conscious of having ruptured the tympanic membrane, inasmuch as he could pass air freely through the ear with the mouth and nose closed.

The pain did not subside, and in twenty-four hours was followed by a profuse discharge, which was abundant when I saw him. The hearing had become so far lost as to make the ear practically useless. The anterior half of the membrane had undergone ulceration. Subsequently, under treatment, the discharge and other symptoms subsided, but very considerable deafness remained, and the perforation did not heal.

CASE 7.—On November 10, 1874, Mr. G. B——, aged fifty-seven, gave me the following account:—Whilst out cover-shooting a long thorn ran into the left ear. This was followed by acute pain, a loud report, and a little bleeding. By the next day there was no uneasiness or deafness.

When I saw him, long after the accident, there was a distinct scar in the posterior section of the membrane. An unmistakable appearance of scars in the membrane is not at all usual. The hearing

was not quite so good as with the other ear, but he was not conscious of any difference until it was carefully tested.

By the side of this case I place another, where almost precisely the same accident occurred.

CASE 8.—A gentleman about thirty years of age was cover-shooting in the winter of 1873, and turning his head suddenly round to shoot at a rabbit, a twig of hazel-tree ran into the left ear and gave him great pain. I examined the ear two days afterwards. There was a small perforation in the posterior section of the membrane. This healed in two days, leaving the hearing unimpaired. So clearly was this the case that, in making a report on the matter to the Accidental Insurance Office in which the patient was insured, I described the hearing as having suffered no injury whatever.

CASE 9.—On November 11, 1874, Mr. J——, aged thirty-five, applied to me for advice on account of an accident which occurred in this manner:—Three weeks before, he had in his sitting-room put together a fishing-rod, and, on suddenly turning round in play with one of his children, had run the brass ring at the end of the last joint of the rod into his right ear, and perforated the membrane. The accident was followed by great pain, inflammation of the tympanic cavity, a profuse discharge from his ear, and extensive deafness. The inflammation had, when I saw him, extended from the tympanum to the mastoid cells; the tissues over the mastoid process were swollen, the surface was red and acutely tender to the touch, and he was in great suffering.

The membrane was extensively perforated; there was a purulent discharge, and the deafness was extreme. Under the influence of leeches and hot fomentations the acute symptoms subsided, and the patient did not present himself again until January, 1875, at which time there was a profuse discharge from the ear, and the meatus was partially filled with a fleshy polypoid growth. This was removed by forceps, and the granular surface was treated with astringents. All trace of the tympanic membrane was gone, and the hearing considerably impaired. With the use of the cotton-wool support the hearing became fairly good, and the discharge ceased.

CASE 10.—On November 17, 1874, Mr. W. D—— consulted me, with history as follows:—Up to July last he had good hearing, and never any trouble with his ears. During that month, in consequence of a stuffed feeling in his ears (which had only lasted a few hours), he forcibly inflated them, and in doing so the air passed through the right ear; he felt a loud crack at the time, together with acute pain. A few days afterwards a discharge appeared, and had been persistent ever since.

I found two small slit-like perforations, with red edges, one on either side of the handle of the malleus. The deafness was considerable. The perforations were very small, air passing freely through them. They presented not at all an unhealthy appearance. Whether they will eventually heal or not I cannot say, as the patient sailed the next day for Australia.

CASE 11.—On December 17, 1874, whilst a young

gentleman aged twenty was seated at the table, his brother gave him a sound box on the ear. This was instantly followed by considerable deafness and tinnitus. On examination of the ear on the following day, I found a vertical slit-like rupture in front of the handle of the malleus to the extent of about half the membrane. He could hear the tick of a watch only when pressed close to the ear, and was very deaf to ordinary sounds. In five days the rupture was quite healed. From the time at which the accident occurred the hearing power gradually returned, until in the course of a fortnight it was of the normal standard, and the tinnitus had quite subsided.

CASE 12.—On January 1, 1875, I examined the right ear of a gentleman aged sixty-two, who had become suddenly deaf three weeks before while an attempt was being made to remove some cerumen from the ear with forceps. Previously to this the hearing had been good. There was a small perforation, with red edges, in the upper part of the posterior section of the membrane, and a very slight discharge. The hearing was subsequently improved in some degree, but the perforation has not closed, so that in all probability healing will not take place.

It will be observed from the foregoing cases, as well as from the ten others previously reported at the Clinical Society, that the conditions which eventually remained, either as to continuity in the membrane or hearing power, were various in the extreme, and this, at first sight, irrespective of the manner in which the accident occurred or the size of the original perforation. Out of the twenty-two cases, the perforation did not

heal in ten ; eleven healed, and one was in the process of healing when last seen ; in six instances the hearing did not suffer at all ; in the remaining sixteen it was more or less seriously impaired. But a return to good hearing by no means always followed the closure of the perforation, and in many cases, when the wound healed, the patients were far more deaf than in others where a purulent discharge continued through the opening into the tympanum. So we must look for causes to the impairment of function altogether independent of the lesion, so far as can be seen. There can, I think, be little question but that the chief of these is shock to the nervous structures behind the tympanum at the time of the accident. To take, in the first place, the instances where the rupture healed rapidly without any suppuration in the tympanic cavity. From the time of the occurrence of the accident the hearing never varied, and vibrations of sound conveyed through the bones of the head (the sound from a vibrating tuning-fork on the vertex, for instance) were heard less loudly on the affected than on the non-affected side ; in fact, the perception to sound was affected, while the conduction through the tympanum was not. This is what happens in the deafness which follows a blow on the head, a box on the ear, or an explosion near the ear, where no rupture of the membrane takes place. In truth, in instances of this kind the hearing is generally more irreparably injured than when the membrane has given way. On the other hand, when suppuration in the tympanic cavity follows the accident, the conduction of sound as well as

the perception of sound becomes affected, and so we find that a vibrating tuning-fork placed on the head will be heard far more loudly by the injured than by the healthy ear. Thus the products of inflammation in the tympanic cavity become the second element which impairs the hearing.

No. II.—ACCIDENTS TO THE EAR.

(Continued.)

AN account of accidental rupture of the tympanic membrane would be incomplete if mention were not made of this injury as a very frequent result of injudicious attempts which are at times made to extract a foreign body from the external auditory meatus. Any out-patient room devoted to affections of the ear, and every-day experience, will afford ample evidence of the occurrence of such mishaps.

When a child has, or is believed to have, a cherry-stone, a bead, a piece of slate-pencil, a stone, or what not, in the ear, the proceeding which is commonly adopted to effect its removal consists in laying the child down on the side opposite the ear to be operated upon, and some sort of forceps or other instrument ingeniously constructed for the purpose is pushed into the meatus with the well-meant intention of seizing the foreign body and withdrawing it. What then often happens is this. The foreign body, not being immediately captured, on the first touch of the instrument slips down the deep curve

which the floor of the bony part of the meatus takes in the direction of the tympanic membrane. A little further groping in the dark now readily ruptures the membrane, and this may be, and often is, effected at leisure if the patient is placed under chloroform; for, inasmuch as the process is extremely painful, it is found that he or she will not submit without so much struggling as to be embarrassing to the operator. The oozing of blood from the meatus will show that the membrane has given way, and in the course of a few days this is still further evinced by the appearance of a purulent discharge from the ear.

The frequency of such *accidents* (if such a term is applicable) may be gathered from the fact that during the past session, out of five cases which applied on two successive out-patient days at St. George's Hospital, three on one day and two on the other, the order of events in four had taken place in the manner described. In the first, a small stone had been pushed through the membrane into the tympanum during the course of four attempts which had been made to remove it, two without chloroform and two with. In the second case, a bead had been pushed through the tympanic membrane. In both instances the meatus was very much swollen, there was a purulent discharge from the ear, and in the space of three weeks, when the swelling had subsided, and the ears had been daily syringed by the children's mothers, the stone and bead respectively came out, leaving, of course, considerable deafness. In the third case, where no attempt had been made to remove it, whilst light was reflected

through the speculum, a stone was seen and readily removed with a small pair of ring polypus-forceps. In the fourth and fifth cases there was no foreign body in the ear, but the account given by the children and their parents had been thought sufficient to justify interference, which was followed by a result similar to that which had occurred in the first and second cases. Numbers of such examples might be brought forward, but these will suffice to show how exceptional it must have been for the past generation of students to be taught a simple and ready mode of examination of the external auditory canal. Such an explanation of the *accidents* here mentioned can be the only one admissible, for it is otherwise inconceivable that such surgery could be possible in the present day.

In connection with this subject, it cannot be too forcibly impressed on the minds of students that by the help of an ordinary ear-speculum and an eight-inch focus reflector, the entire meatus and tympanic membrane can be so illuminated that the presence or not of a foreign body may be demonstrated beyond doubt, and that no attempt whatever to remove it should be made unless the canal is at the time thoroughly exposed to the sight of the operator by means of a similar reflector fastened to his forehead by a band round the head—in fact, a laryngoscopic mirror. With this precaution, and ordinary care in the handling of any instrument, the rupture of the tympanic membrane or other injury should be impossible; and, inasmuch as all manipulations should be painless, an anæsthetic becomes necessary

only in the case of very young children in order to insure perfect stillness.

Occasionally, however, even with these precautions, the removal of a foreign body from the ear is extremely difficult. This is especially so when it has passed beyond the part where the floor of the bony canal dips downwards, as then it at once slips to the farther end of the meatus and is not easily laid hold of. If the object is small, and lying loose in this situation, it will often come out by simply syringing. If it has rugged edges, some point of it may be seized with small rectangular forceps; sometimes a loop of wire can be passed beyond it, and so it may be withdrawn. I have removed cherry-stones, pieces of slate pencil, and other objects, that will roll, but are grasped with difficulty, by the help of a small steel hook; and when a foreign body has been lying in close contact with the membrane, have resorted to a plan some time since suggested by M. Löwenberg, of Paris, and to which reference was made in a communication to the *Lancet* in 1872. "The end of a rod is dipped into melted glue; the point thus armed is held in contact with the foreign body until the glue has hardened (about twenty minutes suffices for this); the rod is then withdrawn, bringing away with it the foreign body." In short, after a good view has been taken of the object to be removed, some one of many modes of procedure will usually suggest itself as the most appropriate in the case under notice; and if one fails, another must be tried. It should also be remembered that no harm

will happen by waiting, for, often enough as the ear has been injured by attempts at help, if not interfered with, most things that find their way into the auditory canal (lined throughout as it is with skin) are of themselves as harmless as if held in the hand. Exceptions to this are very rare. Amongst them I may here refer to a case which I reported in the "Transactions of the Clinical Society," in which some plaster of Paris in a semi-fluid state was accidentally poured into an ear, and, rapidly becoming hardened, was only removed after a great deal of anxious trouble; and to another curious instance of the same class of accident, in which, during the past year, I removed, on three different occasions, a piece of a needle. Each piece was deeply embedded beneath the skin of the meatus, rather more than half-way down the passage, and when taken away the three pieces made up the entire needle. The patient, a young lady, had complained for a long time of great pain in the ear, and on examination a very small piece of the needle could just be detected appearing through the skin; this was seized with forceps and withdrawn. The other two pieces were taken out in like manner some days later. No history whatever to account for the presence of the needle could be obtained. From the position of the pieces they could not have been put in by the patient, and indeed there were no grounds for suspecting this.

The mental distress which persons often exhibit from the idea of having something in the ear is familiar enough to us all; and, especially with

women, it is not always easy to convince them of their mistake after an examination of the meatus has shown their fears to be groundless. Sometimes whilst picking the ear with a pin they prick themselves, and, dropping the pin, believe it to have been left in the ear. No doubt the energetic endeavours which are made to extract the pin are not unfrequently urged upon the operator, whose ignorance of the whereabouts of the pin is no bar to his enterprise. Within two weeks of writing this I had occasion to examine the ear of a young woman supposed to have a pin in her ear, whose tympanic membrane had been lacerated in the course of a prolonged attempt (which it was proposed to repeat that day) to extract it. As might be expected, there was no pin in the ear. When a foreign body is found impacted in the meatus, it has become so in consequence of considerable violence being used, either at the time it was placed in the ear or subsequently, and no attempt should be made to remove it until all the irritation thereby caused shall have subsided. When it is added, that so lately as during last year a case was recorded in which a child died from meningitis induced by violent measures which were used to extract a stone from the ear, enough will have been said to show the urgent necessity of warning students of the injury they may do, in regard to these cases, unless they proceed with such caution as common sense would seem to dictate, but which does not appear to have received such general attention as is desirable.

No. III.—CLOSURE OF THE EXTERNAL AUDITORY MEATUS.

January, 1876.

PARTIAL or complete closure of the external auditory meatus, although not a very common condition, is one which occasionally calls for surgical interference. The tissues by which this canal may become closed are either bony, in the form of so-termed exostoses, or connective in one of two forms: firstly, as congenital closure; and, secondly, as a firm cicatrix at the opening of the ear. This latter condition is at times induced by a long-continued profuse discharge from the external meatus, due sometimes to a perforation of the tympanic membrane, at other times when this membrane is entire. The external part of the ear becomes inflamed, and the opening, so to speak, skins over, leaving a small hole just large enough perhaps to allow the passage of a small probe. When this state becomes permanent, in addition to the disfigurement which it causes, such an aperture is obviously too small an inlet for the passage of sound to the tympanum; and how difficult it is to restore the opening to the auditory canal is sufficiently well known to those who have made the attempt. Dilatation, however practised, produces only a very temporary effect. For example, if this dense tissue be freely cut through, say by a crucial incision, the flaps turned outwards, and the opening thus made be carefully plugged with lint and dressed daily it will close in a few days, after dressing is discontinued, as firmly as before. Sponge tents, pieces of gum-elastic

catheter, and a variety of other expedients, have from time to time been used with a view of keeping the opening patent; but such attempts have, so far as I know, universally failed. The extreme difficulty, then, so generally experienced in this respect makes the following case especially worthy of attention, as the results of the plan employed proved most satisfactory.

In February, 1875, a young lady aged twenty-nine applied to me under the following circumstances. In the middle of the previous October, she, being in good health, was seized with acute pain in both ears. This lasted five or six days, and was succeeded by a purulent discharge from both ears and cessation from the pain. After this the suppuration continued to be profuse, and there was occasionally some return of the pain, for the relief of which poultices were very frequently employed. It was during this period that the external openings of the ears, being subjected, as they were, to the irritating influence of the discharge, became inflamed, covered with granulations, and, lastly, were the seat of cicatricial tissue; in other words, the tragus on either side having been lost by ulceration, the openings of both ears skinned over, leaving, however, a minute hole (large enough to admit an eye probe), through which from time to time oozed a thin purulent discharge. The deafness on both sides was extreme. From the history of the case it would be supposed (although this supposition eventually turned out to be incorrect) that the tympanic membranes were perforated. Both sides were treated in the same way. The patient was placed under the influence of ether. Taking the

small orifice above mentioned as a centre, a free incision was made upwards, downwards, inwards, and outwards, and the opening thus made plugged with lint. On the next day the lint was taken away, and replaced by pure lead contrived as follows: A piece of thin lead sheeting was rolled until it was of a size that exactly fitted the canal, and was then inserted to the depth of about three-quarters of an inch. The plugs were removed night and morning, the ears were syringed, and the plugs replaced and kept in position by a bandage round the head. In the course of ten days the rim of the openings had cicatrized around the lead; the canals were of their natural calibre, and an examination of the tympanic membranes became possible. It was then found that they were entire. There was no further discharge from the ears. The difficulty in the management of the case now began, for it was found that if the lead was allowed to remain out of the ears for even half an hour, the meatus became swollen and painful, and there was the greatest difficulty in replacing the lead. This curious condition was so marked that the patient one night took out the lead at ten o'clock, syringed the ears, and by my desire left out the lead till eleven o'clock. She then found that she was unable to replace it, and came at twelve o'clock to me, when I was obliged to use considerable force, causing great pain, before I could re-insert the lead. For more than two months the patient used the greatest care in managing the replacement of the lead after it was taken out of the ears, very gradually increasing the periods during which she left the ears without the plugs from ten

minutes to twenty, and so on up to four or five hours. At the end of two months the openings were considered to be permanent, and the ears were left unmolested. Four weeks after this, having left London, she awoke one morning feeling great heat and pain in the left ear. She attempted to put in the lead, and failed. Ten days later she came up to town again, with the ear in precisely the same condition as before the operation, the right ear, however, continuing well. To make a long story short, so far as the left ear was concerned, all the same trouble as before was gone through. She made a good recovery, and both meatus have since remained normally patent.*

In connection with this case I would here suggest the question, Might not a similar procedure be adopted in those cases of congenital closure of the meatus where a very considerable degree of hearing is present—*i.e.*, where the deviation from normal hearing is no more than would be caused by the connective tissue which separates the external auditory meatus from the outer ear? Congenital closure of this passage is, as a rule, accompanied by complete deafness, and then is doubtless coexistent with some other defect in the auditory apparatus; but this is by no means always the case, for I have on several occasions seen instances where the hearing has been so good as to admit of the acquirement of speech in young children,—and such an extent of hearing in very young children means a very slight degree of deafness.

* January, 1887.—I saw this patient last year, and the openings still remained.

Even more difficult of management, and at times more urgently calling for interference, than any of these examples of closure of the external auditory canal, are those in which bone forms the obstacle to the passage of sound: cases of so-termed exostosis. Bony growths in this situation are far more frequent than is generally supposed; and this may readily be imagined when, from October, 1874, to October, 1875, no less than fourteen cases came under my observation in private practice, in eight of which only one ear was affected. These growths are, more often than not, multiple—*i.e.*, in the same meatus, where there is one there are generally more. And it is a remarkable fact that, although exostoses are met with in one ear alone, it not unfrequently happens that both meatus are affected similarly, not only in respect to the presence of these tumours, but also as to their size and number. Thus I have often seen three large growths so nearly meeting in the axis of the canal as to well-nigh obliterate the passage, and on examining the other ear have found an exact counterpart. That small bony enlargements in the external auditory canal are sometimes congenital, I feel tolerably confident; that they remain without any perceptible change in size for many years, I have satisfied myself beyond question; and that they should at one time increase synchronously (as they undoubtedly do) in either canal, and at another affect one ear only, is at least interesting, if not capable of explanation. It would seem that they are at times called into existence by an irritation, so to speak—by the irritating influence of a discharge coming through a perforate tympanic

membrane and constantly passing over the meatus ; at least, such an explanation appears not so improbable when an exostosis is found in the ear so affected, whilst the other (a healthy ear) is free from these growths ; but, on the other hand, such a theory will not hold true when the ear in question is to all appearance and shown by all known tests to be in perfect health, save the bony enlargement itself. As to Mr. Toynbee's theory of their gouty origin, it is hardly necessary to revert to it, except to say that experience amply proves its fallacy.

In place, however, of speculations as to the origin of bony enlargements in the part under notice, it is more useful to consider what is the best to be done when they become the source of inconvenience and trouble. Very often for many years they remain unnoticed until a little cerumen completes the closure of the already partially closed canal, and the consequent deafness directs attention to the ear. So long as the meatus can be kept clear of secretion by oft-repeated syringing, it is undoubtedly better not to interfere any further ; but there are two conditions under which an attempt should be made to remove these growths—first, when behind the exostosis there is a perforation of the tympanic membrane, a polypus growing from the lining membrane of the tympanum (the protrusion of some part of the polypus beyond the exostosis will afford evidence of its existence), and thus preventing the free egress of discharge from that cavity, inducing symptoms of cerebral irritation, and so threatening life ; second, when the exostosis, by

completely closing the auditory canal, causes intense deafness.

The removal of exostoses in the external auditory canal is beset with difficulties. The very position of the growths makes it necessary that all work must be done under light reflected from a mirror worn on the forehead of the operator. To keep this light steady, the patient's head must be absolutely motionless, and the surgeon's head must be so as well. Again, the size of the canal not only limits the movements of instruments, but also their use, to but few, and any bleeding checks all proceedings until such bleeding can be stopped. Moreover, the intense hardness of the exostosis does not facilitate matters. There are two modes of operating which are deserving of especial mention. The first was originally suggested and successfully practised by Dr. Thos. E. Clarke, of Bristol, in 1873, in a case of a large exostosis which almost filled the meatus. Three needles were introduced into the growth, two at the base and one at the anterior edge. Through these needles a continuous current of electricity from six pairs of plates of a Stöhrer's battery was passed for three minutes. Fourteen days afterwards this was repeated; and three weeks later the growth was so loose as to be readily extracted, and the patient made a very good recovery. Since Dr. Clarke's case was published, in adopting similar measures, owing to the extreme hardness of the bone, I have found it convenient to drill holes into the base of the tumour to permit of the introduction of the needles; and I can testify to the success which attends this plan of removing

bony growths. But I have to relate a most unfortunate mishap which occurred upon one occasion, when every precaution (so far as could be foreseen) was used. The case was one in which there was a polypus behind the exostosis, and some unpleasant symptoms of cerebral irritation made the operation necessary. Two needles were inserted at the base of the tumour, and the current was passed for two minutes. The patient, a healthy man thirty years of age, suffered a good deal of pain during the night after the operation; and on awaking the next morning the facial muscles on the side operated upon were paralysed. This happened in November, 1874, and the power of movement up till now has been only partially regained. This accident must have occurred from one of two causes: either it was the immediate consequence of the electricity as applied, or else it was due to inflammation in the tympanic cavity set up by the operation. For myself, I am satisfied that the latter explanation is the correct one. We know how frequently acute inflammation in the tympanum will produce paralysis of the muscles supplied by the portio dura, affecting as it does that part of the nerve in the aqueduct of Fallopius; and we do not as yet know that an electric current, passed as was done in this case (so that the course of the current was at a considerable distance from the nerve), is capable of causing such an effect; and again, if the current had immediately paralysed the muscles, the paralysis would have occurred during the operation, and certainly on the evening of the day of the operation there was no facial paralysis. I have thought it

right to publish this account, that it may serve as a caution in the future to others besides myself in dealing with similar cases, but how far we shall be justified in abandoning this method of treatment because an unfortunate accident happened in a single case, each one must judge for himself. The removal of exostoses in the external auditory canal is not sufficiently common to supply a very large experience, but I must confess to have kept on the safe side since this case, and to have employed another method, which is entirely free from the slightest risk of any like catastrophe. It consists in grinding the bone away, and the most satisfactory appliance for this purpose I find to be the drill which is in common use among dentists. The variety of steel instruments which can be fixed to this, and the perfect command with which the instrument can be directed, render this an especially convenient instrument. Reflected light of course must be employed, the patient must be made insensible to pain, and a third person must turn the lathe, or cease turning, according to the directions given him at the time; with such precautions I know of no such ready method of destroying these bony growths when their removal becomes imperative.*

* January, 1887.—Since this was written, in every case in which it has been necessary to remove exostoses, I have adopted this method, and without any sort of accident. It may be useful to add that the risk of the drill slipping is more imaginary than real, as those who are in the habit of using a drill upon very hard substances are familiar with the fact that it is not necessary to employ much pressure, and that with the lightest touch of the drill its work is most effective upon bone, provided that the drill is changed as soon as the one in work becomes clogged.

No. IV.—ON THE DIAGNOSTIC VALUE OF
MORBID APPEARANCES IN THE TYM-
PANIC MEMBRANE.*May 31, 1886.*

It would be very difficult to find a more remarkable instance where careful observation of morbid changes can help to illustrate the uses of individual parts of an organ than occurs in the case of the tympanic membrane. It would be still more difficult to cite examples where more mistakes have been made in respect of such changes as immediate causes of impaired function. Even at the present time one hears it often enough said of a child (Ex. 1) who has become completely deaf after scarlet fever, or an attack of inflammation of the tympanum due to some other cause, and accompanied by total loss of the tympanic membranes, that he is deaf from perforations of the membranes. But, again, another child or adult (Ex. 2) with a similar complete loss of the membranes is the subject of impaired hearing of so slight a character as to occasion little or no inconvenience, and only noticeable when subjected to careful tests; whilst another (Ex. 3) with the same lesion is very deaf, and regains most satisfactory hearing by wearing a contrivance to which the term has been applied "artificial membrane." The explanation of this effect which was originally offered was that the improved hearing was due to the fact that this contrivance confined the vibrations

of sound to the tympanic cavity, and thus performed in part the functions of the natural membrane. If this were a correct view of the matter, why should this method so frequently be found quite useless when, instead of so great a loss of tissue, there is only a small perforation? In truth, experience shows that where the perforation is minute, it is even more usual to meet with extreme deafness than when it is larger, and that the artificial closure of the perforation only causes increased deafness. Those who are in the habit of treating cases of perforation of the tympanic membrane are now well aware that in suitable examples the success or failure which attends artificial support, however applied on to the tympanum, depends solely upon the degree of exactness with which the precise spot requiring pressure is discovered, and that, in fact, as soon as the patient has acquired facility in using aid of this sort to hearing, he can at any time, with the help of forceps and a small probe, so adjust a piece of moistened cotton-wool that the requisite pressure is exerted on the stapes. In such instances, then, it is quite obvious that the impaired hearing is due simply to a defect in the normal amount of tension throughout the ossicles, and so on to the fenestra ovalis. It is equally just to suppose, in those cases where this expedient fails after fair trial, that the loss of hearing is due to disorganization in the tympanic cavity beyond what can be accounted for by the change in tension above-named. That the loss of the membrane, *per se*, can have caused this is at once negatived by the consideration of Ex. 2. From the result of

previous well-known dissections it may be presumed that this further disorganization takes the form of a general thickening of the lining membrane of the tympanic cavity, as well as other changes elsewhere described. The probable truth of this explanation is made more apparent, when the opposite ear is perfect, by the fact that the vibrations of sound conveyed through the cranial bones are heard better by the affected than by the other (healthy) ear; for in this case the increase in the perception of sound would seem to be caused by some obstruction in the tympanum which interferes with the outward passage of sound through this cavity. At any rate, it is manifestly incorrect to attribute all the deafness met with in perforation of the tympanic membrane to that part of the morbid condition which a superficial examination at once discloses.

To take another illustration of the loose way in which cause and effect are spoken of in relation to one another. What more common than to hear it said of a patient who is more or less deaf on one side that he has "thickening of the membrane" (meaning the tympanic membrane)? How true an explanation of his malady this may be can be judged from the following:—An adult is found to have a large calcareous deposit in both tympanic membranes, is quite deaf with one ear, and has imperfect hearing with the other. Another patient is obviously deaf from nervous causes in the right ear, and on examination of the left ear, with which the hearing is perfect, it is found that the membrane is the seat of a large calcareous deposit; whilst a third,

with a still more extensive deposit of a similar kind in both membranes, hears quite well on both sides. Each of these examples I have myself observed. Surely in any one of them there is sufficient "thickening of the membrane" to account for any degree of deafness, but it is nevertheless plain enough that this symptom is in no way due to such a cause. In the face of this may we not be justified in supposing the failure in conduction of sound to be due (as in the case of perforation) to morbid changes behind the membrane? Do not facts like these still further point towards the necessity which exists for some modification in the views popularly held of the functions of the tympanic membrane, at least so far as its vibratile properties are concerned? It seems not easy to understand how the vibrations of this membrane, so thickened and changed by disease as we see it sometimes, can be a very essential factor in the function of good hearing; and is not this what is generally taught in physiological text-books? For instance, it is explained in that charming little work of Mr. Huxley's on Elementary Physiology that those aërial waves (produced by the vibrations of sonorous bodies) which enter the meatus, impinge upon the membrane and *set it vibrating*; that the vibrations set up in the membrane of the tympanum are communicated in part to the air contained in the drum of the ear, and in part to the malleus and thence to the other auditory ossicles. We are not here concerned with the effect of the vibrations communicated by these routes to the fenestra ovalis on the one hand, and to the fenestra rotunda on the

other. But to take the two cases above quoted, the one in which the ear has entirely lost the membrane by ulceration, and the other in which the membrane has become metamorphosed by calcareous degeneration, nearly perfect hearing remaining to each, must we not almost put out of consideration the *vibrations of the membrane* which intervene between the aërial waves in the meatus on the one side, and the vibrations of the ossicles and the vibrations in the air contained in the tympanic cavity on the other? In short, the functions of the membrane as a medium in sound conduction well-nigh disappear, whilst its functions as a support to the chain of ossicles and as a protection to the tympanic cavity become proportionately more noticeable.

Whatever truth there may be in this mode of reasoning makes it tolerably plain that to talk of a slight thickening of the membrane, or a small perforation, as a cause of extreme deafness, implies a misapprehension of the diagnostic value of such pathological changes. This is made still more apparent, as regards perforation of the membrane, by the consideration of cases reported in the *Lancet* of May 29, 1875, where some accidental ruptures of the membrane were not attended by any appreciable loss of hearing power.

A due regard to the value of appearances in the tympanic membrane, far from inducing a superficial examination of this part, should make inquiries in this direction the more exhaustive, so that changes from health may become the marks on an index telling of still further changes beyond. Thus, a loss

of translucency and lustre in the membrane points at once to catarrh either past or present. If past, either recovered from, or having left impaired hearing, which tells truly of induration in the lining membrane of the tympanum; if present, showing surely that secretion has lately or is still taking place, and so calling for immediate treatment. Beyond all other changes in the tympanic membrane, in diagnostic value and as a guide to treatment, are deviations from the natural plane of the membrane. A passing or permanent obstruction of the Eustachian tube cannot fail to leave its mark on this structure by the increase of its curvature and alteration in position of the malleus. No less important are the partial or complete collapse of the membrane, increased mobility on inflation of the tympanum, as well as thinning of the membrane in parts, together with bulgings and bladder-like protrusions. All these appearances and many more mark in language plain and intelligible the results, and for the most part remediable results, of catarrh of the middle ear.

No. V.—FATAL CASES OF DISEASE OF
THE MIDDLE EAR.

February 3, 1877.

ALTHOUGH the occasionally fatal results which attend cases of perforation of the membrana tympani are well known to the profession, it is to the fact of this

affection being so common that we must attribute the indifference with which a discharge from the ear is generally regarded by so many, and for the same reason the deaths which are due indirectly to perforation of the membrana tympani might be not inappropriately spoken of as accidents in the course of disease. From whatever cause arising, where once the tympanum has become the seat of inflammation, and pus has made for itself an exit through the tympanic membrane, if the perforation does not heal within a few weeks, the prospect of closure ever taking place is very remote. The condition then arrived at in the ordinary course of events is that the cavity of the tympanum becomes a surface subject to suppuration, and discharging more or less, or ceasing to discharge, according to surrounding circumstances. Given a large number of persons with perforation of the tympanic membrane, it admits of no question that a certain proportion of them will die from inflammation of the brain or its membranes, and that others will die of pyæmia. It may be true enough that every physician and surgeon to a large hospital has these facts sufficiently often brought before his notice to be familiar enough with these cases as soon as he meets with them; still, it cannot be too often repeated that a tympanic membrane whose perforate condition may date from infancy, and be the source of an occasional purulent discharge till advanced life, can at any time during this period of life be the indirect cause of a rapidly fatal affection, until the surprise which death from this cause creates is replaced by greater attention to the condition of

the ear. Even then, with every precaution, a few cases, though far less than heretofore, will, I believe, terminate fatally.

Considerably more notice to this subject has this year been directed by papers in some of the journals, and especially in reference to its bearing on life assurance, by Dr. Cassells, of Glasgow, and others, confirming the opinion which I expressed on the matter in the *Lancet* for 1872, as follows:—"I believe that a discharge from the ear is regarded by insurance companies as an element against granting a policy, or at any rate demanding an increased premium. I can only say that, if it is not so regarded, it would be, if the companies consulted their own interests."

There would appear to be two almost distinct divisions in these cases—viz.: the first, in which the fatal symptoms make their appearance soon after the attack of inflammation in the tympanum and rupture of the tympanic membrane; the second, in which the symptoms do not appear until the discharge from the tympanum (and sometimes the mastoid cells) has become chronic. In the first, I believe, must generally be placed the unavoidable deaths; in the second, those in which care and appropriate treatment will oftentimes place the patient in a position of safety.

During the past year three most noticeable instances of those in the first division came under my notice: one, where an elderly gentleman died of meningitis within a few weeks from the time when the tympanum became the seat of inflammation; another, where the same course of events occurred to a middle-

aged man; and a third, in which a young boy died from pyæmia, the first rigor happening before I saw him, and a few days only after the tympanum became inflamed. However grave these cases may be, nothing of especial value would be gained by relating them in detail. But the other division cannot fail to be of great surgical interest. In this the local condition of the ear generally met with will include complete or nearly complete loss of the tympanic membrane, the tympanum being in each instance a suppurating cavity, the surface of whose lining membrane is either studded with exuberant granulations, or is the origin of a polypoid growth, which completely fills it, and in some instances protrudes into and beyond the external meatus. Occasionally added to this will be found a bony growth, a so-termed exostosis, in the meatus.

A more perilous condition than some of these complications entailed can hardly be conceived—how perilous is sufficiently well attested by the number of deaths which take place from meningitis and pyæmia induced by this state of things. At the present moment, however, I desire especially to direct attention to how the fatal termination may often be prevented, and shall probably best illustrate this matter by relating briefly the following.

CASE 1.—In October, 1874, I saw a middle-aged lady who had for many months at times been subject to a discharge from the left ear, attended with considerable deafness, but to which she had paid little attention. She began to suffer during the early part of the year from occasional severe pains in the

head, which were considered to be neuralgic, and for which she had visited German baths and tried a variety of remedies. In the summer of the year she had frequent attacks of giddiness. Amongst others she had consulted Dr. Buzzard, who referred her to me for an examination of the ear as probably being the source of her discomfort.

There was a profuse discharge from the ear, and a polypus which blocked up the furthestmost portion of the meatus, and obviously was interfering with the escape of discharge from the tympanic cavity. She objected to my at once removing the growth. Within a fortnight the symptoms became more urgent in their character. She was so giddy that she could not walk upstairs or for any distance without support; the pains in the head were so severe as to interfere with her rest, and her general health was becoming seriously affected.

On a consultation with Sir W. Fergusson and Dr. Buzzard it was decided that the polypus should be removed. I accordingly took it away the next day (under ether). After the removal it was found that the tympanic membrane was completely ulcerated away, and a small portion of the bone at the lower part of the tympanic cavity was exposed. The ordinary local applications were subsequently used to the growth, all the pains in the head and giddiness gradually passed off, and by the early part of December there was so little discharge that it could not be detected except by very close examination with the speculum, and she had returned to her accustomed health.

From time to time I see this patient. She has had no repetition whatever of the head symptoms, and the growth has shown no signs of returning. Can there be any reasonable doubt that, in the absence of any decided treatment, the case would have followed the usual course, so often terminating in cerebral abscess or meningitis?*

CASE 2.—A young gentleman, aged eighteen, was brought to me in September, 1874, with the following account:—At nine years of age, after scarlet fever, he had a discharge from both ears, which had continued more or less ever since. Up to twelve days before I saw him, with the exception of the discharge and considerable deafness, he was in good health. On that day, whilst in the garden, he had an attack of giddiness, went into the house, lay down on the sofa, became insensible for several minutes, and was violently convulsed. From the account given by a male relative who was present, the fit appeared to be of an epileptiform character. He had no recurrence of the fit, but occasional giddiness, and a feeling of uneasiness in the head (scarcely amounting to pain) on the left side.

Both tympanic membranes were perforated; he could blow through each; and on the left side there was a small polypus, evidently growing from the lining membrane of the tympanic cavity.

The question at issue was, were the attacks of giddiness and the epileptiform fit due to cerebral irritation caused by the condition of the left ear?

* January, 1887.—This lady has had no further trouble from the ear, and is in good health.

I removed the polypus; it was about the size of a sweet-pea, and of the usual fibro-cellular form. Careful examination with a probe did not detect any exposed bone.

The root of the polypus and the surface from which it sprang were treated with caustic application, and the hearing was very materially improved by wearing the usual form of cotton-wool support to the tympanum. There has been no recurrence of the head symptoms or any return of the growth.

CASE 3.—The patient, a female, seen in August, 1874, had for many years been subject to discharge from the left ear, with deafness so slight that it gave her no inconvenience. For two months previously she had short periods of distressing pain in the left side of the head in the temporal region over a space that could be covered by the palm of a hand, coming on sometimes every few hours in the course of the day, and at others absent for two or three days. Together with the pain, and occasionally without it, there was a feeling of giddiness. The effect upon her had been to reduce her to a painfully nervous state.

The tympanic membrane, with the exception of a slight rim (a condition quite compatible, by the way, with very fair hearing), was absent. The exposed surface of the tympanic cavity was covered with exuberant granulations, and there was a very small fleshy growth (scarcely large enough to be dignified by the name of polypus) in the lower and posterior corner of the furthestmost portion of the meatus.

The treatment was of the simplest kind. The little growth was taken away; to the granulations

on several occasions nitrate of silver was applied. With the aid of the syringe she kept the ear thoroughly free from secretion, used the liquor plumbi on cotton-wool, and subsequently other astringents, to the exposed tympanum.

Suffice it to say that with the improved condition of the ear all the pains in the head and giddiness disappeared, did not return, and her health was proportionately improved.

These cases are most striking examples, but others with symptoms of a less definite and marked character are most common. In fact, it is a matter of almost daily observation for patients who present themselves with extensive perforation of the tympanic membranes to complain of frequent pains in the neighbourhood of the affected ear—pains which sometimes extend over the half of the cranium,—such symptoms being often accompanied with attacks of giddiness.

Can there be a question as to these patients being in a position of more or less peril? Can it be a matter of surprise that some of them eventually become the subjects of meningitis? It would be natural to expect that this occurred more frequently than it does, when the position of the suppurating surface is remembered. The routine of desirable treatment has been indicated in the foregoing cases, and may be shortly said to consist in the removal and complete eradication of polypus where it is present, an improvement of the general condition of the tympanum by astringent applications, and the use of an artificial support in the form of the flattened pad of cotton-wool, learned to be adjusted by the

patient. Under the use of this latter application the tympanic cavity is always protected from the external air, and a profusely suppurating granular surface is soon replaced by a more healthy condition of mucous membrane, in which the discharge scarcely suffices to coat the pad when it is daily exchanged for a fresh one. By scrupulous cleanliness and such attention to details the fatality in these cases may, I believe, be immensely diminished, and I am the further encouraged in this view by remembering that many of the deaths from meningitis which have come under my notice have been in those where the condition of the ear has not obtained attention until premonitory symptoms of pyæmia or meningitis have set in. In these, as in all others, death has generally followed when there has been a distinct rigor.

In conclusion, I cannot help repeating that when a polypus by its presence acts as an obstruction to the egress of discharge from the tympanic cavity, the propriety of removing it is so obvious as scarcely to merit discussion. How obvious this is may be frequently seen in the examination of these cases, when, by pressing the growth on one side with a small probe, a quantity of foetid pent-up pus will escape from the tympanum. The most ready method of operating in these cases has previously been considered in the *Lancet* and elsewhere, but the method by which the polypus is removed is (provided that it is entirely taken away), comparatively speaking, a trivial matter, the chief difficulties being in the after-management, which shall insure its complete eradication, so much so that the truly important part of

treatment may be said to commence after the operation. This after-treatment demands the greatest care and patience. It is not enough that the root of the growth should be destroyed, but the small portion of mucous membrane from which it springs must be treated in a like manner. In doing this the utmost caution should be used not to touch any part of the surrounding tissue, as this is in the highest degree sensitive; and if the caustic comes in contact with this part, it not only causes extreme pain, but is liable to excite great irritation and inflammation, which, it is hardly necessary to observe, is most undesirable and dangerous in the locality under treatment. To avoid any chance of this it is necessary that the surface under manipulation should be thoroughly dried before the application of any caustic, and that the reflected light used for illumination should be the brightest obtainable. The subject of exostosis in the external meatus, as a complication in cases of perforation and polypus, was discussed in the *Lancet* of January 22, 1876, so I make no further allusion to this at present.

No. VI.—SYPHILITIC AFFECTIONS OF THE EAR.

February 10, 1877.

THERE are several ways in which syphilis may be the means of causing either permanent or temporary loss of hearing; and the most important of these,

perhaps, is the extreme and irremediable deafness which is sometimes met with in the children of syphilitic parents. Next to scarlet fever, inherited syphilis may be reckoned as the most fruitful cause of deaf-mutism as it occurs in children who are born with good hearing power. This is owing to the very early age at which these children generally become deaf, and the rapidity with which all hearing is sometimes lost. Out of a large number of children who markedly inherit syphilis, only a certain proportion of them will lose their hearing; and from this large number the selection of subjects (so to speak) who are to become deaf follows no law with which we are acquainted. A similar apparent uncertainty may be observed as to the rapidity with which the hearing is lost; for whilst with some in a few months, or occasionally a few weeks, all hearing is gone, with others several years of gradually increasing deafness precede the extreme degree which it finally reaches. With others, again, some degree of hearing power remains throughout life.

The disease under notice is essentially a nervous one—*i.e.*, the nervous, and not the conducting part of the auditory apparatus, is at fault. It is of the utmost importance that this affection should be clearly recognized as having no connection whatever with changes that may be found in the tympanum. I have frequently known considerable confusion to exist on this point, and in the following way:—A deaf syphilitic child is observed to show evidence of more or less tympanic disease; it is straightway argued that this local affection is due to the inherited

syphilis. The child gets well under treatment, and the syphilitic affection of which I am speaking is said to have been relieved by certain remedies, the true explanation being that the syphilitic child, unaffected by syphilis so far as its ears are concerned, has had a catarrhal disorder of the middle ear, which has yielded to the ordinary remedies applicable to such cases. Or (to give another example) a child who is deaf in part from inherited syphilis, and in part from tympanic disease otherwise acquired, derives partial benefit from treatment, and the syphilitic affection is said to have been relieved. Errors of this kind are the result of a too limited observation, and to estimate clearly the value of any treatment in the syphilitic nervous affection it is necessary to notice the course of the disease as seen in those children who possess healthy tympana, together with the rest of the middle as well as the external ear in a condition of perfect health. With such as these no treatment within the knowledge of reliable authorities has the slightest influence on the hearing, and it will also be observed that vibrations of sound (which would be well heard if the tympana only were affected) conveyed through the cranial bones make no impression whatever.

Along with the impaired hearing there is almost always some other distinctive mark of syphilis: the characteristic teeth, interstitial keratitis, or both. Again, in these children there are certain limits of age at which the hearing suffers. Thus, they are born with good hearing; the most usual time at which they become deaf is early childhood (after they begin to talk), or the period between this and puberty.

The eldest example in which I have observed this form of ear disease to begin was twenty-three years old, so that it may be roughly said that if adult life is reached with good hearing, these subjects do not become deaf from the same causes which produce this symptom in earlier life. Whether the seat of the lesion which impairs the functions of the auditory nerve is in the labyrinth or in the nerve before its termination in this structure, has not at present been determined. Attention was first directed to the existence of the lesion by Mr. Jonathan Hutchinson.

Acquired constitutional syphilis affects the ear both as regards the nervous and the conducting parts of it. In the first place, as is well known, it is no uncommon thing for a man to become more or less deaf whilst he is suffering from what used to be called secondary symptoms, and this, without any evidence whatever of obstruction of the Eustachian tubes or affection of either tympanum. The healthy condition of these parts, the difficulty with which a vibrating tuning-fork placed on the vertex is heard, show at once that it is the nervous and not the conducting part of the ears which is at fault. Far more often than not, both ears are affected at the same time, and the deafness is very seldom anything like total; only once have I seen this to be the case, and the patient recovered his hearing in six months, under treatment directed to the constitutional disorder. This is the way in which such cases get well, no treatment especially directed to the ears being necessary. However, the eccentricities of disease here, as elsewhere, show themselves, so that occasionally

permanent loss of hearing will remain in one ear, even though the other has recovered its function.

It is interesting to notice, in examining this class of cases, that, as in most other affections of the labyrinth, the very high notes are frequently not heard, however loudly sounded; whilst the inability to hear low notes may be, in comparison, very slight. This, as has been noticed by Dr. Roosa, would induce us to localize the affection to the cochlea. The same favourable termination which usually distinguishes syphilitic disease of the labyrinth in the early portion of the syphilitic history of its subject (that part of the history which includes the rash and sore-throat) does not hold good in the later periods of the disorder. I mean that a patient in whom syphilis has appeared (during a period to be counted by years) in its infinite variety will, in addition to his multiform troubles, have at times added to them an intense and irremediable deafness which obviously depends on some intracranial change. Another way in which constitutional acquired syphilis affects the ears at the time of the ulcerated throat is by extension from the fauces up the Eustachian tubes and into the tympana. This shows itself by the same symptoms as an ordinary catarrh of the middle ear; and so, in addition to the local management of the throat and the medicinal management of the patient, it is necessary to make use of the general methods of treatment for catarrh of the middle ear, such as the air douche and injections to the tympana as may be required. It may be mentioned, in passing, that with these patients, if an Eustachian catheter is used, it should be put aside

for the exclusive service of that patient, as syphilis has been occasionally communicated by carelessness in this respect.

As a rule, these cases make an excellent recovery, but sometimes the catarrhal affection proceeds to suppuration in the tympanic cavity, and consequent rupture of the membrane. In one case under my care about a year ago, where this had taken place (the patient having an ulcerated throat at the time), the character of the ear-complication was well shown; the discharge from the tympanum in its passage outwards had excited the growth of syphilitic warts at the orifice of the external ear—to me a new landmark in the many routes adopted from time to time by syphilis.

No. VII.—ON THE LOSS OF HEARING
POWER WITHOUT PERCEPTIBLE LOCAL
CHANGE.

August 11, 1877.

IN the examples alluded to in the following remarks I presuppose that the conduction of sound to the labyrinth is perfect—in other words, that the external ear, the tympanum, and the Eustachian tubes are in each case in a condition of health.

A lady, who some few years ago was under my observation, went to India to join her husband, and, upon landing, was driven to the house where he had suddenly died a few hours before her arrival. Walking into the house with good hearing, she

came out of the room in which her husband lay dead, stone-deaf. In the course of six months she recovered some slight degree of hearing power, but never improved beyond a point which made a clearly articulated word spoken loudly close to either ear audible.

A young lady whom I saw in the present year became the subject of a similarly sudden loss of hearing, though in a less degree, upon receiving intelligence of the death of her father. She never afterwards noticeably improved.

That emotional causes exercise a very decided influence on the function of hearing cannot fail to be observed by those who are in the habit of paying attention to affections of the ear. Prolonged anxiety and mental strain, however directed, are quite sufficient to at one time materially damage, at another to destroy in great measure, the function of hearing, without any predisposing cause so far as can be ascertained. Perhaps because women are, more than men, mastered by their emotions, it is far more frequently in their case that such causes appear to exercise an influence in this direction. The absorbing attention with which they tend their sick relatives during long and serious illnesses, the utter desolation which overwhelms them at the loss of those in whom all their interests are centred, will sufficiently explain this. However this may be, it is a matter which admits of no question, that when the strain of mental anxiety ends, as it must in the nature of things, in the giving way of some part of the organism, with women deafness and the

subjective symptom of tinnitus seem more often due to such causes than in the case of men.

Did I wish, I could enumerate a very large number of illustrations to these remarks, but the two already briefly alluded to are sufficient to indicate the direction which such observations would take. For the rest, it is more fitting that they should be numbered amongst the unrecorded list, in which may be found that sprinkling of romance which obtrudes itself upon all of us in our daily routine of work.

As might be anticipated (although this is not without occasional exception), excessive strain on the intellectual powers is more often with men harmful to the nervous part of the auditory apparatus than is the undue exercise of the emotions. Among barristers, physicians, literary men, politicians, and business men will be found instances where deafness and tinnitus may be traced to overwork. Whilst many of these overworked fail in some other direction than the one here indicated, it happens to such as myself to have brought before their notice the instances in which the hearing becomes the failing part. In looking at this matter in as broad a manner as possible, the question naturally arises—Was not the hearing faculty a weak part of the machine before it manifested symptoms of declining power? With some of these there would seem to be a predisposition (inherited) for the hearing power to decline at the time of life when degeneration commences, but with others no evidence of this kind can be elicited, and such an explanation is often distinctly negatived

by the fact that the hearing is lost in early life. It must then suffice for us to recognize such change when brought before us, and use what influence we may have towards restoring the mental and bodily health.

Similar conditions to these, which may be traced to mental causes, again and again force themselves on our attention, and test all our ingenuity to discover the origin of the condition. Exceeding care in clinical investigation will, however, do more in this way than would at first sight appear possible, and cases may, as it were, be placed into classes so defined as to their histories, symptoms, sudden or gradual advent of symptoms, that something like accuracy may be arrived at, not only in such classification, but, what is of more material value, in predictions as to the future prospects of recovery, permanence or certain increase of the loss of hearing to be looked for.

For instance, a young woman who, without any change in the outer or middle ear, becomes deaf during her first confinement, is pretty certain to be subject to an accession of this symptom on every repetition of this event, and will be in danger of increasing it indefinitely if she nurse her children.

The incessant noise which some manufacturing and iron-plating establishments inflict on the ear is shown to be so against what the ear is intended to be subjected to, that extreme failure in its natural functions very frequently is the result.

What happens to some from these oft-repeated sounds is in others effected by a single explosion or

noise near the ear. Our sailors and soldiers are too familiar with this, and know well how an unexpected explosion of a gun is to be dreaded, and how far more irretrievably damaging are the explosions from brass guns than from some other kinds. The railway whistle sounded unexpectedly has been within my knowledge the means of destroying the hearing of many. This was curiously shown a short time ago in the case of a man whose business made it necessary for him to pass much of his time on locomotives. He told me that whilst on an engine five years ago, the whistle was sounded unexpectedly, and he immediately became, and remained, intensely deaf in the left ear. Precisely the same accident happened to him in the case of the right ear ten days before I saw him.

With these accidents must be classed those where a slight unexpected tap on the ear has produced deafness. From all these accidents I exclude those in which the tympanic membrane has been ruptured. In passing, I say of them that the precise lesion is not known, and we are obliged to call it *shock* (whatever that may mean), and to conjecture, and to perhaps suggest, rupture of a small vessel in the labyrinth—in short, an apoplexy. With as fair a show of reason, we may conjecture in a like way on the lesion in those cases which, for want of a better name, have lately been spoken of as Menière's disease. A man or woman falls down in a giddy fit, perhaps vomits, and on recovery is found to be very deaf in one ear; or a giddy fit is followed by a loss of hearing. The loss is intensified, again and again, by successive attacks of

giddiness. Tinnitus is in such instances a prominent symptom. I am as familiar as possible with these cases, insomuch as I extract by questions these histories nearly every day of my life when I am asked about the symptoms of deafness (which, by the way, never gets in the least degree better), and I find that physicians of long experience are familiar with these cases, because they simulate symptoms which, proceeding from other causes, indicate danger to life. What is the lesion? We know all the theories about the semicircular canals being affected, but they again amount to no more than conjecture. No evidence that I can find either settles the character of the lesion, or even the seat of it. *Spero meliora*, but to-day I can get no nearer than to say there is a deviation from health in the origin, course, or termination of the auditory nerve. The fact of vomiting accompanying the giddiness or succeeding to it points rather to the origin of the nerve being the part affected, as we are led to think of the close relation of the origin of the auditory and pneumogastric nerves; but, on the other hand, how constantly is a patient the subject of giddiness from the pressure of cerumen on the tympanic membrane, such pressure being transmitted through the chain of ossicles by means of the stapes on to the labyrinth. How often again are patients made giddy by syringing the ear when the tympanic membrane is entire, especially when the water used is not very warm, and how much more often when the membrane is perforate. I have seen more than once a patient fall off the chair in which he was sitting whilst the ear was being syringed, and on

several occasions an instantaneous vomiting without a premonitory sensation of sickness.

In cases where giddiness is a prominent feature in connection with deafness, it is worthy of notice that the very high notes are amongst the first to be lost, so that it would appear that the cochlea was one of the parts affected; and whilst on this subject, I may say that it is also the case in many other diseases of the nervous apparatus of hearing. Careful experiment will show that a large number of persons in advanced life are incapable of hearing very high notes—notes which correspond, for example, in the frequency of their vibrations to the call of a partridge or the sound from a cricket. This may be readily demonstrated by experiments with one of the whistles constructed on the plan devised by Mr. Francis Galton. More than is at present known on these matters will, I trust, by-and-by be discovered, and increasing knowledge in this direction will help much to localize the seat of lesion in nervous affections of the ear. The precise character as well as the position of morbid change can, however, only be satisfactorily shown where, side by side with the history, the objective and subjective symptoms, are placed post-mortem changes that can be demonstrated beyond a question.

In nerve tissue this will, from the nature of the case, be always a difficulty, but difficulties are made to be overcome. What can we say of tinnitus? Pages might be written about the symptoms, the countless conditions under which it is a prominent symptom in one ear or both. Sometimes we can

produce it, account for it, remove it; at others, we can do little or nothing. It may be caused by pressure on the tympanic membrane (and so on to the labyrinth), by inflammation in this membrane, inflammation accompanied by effusion in the tympanic cavity (here again is pressure on the labyrinth), inflammation of the external meatus or the mastoid cells, by the action of certain drugs, such as quinine or salicylic acid.

The effects of quinine, for example, are well-known in India to be by no means always transitory: from my own experience I know this well. In nearly all nervous ear affections tinnitus accompanies the deafness. If we can relieve the one we generally can the other. This is instanced in constitutional syphilis among nervous diseases; and, to go back to affections of the middle ear, the tinnitus and deafness often disappear simultaneously under treatment. People may be found to talk of functional deafness (so far as I understand the English language, all deafness is functional), but an instance of what they mean would be when a man becomes suddenly deaf with no apparent cause, and recovers as suddenly after a free purge. Here we should perhaps be not too presumptuous in saying the loss of hearing depended on passive or active congestion in the neighbourhood of the head, but more than this we certainly do not know. I have been asked to prescribe on two occasions for men in middle life who had for several weeks, when in apparently good health, suffered from symmetrical loss of hearing and tinnitus. No cause was discoverable for these symptoms, and in

each case some few weeks afterwards the patient became maniacal. Possibly physicians of experience in mental disorders are accustomed to look upon these symptoms as premonitory of acute mania, or it may be that the relation of the one to the other (I mean the deafness to the mania) was a coincidence. The pathological changes on which either depended were there, though perhaps not recognizable. Certain it is that in cases where the most furious tinnitus has persisted for years, the most careful examination has been made after death by the most accurate of observers, and no deviation from health detected in the brain or any part of the apparatus of hearing.

In common with this subject, an interesting question suggests itself, as to the nature of the nervous lesion which follows certain illnesses, especially the fevers and mumps. Here, again, it must be repeated that from the cases here spoken of are excluded all those in which the middle ear has been in any way involved. The results of inflammation of the tympana come within a category distinct from these. I am now referring to the instances where the conducting apparatus is perfect, the perceptive part of the ear damaged or destroyed, where the deafness so often observable during the fever remains without alteration, although in other respects the recovery to health is complete. Caused at first, let us suppose for a moment, by the cerebral congestion incident to the fever, if the symptom of deafness subsides in the one case, why not in another? Mumps affords a still more curiously striking instance of a similar nature. I have known patients suffering from this complaint,

without the least feeling of discomfort in the ear at any time, to be hearing perfectly at one hour, and within two hours afterwards to be stone-deaf in one ear, sometimes in both. Hence, when its subject is under five or six years old, mumps comes to be numbered amongst the already numerous causes of acquired deaf-mutism. What the precise character and position of the lesion may be is as yet not known.

NO. VIII.—THE PROGRESS AND TERMINATION OF INFLAMMATION WITHIN THE TYMPANUM.

February 21, 1880.

IN the early stage of inflammation within the tympanic cavity, none but a very rash or ignorant man would venture to do more than suggest probabilities in regard to the future—either as to life or death, good or faulty hearing, perforate or an entire membrane. Again, should the membrane give way from ulceration, a similar uncertainty may be said to exist as to its ultimate closure, unless it has been entirely destroyed during such a process. To the patient, however, it is of immense importance which out of this list of possibilities may eventuate, and it is satisfactory to be able, by a careful consideration of the parts under observation, to direct his attention to the details which should be attended to in the management of his case. For example, when, in an adult, a few days of pain in the ear

is succeeded by a purulent discharge and relief from the pain, what is more common than to find him syringing the ear with some astringent lotion, perhaps composed of a solution of sulphate of zinc or acetate of lead, with the idea of checking the discharge, which annoys him? The effect of this treatment is threefold. The edge of the perforation cicatrises, the discharge visibly decreases, and the patient is more deaf than before he commenced this treatment. Thus the chance of a closure of the perforation is enormously decreased, and so perhaps for the rest of his life he is in more or less danger of cerebral complications. Now whilst no pathological state of the ear is more frequent than a perforation, a scarcely less common one is an entire membrane that has at some previous time been the seat of a perforation, and this is due to the fact that a discharge from the ear in children is often allowed to remain without any treatment, and so they escape being subjected to the syringing by astringents just mentioned. Children, as we know, are peculiarly liable to inflammation of the middle ear from catarrhal causes; the membrane most readily gives way, and, when no very great extent of tissue is lost, it as readily heals. The condition most favourable to healing is scrupulous cleanliness, and this, to be effectual, cannot be achieved solely by syringing, but should include the expulsion of purulent matter from the tympanum. In other words, whenever the patients are old enough to be taught, they should blow through the perforation whilst the ear is being syringed; or, if too young to do this, the same

result must be brought about by using Politzer's method. In doing either, the cavity of the tympanum is freed from the pus which collects in it, and it is this collecting of purulent matter which helps to retard the healing. If it be thought that such a mode of cleansing the tympanum is likely to interfere with the healing process, it may be remembered that when an opening has been artificially made, a similar proceeding, however assiduously employed, will not prevent closure for more than a few days at the most. But what is more useful than theorizing by analogy is the fact that experience shows this cleansing process to be constantly followed by healing when it is commenced sufficiently soon—*i.e.*, before cicatrisation of the edge of the perforation has taken place. In the early days, then, of a small perforation, the prospect of healing is very good, and anything even of the most simple nature which will facilitate this is well deserving of attention. In a previous contribution I have shown how general is the closure of a perforation accidentally produced, even after the purulent discharge has been established, and such a case differs but little from a perforation effected by disease if the loss of tissue has been small. But how fares it when the loss has been extensive? To this it must be answered that where there is a very large opening it remains for a considerable period, and at times during life; certainly for life if all the membrane save a narrow rim has been lost; but healing can never be declared impossible if so much as half the membrane is left; indeed, even two-thirds have been known to be

restored. This restoration, after long periods of discharge, cannot be definitely started in such instances, and it is delayed perhaps for years; but that it does take place, and apparently from no assignable cause, is a matter of common observation when patients present themselves, after an absence of several years, with an entire membrane, but one that had previously been noted in the case-book as having been perforate.

When the function of the membrana tympani as a protective membrane is suspended by the admission of air through a perforation, and the lining membrane of the tympanic cavity is thus converted into a suppurating surface—in other words, when a fistulous opening has been fairly established, the minimizing of the discharge is found to be accomplished by the application of some suitable material to the tympanum, which protects it from the external air. The unsuitable nature of gutta-percha is one of the several reasons which has led to the disuse of Toynbee's so-called artificial membrane, and the theory of the manner in which this occasionally increased the hearing power need not be discussed here. Suffice it to say that, if pressure on the stapes is required, it may be effected in a variety of ways, and in such a manner that, whilst air is excluded from the tympanum, the exposed mucous membrane is tolerant of the application. Until both these requirements are satisfied, no permanent diminution or cessation of the discharge may be expected; but when they are, there can be no sort of doubt but that the chances of cerebral inflammation are enormously

lessened and well nigh destroyed. Under such favourable conditions, the membrane, in the course of months or years, is often found to be considerably increased in area; the exuberant granulations disappear, and are replaced by a fairly healthy surface. The complaisance with which a discharge from the ear is regarded for the best part of a lifetime would be surprising if the same carelessness were not exhibited in other matters connected with the health, and the idea with the public seems to be generally prevalent that it is comparatively harmless, until perhaps an insurance office, more cautious than usual, refuses to insure the life of the individual so suffering. Another very general impression (and one not altogether confined to the public) is that a large perforation is more serious than a small one, the reverse of this being more in accordance with facts, as a large opening of this kind is far more easily managed than one of less size, not only as regards the hearing, but also as to the facility with which the tympanum may be protected.

If in the course of inflammation of the middle ear the portio dura in its passage through the tympanum becomes affected, it by no means follows that inflammation should have been so severe as to cause rupture of the membrane, or, indeed, very severe at all. No doubt facial palsy constantly occurs when the inflammation has been acute, and so acute as to cause in addition to the perforation caries of the bone, but the same accident to the nerve may happen after a very slight attack of earache followed by very

trivial deafness, which is soon recovered from. The advent, then, of facial paralysis in ear affections need not necessarily be regarded as pointing to serious change within the tympanum, but rather to the fact that the bony covering of the aqueduct of Fallopius is abnormally thin, and probably so perforate as to leave the nerve in an unusually exposed position. But whether the nerve soon or ever recovers its function will certainly depend upon the severity of the inflammation which has caused its paralysis. Thus I have often observed the paralysis following slight earache to be completely recovered from in the course of a few months, but in a case where the facial palsy followed the enterprising treatment of injecting a strong astringent through the Eustachian catheter, the action of the muscles was not regained for a very long period, and then only after prolonged treatment by the continuous current. Any change for the better is of course not to be expected when caries of the bony canal just mentioned has taken place, and in illustration of the tediousness of recovery may be cited two cases previously mentioned in these papers, the one where the nerve was injured by the point of a pair of scissors accidentally plunged through the membrane, and the other in which the paralysis followed the removal of an exostosis from the auditory canal by electrolysis.

From these remarks it will be obvious that whenever acute catarrh of the ear ends in a perforation of the membrane the sooner this structure gives way the better, for by this event the more or less complete disorganization of the contents of the tympanum

is avoided. Whilst it is clearly most desirable that, when it is possible, the inflammatory process should be controlled, as it often may be by leeching in front of and behind the ear, its progress is often so rapid as to preclude this possibility; and in scarlet fever and other exanthemata the serious condition of the patient very generally prevents the ear trouble attracting the attention which it otherwise would. How the hearing may suffer if the membrane in such cases remains imperforate for many days can be estimated by noting that it is sometimes quite lost in the ear so affected, and damaged but slightly in the other from which the discharge appeared much earlier in the attack. Again, it is not unusual to find a patient after simultaneous inflammation of both tympana totally deaf in the ear with an entire membrane, and hearing fairly well with the ear whose membrane is perforate.

If the results of inflammation within the tympanum are important as regards the loss of hearing or facial palsy, how much more so is the further disorganization and complications which may follow the prolonged suppuration induced by a fistulous opening into this cavity, such as bony enlargements in the external canal and morbid growths arising from the mucous membrane lining the tympanum. Both of these are often without doubt excited by the constant irritating presence of purulent matter, and either may at any time interfere with the escape of pus from the ear.

In the last volume of the "Transactions of the Medical and Chirurgical Society" I related a case of malignant growth which commenced in the tympanum,

and since that was published a similar case has come under my notice, in which death occurred from sudden hæmorrhage from the internal carotid. In this latter, as in similar instances recorded, a discharge from the tympanum had persisted for many years, and that which had all the appearance of a small polypoid growth, assumed, after a long period of quiescence, a malignant character. The same sort of history preceded another case, in which the growth was a round-celled sarcoma. Generally speaking, however, the importance of growths in the tympanum lies not so much in their structure (which is usually of a most simple character), but in the fact that they may, and do, become the indirect cause of death, by preventing the free exit of pus from the tympanum. If any point more than another demands careful attention in their treatment, it is not only their early removal or their complete eradication, but the defence of the tympanic cavity by some arrangement already referred to.

No. IX.—PERFORATIONS OF SHRAPNELL'S MEMBRANE.

June 21, 1884.

THAT portion of the membrana tympani just above the short process of the malleus which covers a small space communicating more or less freely with the tympanic cavity, and which goes by the name of Shrapnell's membrane, possesses an interest when it is perforated altogether disproportionate to its uses in

health. These uses begin as a protective membrane, and that they also end there I have convinced myself on several occasions by observing complete absence of this part when the hearing has been perfect. Perforations of the membrane of Shrapnell have received at various times brief notices at the hands of aural surgeons on the Continent and America.* There are certain points in connection with this subject that will, however, I venture to think, be of sufficient interest to warrant the following remarks. When the tympanic membrane has been completely destroyed in the process of ulceration, this small area sometimes remains, and at other times is destroyed. In either case no particular importance attaches to this circumstance, since no especial symptoms manifest themselves. But there exist a certain number of cases in which the loss of tissue is altogether confined to the membrane of Shrapnell, the membrane proper remaining intact. Out of several cases of this nature, the notes of which I have before me, in no less than six the hearing was absolutely unaffected. In five others the only symptom complained of was loss of hearing, and it was sufficiently obvious, both from the history and the usual methods of examination, that the deafness in these five was due to the products of inflammation and its results within the cavity of the tympanum proper. No inconvenience of any sort resulted from the loss of the membrane of Shrapnell itself; and although there had at some distant period been a slight discharge, this had ceased for many

* Vide writings of Burnett, Blake, Green, and an excellent description of this lesion in Politzer's Text-book.

years. The trouble, so far as the loss of the particular portion of membrane is concerned, had therefore passed; but with regard to others in which the hearing was good, there was more or less discharge from all; and although in some there was no pain, it was on account of the periods of deeply seated pain in the ear and in the region of the temporal bone that others applied for relief. In one case, that of a lady thirty-five years old, the pain had been most intense. For more than three years she had never passed a week without great suffering. There was a slight discharge. Local applications too numerous to mention had been poured into the external meatus. Hot fomentations and leeches only afforded a very temporary relief, and medicines of all sorts, such as are given for the so-termed neuralgia, had been taken at various times without any appreciable effect. The periods of pain were confined to no particular time, although they prevented sleep for part of the night; they invariably followed any exposure to the external air, and for this reason the patient not only kept wool in the external canal, but covered the ear with a pad whenever she went out of doors. Beyond the entrance of air into the ear no influence, so far as could be judged, excited it. On examination of the perforation with a small eye probe the roughness of exposed bone could be felt, but the spot was not in any way sensitive to the touch. It seemed from a consideration of the points mentioned that the best prospect of relief would be probably found in an arrangement which protected the exposed surface for a considerable time uninterruptedly from the action of

the air, and, finally, the most complete comfort was afforded by a thick covering of lycopodium powder. After the ear was carefully dried, the patient was directed to blow the powder through a piece of india-rubber tubing to which was attached a small piece of fine glass tubing. By carefully directing this along the roof of the external canal the powder was scattered over the perforation in a thick layer, which was allowed to remain for four or five days without being disturbed. Under the influence of this very simple treatment the discharge quite ceased, and the pain after a few weeks did not return. Beyond this no other protection was used, and, on the last occasion of seeing the patient, who was still using it, more than a year had passed without any return. It would appear that the reason why all previous forms of protection had failed lay in the fact that between the protection and the perforation there was a column of air.

In another case of a young lady who had a discharge from the ear since childhood, by a curious coincidence precisely the same condition was present in both ears—that is, the membrane of Shrapnell was absent, the other part of the tympanic membrane being intact; there was a profuse purulent discharge from the exposed surface; when the ear was syringed and dried the hearing was perfect; there were not any bone granulations at the seat of the perforation; and lastly, there was never pain. The small polypoid growths often observed in this situation, and so difficult to eradicate, are without doubt connected with dead bone, which extends slightly forwards,

and so encroaches on the roof of the external meatus. Remembering this, I cannot but think that, in those cases where pain is complained of, this is also the direction in which ulceration has taken place—(*i.e.*, on to the roof of the exposed canal)—as a point just anterior to the membrane of Shrapnell is frequently sensitive to the touch of a probe, although the probe may be put directly into the perforation without giving pain. In the case of another patient with this form of perforation, there had been a slight discharge since childhood, but no pain or loss of hearing.

No. X.—EDUCATION OF INCURABLY DEAF CHILDREN.*

It fortunately does not fall to the lot of many to observe the process by which a young child who, having in consequence of disease become incurably deaf, loses the power of speech; but it is most important that everyone should be familiar with the fact, because to a knowledge of the danger will frequently be added a means of its prevention. There are, it is well known, a number of diseases which induce complete or partial and irremediable loss of hearing; and if this incident or accident in the course of disease occur to a child before the age of seven or eight, in the ordinary course of

* Read at the International Health Exhibition, June 30, 1884, and printed in *Brit. Med. Journ.*

events the child becomes dumb. To appreciate the physiological process (for the loss as well as the acquirement of speech is a physiological process) it is only necessary to compare the case of a child, say six years old, of ordinary intelligence who has in the course of a few days lost all hearing power, with another case in which a child of the same age and speaking the same language is removed to a distant country, where it never hears a word of its first language; at the time when the first child has lost all articulate language (a period to be counted by months) the second child will be found quite unable to understand a word of its first language, or to indicate any object by a word in that language. The fact of it having acquired a second language in no way affects this. The explanation of the loss is the same in either case; namely, in whatever degree young children reflect, their thoughts are seldom formed to themselves into words (this does not come till much later in life, when it may be noticed that an adult who speaks two languages with equal facility, will detect himself thinking in either); children readily learn, but as readily forget; they depend for their thought so exclusively upon their immediate surroundings, that the relation of objects and acts to the words which denote them soon becomes dimmed and lost to them if they do not hear these words repeated.

Thus it will be seen that when a child has become suddenly deaf, he does not at once lose the facility of denoting objects by words, but the words are gradually clipped and spoken with increased indistinctness,

as time goes on, until they become absolutely lost. Let me here say that a very moderate extent of irremediable deafness is quite enough to induce complete loss of speech in young children, but that any degree of hearing which is left, ought, I think, to alter the course and method of instruction which should be pursued.

The following examples of the condition under which children may be left as regards their hearing, and the plan of education which I suggest, will illustrate what I wish to say.

1. A child who has entirely lost hearing and can read, should be made to read several times during the day, and be taught lip-reading. The constant repetition of the words which it has already used will cause them to be retained by reading, and an increased vocabulary will be acquired by the lip-reading.

2. A child who has become totally deaf and cannot read, should at once be taught on the pure oral system, and words which it could pronounce will, by constant repetition, be retained.

3. If a child can understand words pronounced in its ear, still better if it can hear a raised voice, it can be taught to articulate new words by making use of the hearing; its articulation, whilst becoming deficient, can be corrected, and efforts in this direction, added to lip-reading, will enable it to retain speech.

It cannot be too urgently insisted on that the educational treatment of this character must be commenced immediately after the occurrence of the deafness. When this is not done—that is,

when the originally acquired vocabulary has been lost, the education will have to be the same as that of a congenital mute, except for the important part of taking advantage of the partial hearing to correct the articulation; and thus speech will have to be acquired again. By processes carried out on these lines, but varied according to the circumstances of the case (of which skilled teachers will be the best judges), and especially regulated according to the amount of hearing left, numbers of children have, within my own knowledge, during the last twelve years, been saved from mutism. It will, I am sure, be freely admitted by those competent to form an opinion, that, up to a comparatively recent date, all children who suffered as I have described became dumb. It was the rule, to which I am unaware of an exception. If it be asked, Why was this? I reply, that before the introduction into this country of the pure oral method of education, no one could have been in a position to make the remarks which I have ventured upon to-day. The mode of proceeding with these children could not have suggested itself to anyone. It has become possible by means of a side path, so to speak, which could not have been opened unless the main road of the pure oral method had come into use. It is hardly necessary to say that a most complete revolution has taken place since the year 1871 in the mode of education of deaf children. When, in that year, on behalf of the Association for the Oral Instruction of the Deaf and Dumb, I had the privilege of directing public attention to the matter in a paper read at the Social

Science Congress at Leeds, "On the Education of the Deaf and Dumb by Means of Lip-reading and Articulation," with the exception of two or three small schools, the pure oral method was not taught in this country. The progress of the change which has taken place has been so familiar to me, I have taken so active a part in it, and have written so constantly in the press upon the subject, that I hope I may be allowed to say a few words upon it.

In the first place, I would ask permission to pay a passing tribute to the honesty of purpose and the indefatigable industry of the teachers of the deaf and dumb. It was but natural that they should at first regard with some degree of jealousy the introduction of a system which so completely put aside one in which great facility in teaching had been acquired, and which in its way was very successful; but the whole subject was fairly and carefully examined, and the oral method had not only been gradually adopted, but enthusiastically propagated by large numbers, amongst whom may be reckoned many of those who were at first opposed to it. The Association for the Oral Instruction of the Deaf and Dumb, which inaugurated the revolution to which I have alluded, was in a few years followed by The Society for Training Teachers for the Deaf and Dumb at Ealing, a society which has been doing its work with great energy, and adding immensely to the general diffusion of the system. Then must be reckoned the influence of the members of the medical profession throughout the United Kingdom; for they have, through the medical press, been made acquainted with the exis-

tence of the oral method; and, as it may be taken for granted that the medical man is the first person who verifies the fact of the child being deaf, it has become his duty to inform the parents of every congenitally deaf child that the oral method is within their reach. And here let me say that, after all, parents are those who should select the plan of education for their child, and the merits of the system must be judged by its results as observed by the parents. In 1880, I wrote as follows:—"What is the opinion of the better educated classes upon this method, may be learned from the following circumstance. In my position as aural surgeon to one of the principal metropolitan hospitals, a very large number of deaf children of all classes come under my observation. It has been my habit, on all occasions, not to advise as to either method of education, but to afford opportunities for thoroughly observing both. I can confidently assert, that on every occasion during the past seven years the parents have selected the articulate method; and whenever this plan has not been followed out, it has been in the cases of hospital-patients, whose means were not sufficient to meet the expense, and who were therefore obliged to place the children in asylums, or completely neglect their education. From such experiences as these, whilst having no doubt as to the advantages of the articulate system, it has become a question with me whether, for the labouring classes of the poorer sort, this system is applicable; not simply because of the expenses that are incurred during the education, but also on account of the number of years during which it is necessary to keep

the child at school." I may also add that the pure oral method is obviously unfitted for children with cleft palate, or those in whom sight is in any way deficient; and in one class of cases, where the loss of hearing is the result of disease, the vision is very frequently at the same time affected.

No. XI.—ADENOID GROWTHS IN THE PHARYNX.

October 2, 1886.

IN order to estimate the position which adenoid vegetations in the vault of the pharynx, in regard both to their diagnosis and removal, occupies in the domain of surgery at the present time, it must be borne in mind that, with the exception of two or three solitary observations, up to the year 1868 the existence and gravity of the disorder were not recognized. It was in this year that Dr. Meyer, of Copenhagen, published his first account of the subject, and in the following year brought the matter before the Royal Medical and Chirurgical Society. At the International Medical Congress of 1881 several papers on adenoid vegetations were read, and the various methods in use for their removal were most fully discussed. Thus it will be seen that the intermediate twelve years had served to render familiar in 1881 what was practically unknown in 1868. Taking into consideration these papers and their discussion, as well as the number of surgeons who now habitually treat this

affection, the extreme facility with which the growths can be recognized by an examination with the fore-finger gently introduced behind the soft palate may be said to be acknowledged; and should anyone question this proposition, it is open to him to verify it in any case which presents the usual characteristics of the affection by first examining a patient in whom the vault of the pharynx is healthy, and immediately afterwards the adenoid case. The difference of the two is too striking to escape even the observation of one who does this for the first time. Indeed, it was by an examination of this sort that Dr. Meyer discovered the growths in his first case. A rhinoscopic examination may be regarded therefore as supplementary to this, and in many cases, even in the most skilful hands, as impracticable—as, for example, in the case of young children. As a complete account of the methods adopted by various surgeons to effect the removal of adenoid growths between the two periods which I have named—viz., 1868 and 1881—may be found in Mackenzie's Manual, in the following brief remarks the history of the subject and the practice of others may be taken as read.

If one thing more than another stands out in relation to what is written, said, and done in connection with this matter, it is the necessity of tolerance for other methods whilst advocating our own, and for the following reason: that it is characteristic of the complaint that if the growths are removed in any way, so long as they are completely removed, the patients get well both as to nasal breathing and hearing. To illustrate what I mean, I may be permitted to refer to

a point which interested me very much in 1883. At the Congress, Dr. Guye, of Amsterdam, had strongly recommended a plan of scraping away adenoid vegetations from the pharynx by the nail of the right forefinger, and he had not limited himself in this to any class of cases. I knew also that my friend Mr. Cresswell Baber, of Brighton, habitually practised this plan without any selection of cases. It had appeared to me that if this were possible, nothing could be more satisfactory than to have in their removal the guidance of the sensitive finger which had detected the presence and the position of the growths; and I could readily understand how in the case of young children, when the growths were soft and friable and not in very large quantities, this could be done. When, however, as often happens, these growths are very numerous, of great size, and extreme toughness, I could not understand how the finger-nail of anyone could so embed itself in the tissue as to cut it clean away. I therefore had made for me a species of mechanical finger-nail constructed of steel, on a principle similar to Capart's spoon, but unlike it in action and construction (to which I shall refer presently), and with the help of this I could remove these growths with great completeness and with the most happy results. (See Fig. 1.) On the date mentioned—viz., October 1, 1883—I met Mr. Baber, and in discussing this question of common interest no doubt was left in my mind as to the fact that some finger-nails (notably Mr. Baber's) can be found sufficiently strong, and of such formation, to effect in the matter of operation all that is required without having resort

to any other method. What, however, can be done with the finger-nail only in individual instances ("individual" as applied to the operator) may be done by anyone if the steel nail is employed.

There are several considerations which have commended themselves to me in this method of removing adenoid vegetations from the pharynx. In the first place, when the mouth is held open with a Mason's gag, the pharynx can be most completely explored with the forefinger, and the amount of vegetations, their size and position, can be most satisfactorily estimated. The instant after this is done the steel nail can be fixed to the finger, and they can be

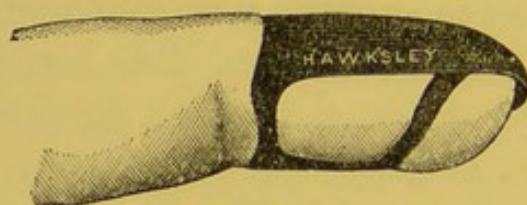


FIG. 1.

scraped away at leisure. When I say "scraped away," I mean that the steel nail can be embedded in them and made to cut them away. The head being bent forward at the time by the left hand placed on the vertex, the blood, which flows very freely, escapes by the nostrils. It will be observed that the instrument is so made that the tip of the finger is exposed, and this is most useful in estimating by touch what is being done. Although the whole proceeding does not occupy long, inasmuch as it is most unpleasant and in some degree painful, it is convenient and desirable in many cases, especially in young and timid children, that ether should

be given. The position in which the head is held prevents the possibility of blood passing into the larynx during an inspiration. Although at one time I was inclined to repeated rather than to immediate operation, I am bound to say that latterly I have found not one of the least of the advantages of the steel nails is that the pharynx is frequently cleared at one sitting—in the case of young children, cleared so completely that a fortnight after the operation, when the swelling which follows it has subsided, the mouth can be kept closed both waking and sleeping; the “deadness” of speech, so indicative of the affection,

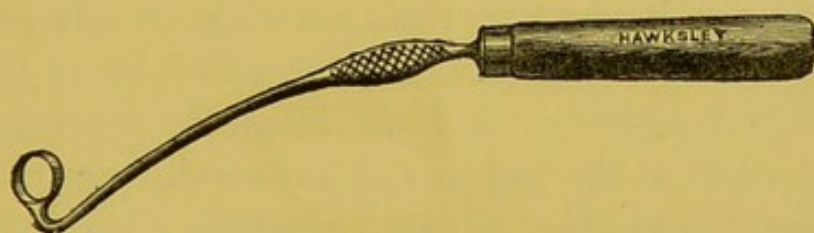


FIG. 2.

disappears; the passage through the posterior nares is restored; the Eustachian obstruction, with its accompanying deafness and the liability to it, is gone. In short, the results of this method have recently proved so satisfactory that in five cases of children in which I employed it (Mr. Braine giving ether in each) during one week no further removal is now necessary. In older patients, where the growths are tougher and very abundant, more than one sitting is generally required. The plucking away in pieces by Löwenberg's forceps will no doubt succeed in getting rid of the vegetations, but this entails several sittings, and some patients and their friends are apt to shirk what

is very disagreeable before the completion of the treatment. It is therefore better to avoid this when possible. Moreover, it is undoubtedly a great advantage to be able to feel with the finger the vegetations as they are being scraped off. This cannot be done with Löwenberg's forceps (or with Woakes' modification, which has the advantage of increasing the cutting surface), or with what is otherwise a most useful instrument—viz., a curved ring knife, which Mr. Hawksley constructed for me before the steel nail. (See Fig. 2.) With this knife, the ring being passed up into the pharynx behind the soft palate, the growths can be by a sweeping movement cut away. This knife is made on the same principle as Gottstein's, and although I have found it more easily moved about in the pharynx, I have seen cases where, in other hands than mine, the whole pharynx has been cleared at one sitting of abundant tough adenoid growths by Gottstein's knife. Notwithstanding the varieties in methods that are now in use, Dr. Meyer still, I believe, adheres (and with excellent results) to the plan which he described in what may be most truthfully said to be his classical paper on this affection in the "Medical and Chirurgical Transactions"—viz., his flexible ring knife passed through the nares into the pharynx, guided throughout its movements by the forefinger of the left hand; but as the unpleasantness of having the ring knife passed through the nares can be avoided by operating through the mouth in one of the many methods now adopted, his mode of attack, so to speak, is, from what I can learn, not followed out by others.

Looking back to a period when this affection was unknown, and the precise cause of the characteristic intonation in these patients was unsuspected, it is curious to notice how absolutely familiar Dickens was with the peculiarities of voice which mark the subjects of adenoid vegetations. He must have come in contact with some of them when he so accurately reproduces the voice in one of the characters in "Oliver Twist." There he makes the boy Barney (one of Fagin's gang) say "stradegers id the next roob," and "ah! ad rub 'uds too, from the cuttry, but subthig in your way, or i'b bistaked." From the context we may fairly suppose he believed this intonation was indicative of race, and he introduces it by way of emphasising the generally disagreeable peculiarities of the characters he so graphically depicts; but in this particular he certainly does Barney an injustice, for adenoid vegetations are to be met with in "all sorts and conditions of men," living under the most favourable or unfavourable circumstances, and in many latitudes. That they are frequently present in several of the same family cannot fail to be noticed (I have seen four in one family), and from the recollection of parents as to their own breathing and hearing in childhood, the tendency to abnormal adenoid development would seem to be inherited; but as the parents have arrived at the time of life when this enlargement has disappeared, it is not easy to establish this point. Besides the departure of three symptoms—viz., the tendency to Eustachian obstruction, the consequent deafness (which generally directs attention to the trouble), and the nasal obstruction—which

follows the removal of adenoid vegetations, there are other advantages to be reckoned, such as the better prospects of recovery in case of diphtheria or scarlet fever occurring, with an empty rather than a blocked pharynx, as well as the better chances of the middle ear escaping destruction during these diseases. The improvements also of the general health, with free nasal breathing, as well as the diminished tendency to bronchial affections, require only mention to be appreciated.

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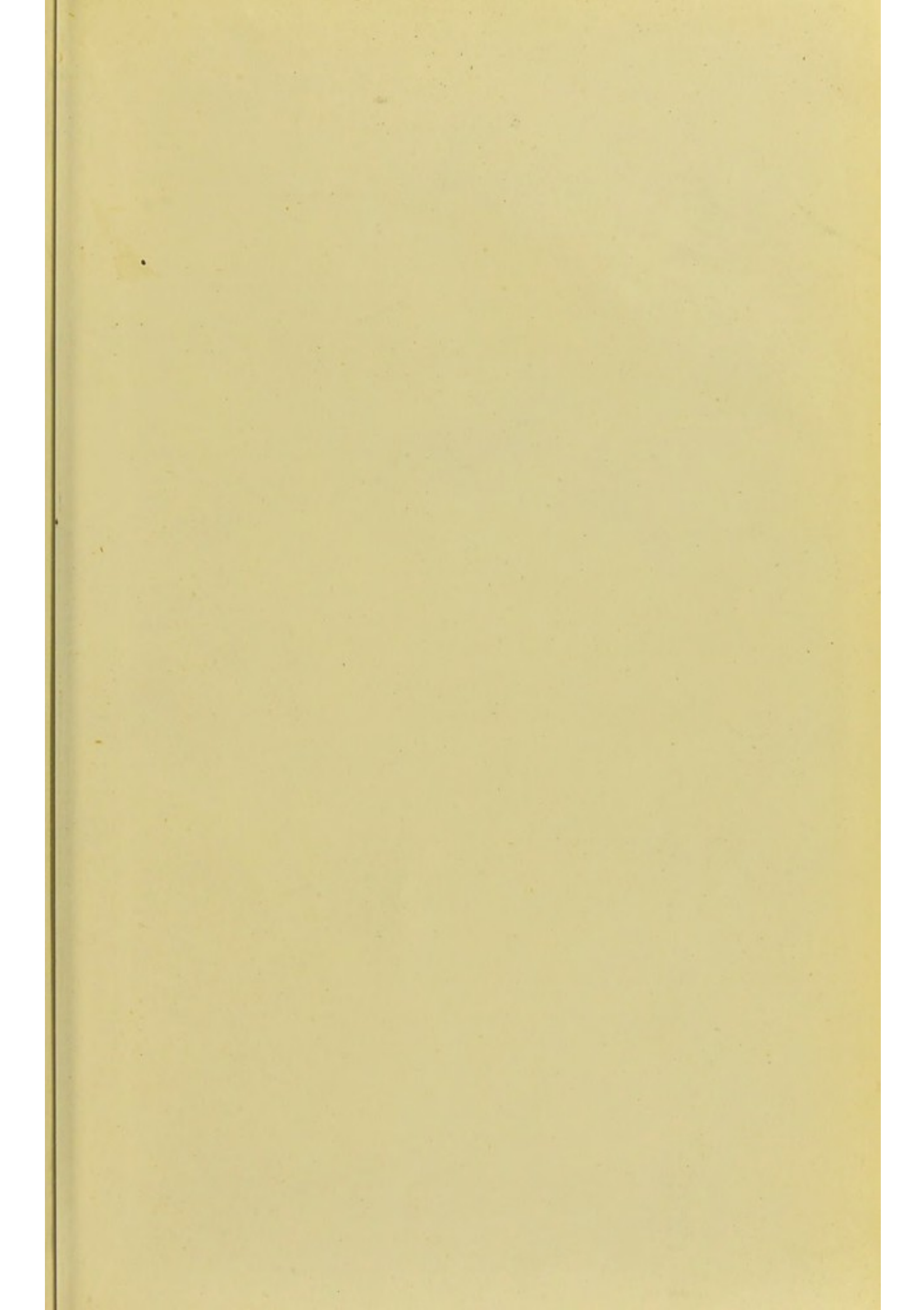
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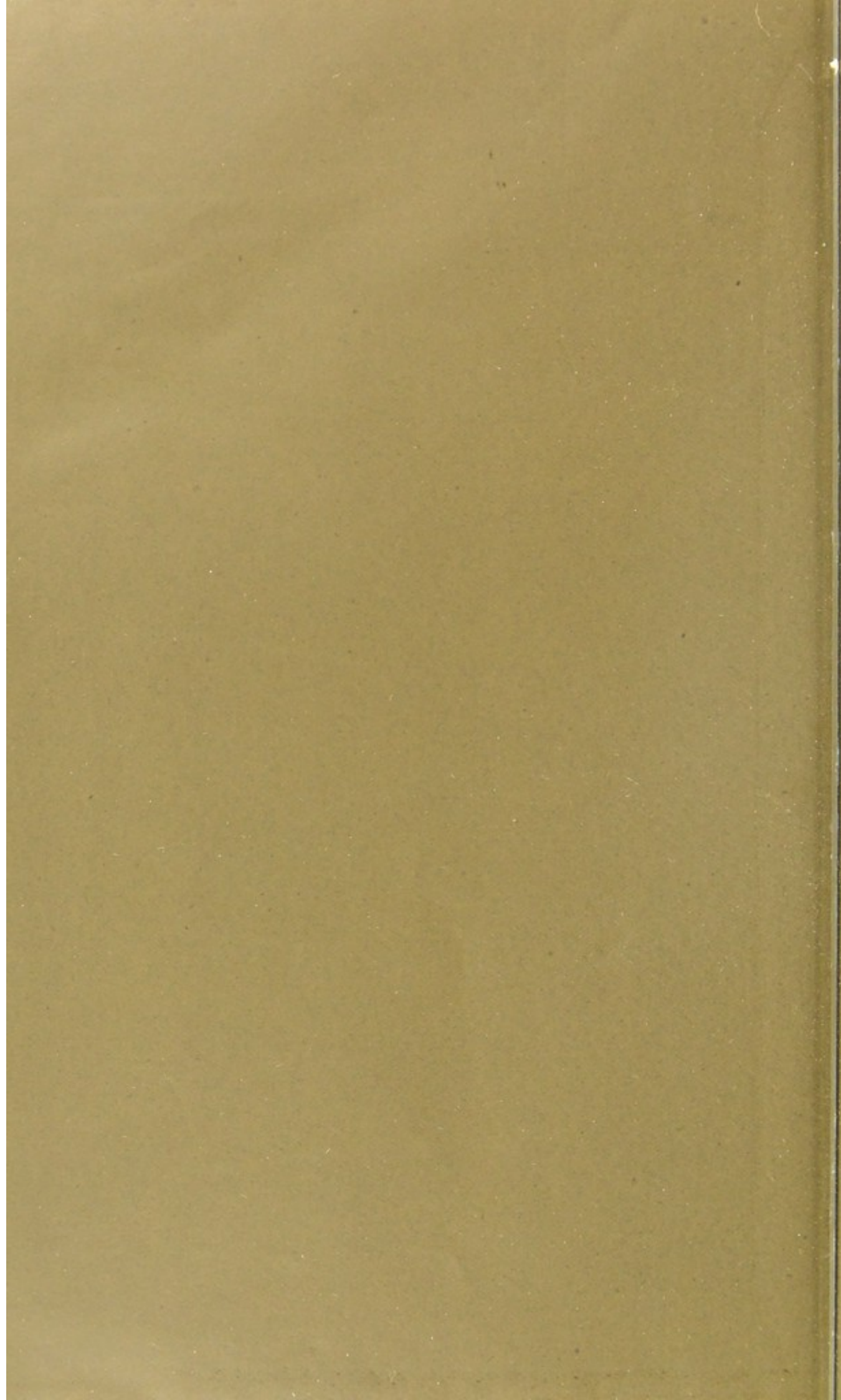
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