Short contributions to aural surgery / by Sir William B. Dalby.

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BY

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PREFACE TO THIRD EDITION.

FIVE additional papers are now published in this edition, making nineteen in all. 1st. "The Functions of the Membrana Tympani illustrated by Disease." The object of this paper being to prove that (1) structural changes in the tympanic membrane of a very extensive nature may exist without impaired hearing; (2) that loss of continuity in the tympanic membrane does not necessarily interfere with its function, provided that the ligamentous support which it affords to the chain of ossicles is not impaired. 2nd. "Bubble Remedies in Aural Surgery" draws attention to certain methods of treatment which the experience of professional opinion has, since this paper was written, so clearly discountenanced, that very much less is now heard of them. The other three additions are short papers on "Cancer of the Ear," "Hysterical (so-called) and Functional Deafness," and a further note on "Adenoid Growths."

W. B. DALBY.

October, 1896.

PREFACE TO SECOND EDITION.

To this edition have been added three further Contributions, viz., paper on "The Management of Perforations," a lecture on "The Limits of Aural Surgery," and paper on "The Removal of Bony Growths from the External Auditory Canal." This latter forms a sequel to the one published in 1876, in which the operation is briefly described under "Closure of the External Meatus."

W. B. DALBY.

London, *January* 1, 1890.

PREFACE TO FIRST EDITION.

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 is 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."

CONTENTS.

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 is. 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 TYMPANIC 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 furthermost 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

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

June, 1896.—Still in good health, the perforation being in a dry state.

irritation caused by the condition of the left ear? 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 furthermost 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 fetid 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 eradi-

cation, 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.*

* The subject of fatal cases of ear disease was further dealt with in 1883. *Vide* "Clinical Society Transactions," vol. xvi.

This paper must be regarded solely in regard to the clinical history of these cases, and to the protection that may be afforded against the invasion of cerebral complications; and it must be remembered that it was written in 1877. Still the clinical history of disease ever remains the same. May it not be possible that when this paper was written the knowledge of the hopelessness of cerebral abscess stimulated the attention to details of symptoms which indicated this possibility to one who, like

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

myself, had had cases so frequently under notice? At any rate, the fact remains that the same symptoms which aroused anxiety as to the advent of cerebral complications or septicæmia were as familiar to me in 1877 as they are now. The surgical operative treatment of these complications is now so entirely different that it is needless to notice the reason why the surgery of cerebral abscess and blocked lateral sinus was not referred to in 1877—viz., that at that period it was not existent.

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 affected 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 them-

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

selves. 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 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 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

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

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 existence 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 forefinger 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

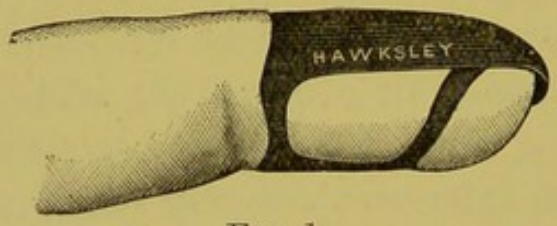

Fig. 1.

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 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, 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

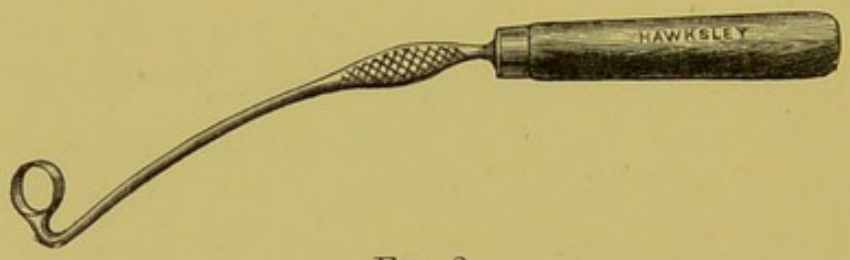

FIG. 2.

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 Gott-

stein'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 Gotsttein'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

emphasizing 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 improvement also of the general health, with free nasal breathing, as well as the diminished tendency to bronchial affections, require only mention to be appreciated.

No. XII.—THE MANAGEMENT OF PERFORATIONS OF THE MEMBRANA TYMPANI.

British Medical Journal, March 12, 1887.

If any examples of a morbid condition of the body might be described as having individualities of their own, as exhibiting various moods, or showing a diversity of behaviour under treatment, surely it would be perforations of the tympanic membrane. To those who are in the daily habit of observing how soon they occasionally heal, how for long periods they do not heal (periods to be measured by years, and even by long lifetimes), how tolerant at one time they are of manipulation and of treatment, how intolerant at others, how susceptible to climate, to diet (especially in the matter of stimulants), they indeed display an "infinite variety."

Occasionally there may be found fragmentary additions to medical literature in which this application or the other is recommended as the best treatment for perforations. Now, although many of these applications are useful under appropriate conditions, I fear it is nearer the truth to say there is no best treatment that may be employed by those who appreciate the interesting variety referred to as belonging to perforations.

To begin with early life. Of all children who during their infancy have a purulent discharge from the ear after a few hours of pain in the ear (the position of the pain being generally unrecognized at the time), how very small a proportion are submitted to an examination of the membrana tympani! When

in isolated cases they are so examined at the time of the discharge, is it not almost the rule that the membrane is found to be perforated? The probabilities, therefore, are that in all, or at least most of them, these discharges are accompanied at the time by perforation. I say at the time, for when the membrane is examined weeks or months after the discharge has ceased, it is often discovered to be entire. We must admit, then, that during infant life the membrane is extremely prone to become perforated, and happily equally prone to heal. This view must have occurred to so many that it is only necessary to mention it, in order that either the occurrence of the perforation or its healing should not excite surprise with those who see comparatively little of ear-disease.

What is still further deserving of notice is that the majority of these children, when they grow up, hear well. If this fortunate ending of the affair is occasionally in part due to the fact that there has been no local interference, it does not follow that nothing in the way of management should be done for recent infantile perforations; but I feel convinced that they are better without treatment, if such treatment includes mineral astringents in solution. The sulphate of zinc and acetate of lead lotions, which used to be thought as necessary for a perforation as iron and quinine mixtures and Latin verses are still for the English boy, are worse than useless. Scrupulous cleanliness—not only by removing discharge from the meatus, but by its expulsion from the tympanic cavity, vegetable astringents, and

protection from the action of external air—include the routine of treatment under which the perforations are aided in healing. The same will apply to the treatment of recent perforations in adults; and when the perforation has healed, so long as there is undue secretion within the tympanum, if the case is treated as one of catarrh, the best possible results as to future hearing will follow. Why, then, do we find so many perforations which have occurred from simple catarrhal inflammation either permanent, or, if they heal, leaving such considerable losses in hearing? Of course the disorganization of the tympanic cavity (the result of inflammation) must be taken into account; but, having excluded this element, I cannot but think this is sometimes due to the pardonable anxiety of the patients to (as they express it) "stop the discharge," and so they resort to anything that offers this prospect.

No doubt, for a time, the mineral astringent will do this, but it does more—it stops the healing, and it stops the hearing. For it astringes the tympanic end of the Eustachian tube; it prevents the possibility of expelling the discharge from the tympanum through the perforation; it allows the discharge to collect in the tympanic cavity, and become inspissated; it causes cicatrization of the edges of the perforation—in short, it does not give the lesion a chance of repair. More than this, when the mineral astringent whose motto is, "Stop the discharge," is discontinued, the discharge comes on as before, so it indifferently fulfils its own motto. I suspect that the advertised lotions and drops for the ear which patients obtain

and use on their own responsibility contain mineral astringents in considerable quantities, as they sometimes cause great pain, and excite inflammation as soon as they reach the perforation. If it is thought that the expulsion of the discharge from the tympanum through the perforation tends to keep open the perforation, let it be remembered (and it is a matter of common knowledge) that if a membrane is inclined to heal nothing of this kind prevents it; of this fact we have ample evidence in the case of perforations made for remedial purposes in cases of chronic proliferous catarrh; and it surely is desirable in the instance of perforation caused by disease that at the time when this happens as little as possible of the products of inflammation should be left within the tympanic cavity.

And now in regard to the tolerance or intolerance respectively which perforations of long standing exhibit to well-recognized and useful applications. Take for example the case of alcohol. Many perforations with unhealthy edges, discharging in large quantities from the tympanum, at once become more healthy under the use of alcohol in various dilutions; but to some, alcohol, even extremely diluted, is most painful and irritating. This is especially noticeable if the perforation is of small size. How can it safely be said in a general way that alcohol is a good treatment for perforations? The same may be said of iodoform or boracic acid. What satisfactory results either of these applications often produce in old perforations with bone granulations and a fetid discharge! But the fact that they occasionally set up irritation is

enough to prevent me, and probably many others, from recommending them when the patient is subject to pains in the head, especially if these pains are chiefly on the same side as the perforation.

The tolerance or intolerance of all forms of artificial membrane or support which perforations show is so well recognized that it is hardly deserving of mention; and the excellent hearing and improved local condition of the perforation are perhaps better known than the occasional intolerance which some perforations show to its employment; but the following case will perhaps illustrate so well what I might term the behaviour of a perforation under treatment that I relate it.

About fifteen years ago, a gentleman had perforations of both membranes after scarlet fever. On the right side all hearing was lost and the perforation healed. It was then found that on the left side (he being extremely deaf with this ear) he could obtain excellent hearing by the use of a cotton-wool pad, which he learned to apply to the perforation. This he habitually used during fourteen years spent in active work which necessitated good hearing. Finding one day that the pad did not give the usual result, he tried various applications without avail. Having noticed that the pad was very dry when it was removed, he proceeded, on his own account, to irritate the ear in several ways in order to produce a discharge. Amongst other plans which he tried, one was by dipping the pad into turpentine. This was soon followed (strangely enough, without any pain) by a discharge, and on again adjusting the pad, he

heard well for several days. Finally, nothing succeeded; the ear became dry, and he was deaf.

When I saw him, I found, as he told me was the case, that the perforation was healed. The size of the old perforation was markedly shown and filled up with new tissue. I made an incision into the membrana, and, after a great deal of trouble, the new tissue disappeared, leaving the old perforation as before, and he could again use the pad with efficiency, and without the tendency to heal being shown.

Could anything illustrate better than this little history the behaviour of perforations? One might almost say that it is necessary to make use of our experience to anticipate their moods, and even then we shall be often wrong in our surmises. What is needed, however, to treat satisfactorily perforations of the membrana tympani, and many other forms of chronic disease, is the intelligent co-operation of the patient, and whoever is the subject of them must patiently learn to manage himself. When it is remembered that by careful management the hearing may frequently be made and kept good enough for the ordinary purposes of life, and, more important still, the patient may often be kept free from the dangers which have a fatal ending, it is not trouble ill-spent.

Of all the many forms of perforation, some of the most troublesome are perforations of Shrapnell's membrane, and the most difficult to treat are those in which there is evidence of caries. The easiest to treat are perhaps those in which the perforation has

arrived at a dry state without any discharge, a state which it may retain for many years if not interfered with; then a masterly inactivity, as shown by leaving it alone (it may be permitted to say for this perforation, if for none other), is the best of all treatments.

No. XIII.—THE LIMITS OF AURAL SURGERY.

Lancet, July 6, 1889.

To-day it is not my intention to enter into any details as to the pathology of diseases of the ear, or as to the treatment acknowledged on all hands to be useful, but by references to and comments upon these matters to indicate as briefly as possible the limits of aural surgery in a few of its principal areas. There are, indeed, some points in the onward course of aural surgery at which there may be discerned great hopes of its future, but also some points where its limits run a risk of being exceeded, and to pass beyond which, unless any advance is guided and restrained by accurate knowledge, is the surest method of setting a limit to its true progress. The treatment, for example, of ordinary troubles caused by catarrh of the middle ear—such as a passing obstruction of the Eustachian tubes, effusion into the tympana, and so on—is pretty well agreed upon; and, indeed, happily now a large proportion of these troubles in early life are cut short, and their return prevented, by the timely removal of adenoid growths from the pharynx, which proceeding has the effect of

completely restoring not only the hearing, but also nasal respiration. But if these cases get well, and ordinary catarrhs and inflammation of the middle ear get well under appropriate treatment, there remains an immense number of chronic, stationary, and progressive conditions, which are neither purely catarrhal nor purely nervous, which do not respond to any known treatment, but the subjects of which submit themselves to all sorts of remedies and procedures—sometimes to treatment which, if the disease was purely catarrhal, would relieve them; at other times to treatment which could have no effect on any known disease of the ear. It is needless to say they do so without any benefit. It is most desirable, therefore, that it should be estimated in what degree treatment will or will not be of service to these people—in short, that the limits of aural surgery for them should be defined.

Then there is another very large class of cases—persons with perforations of the tympanic membrane. That the mass of these cases can be relieved up to a point, that many of them can obtain very fair and even good hearing, and keep their perforations in a condition quite compatible with comfort and safety to life, is well known; but there is no question that in the case of some who obtain only slight benefit to their hearing, if, not satisfied with what has been done for them, they seek for and obtain treatment outside the limits of aural surgery, they court complications which are dangerous to life, which complications, let it be said, in a certain proportion of cases nothing they could do would avoid.

I have noticed of late years that, coincident with the advancement of surgical knowledge, the public has become acquainted with the appliances which so often are of great service in cases suited to their use, and, oblivious of the fact that deafness is no more than a symptom of countless conditions, it (the public), so to speak, helps itself, encouraged by some acquaintance who has been successfully treated by one or other remedy in use. This wholesale application of remedies is traceable to a very natural anxiety to help by local means a symptom which is known to be frequently due to local causes, and so within reach of surgical treatment. When, however, the special knowledge necessary for diagnosis does not exist, a valuable agent is often applied for indefinite periods, with the negative results that might be anticipated. This course of events may now constantly be seen in the instances of two—viz., Politzer's method and the muriate of ammonia vapour. Amongst the useful procedures of a minor kind, perhaps nothing that has been introduced into surgery has done more good service than Politzer's method. It is used for the purpose of opening the Eustachian tube and for diagnosis every hour of the day by hundreds of surgeons throughout the world. I can remember the time when I was seeing a number of aural patients daily, and it scarcely ever happened that any of them had been subjected to Politzer's method. Now (except those in whom the trouble has been of recent origin) most are familiar with it. Many come provided with a Politzer bag, and have used it themselves almost regularly, sometimes every day for

months, the ailment at one time being a piece of cerumen, at another, perhaps, inherited syphilis or one of the many nervous conditions. The satisfaction derived from its use lasts for the longest periods when, by a happy chance, there has been a temporary obstruction of one or both Eustachian tubes, which the daily process for the time being has removed. Even if a passing relief is obtained, it by no means follows that the constant use of a Politzer bag is an unmixed advantage; as a matter of fact, it is very much the reverse, as any one in the habit of treating diseases of the ear well knows. It strains the membrane, rendering it flaccid, giving rise to thinning of it in places, and causing bulgings; and this condition after a time becomes permanent. Again, to take the case of muriate of ammonia vapour. It was brought under my notice when it was first introduced from America. I at once began to employ it largely for recent catarrh with increased secretion in the middle ear, and with satisfactory results. It rapidly came into use, and soon all sorts of modifications of the machine for making the vapour were invented by London chemists, most of which fulfilled all the requirements. Now it is not only prescribed constantly, but patients purchase it and use it largely when they suffer from deafness, and quite irrespectively of the causes which induced the symptom. The public tympanum, therefore, is now subjected to muriate of ammonia vapour almost as freely as to the air douche.

To take another subject—viz., tinnitus. Few things are more delusive or tend more to narrow

the limits of aural surgery—in other words, to prevent its intelligent progress—than the numberless vaunted remedies for tinnitus. The explanation of the marvellous literature that has been written upon this subject is probably to be found in the fact that a good many cases do not admit of relief. The truth is that, like pain, it is a symptom, and, like pain, it has to be endured, unless and until the cause can be removed or disappears. In many cases it can be removed; in others it goes away as it began, without any apparent reason; in others it is of a lasting nature, since the causes which produce it are of a kind which remain with life. Amongst these latter must be counted the degeneration of the arterial system after middle life. Inasmuch, then, as in such instances the symptom is incurable and outside the limits of surgery, advertisers in the daily press volunteer to cure it by means of electricity (always an attractive remedy with the public) and other methods. Perhaps because tinnitus due to degeneration and some other causes is of a constant character, the kind of electricity which finds most favour amongst its advocates is the constant current; but, whether this or the interrupted is employed, it is generally the personally conducted and continuous as long as possible. This sort of treatment seems likely to go on until it becomes known that the cause of tinnitus is very often situated behind the tympanic cavity. I say this with a reservation, as I shall presently show; but, in a large proportion of cases in which patients are troubled with noises in the

head, I have no sort of doubt that it is due to nervous causes: and it is most necessary to state this, since it rarely happens within my experience that patients with tinnitus are not submitted to treatment of the middle ear. In order to understand why this trouble is so frequently of nervous origin, the numerous conditions under which it is produced, and in which it is found to be a constant symptom, must be considered; then overwhelming evidence of its seat-origin may be made plain.

First, to take examples in which one ear only is affected. An unexpected explosion of a gun near an ear will instantly produce it, and it will remain for long periods—sometimes for years, or even a lifetime. An unexpected blow on the ear—*i.e.*, a box on the ear from a person behind. A loud whistle or other violent noise close to the ear—sounded, perhaps, in play. After concussion or fracture of the skull it is generally present. One curious instance of starting this symptom I will relate.

In the spring of 1888, a middle-aged lady, clever, sensible, and not at all imaginative, went to stay in a large country house, and was placed in a bedroom which had not been occupied for twenty-five years. In this room, which was well warmed with fires before she went into it, there was a quantity of antique furniture. The first evening she heard the clicking noise (unmistakable to any one who has heard it once) made by the small insect called the "death watch." There are two varieties, I am told, of these insects, both of which infest old wood and sometimes dried skins—Anobium

striatum, the ordinary death watch, and Vestobium tesselatum, the large death watch. I now show you a specimen of each. These animals were afterwards found in the furniture. On the second night one of them crawled into her ear and awoke her by its peculiar noise. She was perfectly aware of what had happened, and had the ear syringed and freed from it next day. Notwithstanding this, she was at times annoyed with this noise at all hours of the day or night for many months. One day the noise ceased and has never returned. I offer no explanation of this, but narrate the occurrence to show that the causes of tinnitus are more than can be named.

Again, most cases in which the nervous power of hearing is lost without any perceptible local change and without any inflammation or catarrh of the middle ear are accompanied with tinnitus, and this is especially so if both ears are affected. For example, when prolonged anxieties, mental shock, typhoid, typhus, mumps, the fevers of India, &c., are followed by deafness (the middle ear never having suffered), tinnitus is present. When the hearing is lost or impaired by constitutional or inherited syphilis, or by advancing age; with those in whom the hearing fails in most members of the family towards middle age, a deafness whose cause is unknown, without a name, and without a remedy, with no evidence by which to discover such cause; with good health and healthy middle ears: with these and their like there is generally tinnitus. If there is a noteworthy presence of

tinnitus in these cases, so in the large proportion of middle-ear diseases there is a noteworthy absence. In case after case of middle-ear disease that come day by day before our notice, such as an obstructed Eustachian tube, recent catarrh, subacute or acute inflammation of the tympanum, perforations accompanied by purulent discharge, polypus, or other details, is it the rule to meet with tinnitus? When the tympanum has been completely disorganized and membrane destroyed in its entirety, is it the rule to meet with tinnitus? Quite the contrary; it is extremely rare, and then only of passing character. Then, surely, if the source and origin of tinnitus is to be sought and found in the middle ear, it would be common in these examples. If this reasoning is sound, and if it becomes accepted as logical, there ought to be a fair prospect of seeing an end of the restless agitation of the tympana of persons who suffer from tinnitus. It may be asked, what is proposed to put in its place? To this I would reply that before any substitute for unscientific treatment is proposed, it should be discontinued; let it be recognized that, compared with an open-minded attempt to discover the source of symptoms, all treatment is quite unimportant; that when the cause is discovered, rational treatment will suggest itself; that when the cause is found to be a condition that does not admit of remedy, an abstention from all treatment, especially surgical interference, should be insisted on.

Let me exemplify this for a moment. There is a particular class of men whom it is the custom

to describe, and who so speak of themselves, as being overworked. I do not here refer to men of great mental ability, who work assiduously for many hours at occupations which involve intellectual work, but to those men who appear to be unable to bear the worries of business and private life, and who perhaps take a good deal of wine during the day because they feel relief from its sedative action. This class of people often suffers from tinnitus, and, if they can be persuaded to work for a less number of hours and to give up the sedative, get well without any further treatment. The truth is, these men do not start with very strong brains, and what is overwork for them would be child's play for more powerful brains. They may not be very interesting people excepting so far as what relates to their maladies, but it is with these we are now concerned. On several occasions I have seen patients who have complained of tinnitus of a very persistent kind, whose minds were evidently much disturbed by it, and who in the course of conversation have described a variation in the symptom as if they heard distinctly spoken words. This form of tinnitus is without doubt of a very serious character, for the subjects have shortly afterwards become insane. This is, of course, well known to those who have to deal with insanity. It would be an endless task to mention the noises which tinnitus simulates, as described by patients—from the sound of a sea-shell held up to the ear (the mildest of all forms) to the letting off of steam and the distracting noise of machinery; but it may be accepted as a rule

that tinnitus of (so to speak) a furious character is the commencement of very great, if not total, loss of hearing. I observed just now that tinnitus is absent in most cases of perforations which have lasted for years, and in which the loss of hearing has been tolerably uniform throughout; but if in such instances tinnitus sets in, the partial hearing is generally lost or nearly so. This bears out the view that the tinnitus, in this case at least, is distinctly of nervous origin. The sensation of a pulse in the ear combined with general tinnitus is such a common symptom in quite young people (especially the anæmic) with loss of hearing not due to middle-ear disease, that it is desirable not to attach too much importance to it. At the same time, in elderly people with degeneration of the arterial system and deafness depending on this cause, it must be admitted that it possesses a significance which it does not in other cases; and I am led to say this, because I have observed a considerable number of cases in which patients who have consulted me for this symptom have at a period not very remote succumbed to apoplexy.

Another example of the undoubtedly nervous origin of tinnitus might be instanced in the class of cases which go by the name of "Menière's disease." It is a useful term because it serves to designate a disorder which shows itself by a train of symptoms alarming to the patient, but in no way dangerous to life. These symptoms begin by severe attacks of giddiness—so severe sometimes that the subjects fall down, but are never unconscious; a feeling of nausea, even vomiting at

times; sweating; great prostration, lasting for hours and even for days; inability to move without feeling giddy. After such an attack it is noticed that there are tinnitus and deafness in one ear. By-and-by these attacks become less frequent and finally cease, but the deafness and tinnitus remain. The seat of the lesion in these cases is quite uncertain, but at any rate it is central and in the auditory track. I cannot satisfy myself that the semicircular canals are the position of the lesion, for many reasons that it is not necessary to go into here; nor, indeed, do I think that the semicircular canals have been satisfactorily proved to influence the equilibrium. The cases are very common, but I only refer to them now to show the nervous origin of the tinnitus, which is one of their distinguishing characteristics.

Amongst the minority of instances in which tinnitus depends on disorders of the external or middle ear must be included the familiar one of cerumen in the external canal, and that stage of catarrh where a quantity of mucus is in the tympanic cavity; but the chief place in which this symptom figures must be given to that slow and gradual in progress, insidious, obscure in origin, intractable disease termed proliferous catarrh of the middle ear —that change in the whole lining membrane of the tympanum causing progressive deafness, and accompanied by tinnitus. The treatment of this disease is a problem which has exercised the minds of aural surgeons throughout the world, and is still doing so—how to check it in its onset, how to improve

the hearing in its later stages. There are three points which at once present themselves to those who approach this subject: First, that the tuning-fork is heard well through the cranial bones; second, that ordinary catarrh slightly increases the deafness, showing that the lining membrane of the tympanum is the seat of pathological change; and, third, that in all the operative proceedings that have been devised for its treatment one fact stands out in relief—viz., that when an opening has been made, as a preliminary step, in the tympanic membrane, at that moment, and so long as it remains patent (it only does so for a few days, so rapidly does the opening close up), the hearing in many cases has become much better. This would point to the fact that some tension has been relieved, and that if sonorous vibrations could reach the fenestræ without the intervention of the tympanic membrane the hearing would be better. I say these are the points which always have been, and still are, before the minds of those who have made persevering attempts to enlarge the field of aural surgery in the treatment of the disorder. This was notably so in the case of the late Mr. Hinton, of Guy's Hospital. He was a man of original mind, great ability, industry, and perseverance; and at a time when I was daily associated with him, from 1869 to 1872, he was firmly convinced that he would be able to relieve the loss of hearing in these cases. During the period referred to, it is no exaggeration to say that he seldom passed a day without making an incision into the tympanic membrane. He had found

by experience that he could do so without injuring the hearing, and that in a certain number of cases the hearing was better—in some much better—after healing had taken place. But it must be remembered that in his first attempts he had selected cases, not of true proliferous catarrh, but those in which he had reason to believe that there was an accumulation of mucus within the tympanic cavity. The results of this proceeding may be found most carefully detailed in two papers in the Guy's Hospital Reports. How careful he was in his observations may be judged by the fact that he used to have a drawing made of the membrane before he operated (this drawing took the artist several hours to execute), and another after the membrane had healed. Of the extraordinary accuracy of these drawings I had daily opportunity of observing. The cases in the Guy's Hospital Reports speak for themselves; but of the rest what were, broadly speaking, the results? A certain small proportion of these derived considerable relief; but whenever this was so, it happened in those cases where there was ocular demonstration of mucus in the tympanum—*i.e.*, after the incision it was expelled through the cut. I could not say that the results were encouraging in the cases of dry (proliferous) catarrh. Now at that time I was conducting the same kind of tentative treatment, and my results were precisely the same. If further confirmation were wanted in this direction, it can be obtained from the experience of Mr. Purves, who succeeded Mr. Hinton at Guy's Hospital in 1874, and who published his experiences in a paper which was published

in the "Medical and Chirurgical Society's Transactions." Here may be seen most carefully collected details and a most dispassionate view of the results which followed incision of the membrane in these cases. No one can say, therefore, that this proceeding has not had a fair trial. The results are before the profession; and how has it stood the only true test—the test of time? In the opinion of those whose opinion is worth having, it is universally agreed that the exceptions are rare when it is necessary to incise the membrane, and these exceptions are limited to those cases where there is evidence of secretion within the tympanum.

I now come to the mention merely of the operation of the division of the tensor tympani. It may be dismissed in a few words. Its history includes a flight of the imagination, a brief notoriety, and a burial in oblivion so rapid as falls to the lot of few achievements in surgery. It is sufficient to add that if it possessed any usefulness and was free from disasters it would at this moment be practised by some at least of the numerous aural surgeons in Europe and America. Such, however, is *not* the case, and the matter is summed up by Politzer in the following words: "Division of the tensor tympani is, therefore, one of those operations which are not only of trifling use, but which sometimes also have a deleterious influence on the function of hearing." As to the division of the posterior fold of the membrane, which received a fair trial at the hands of Politzer, the results as to the permanent benefit are frankly confessed by him not to have

realized what at first was expected from it. For he says, "as regards the duration of improvement, we can only fairly judge from such cases as we have had an opportunity of observing for years," and, later on, "only in a very small number of cases have I observed an improvement in the hearing lasting for several years."

And now as to the treatment of perforations of the tympanic membrane. The principles of scientific treatment of perforations, and all those complications which include the extremely various routes which pus takes, and the very numerous points at which these routes terminate, may be said to consist in the following:—1. Drainage whenever practicable. 2. Protection of the tympanic cavity from the entrance of external air when drainage is not practicable. 3. Added to this protection, pressure (or rather support) on the ossicles when such pressure improves the conduction of sound. 4. When none of the three first-named principles are practicable, cleanliness and antiseptic remedies when applicable. 5. The avoidance of irritating influences, and still more the avoidance of irritating applications, amongst which must be included the mineral astringents, which used to be so constantly employed, but are now happily abandoned by most aural surgeons. The course of events when a complete drainage is rapidly and *nearly* established by inflammation, and becomes *quite* established by a little aid from surgery, points directly to the curative aid which drainage affords. For example, if in a little child the tympanic cavity becomes inflamed, the membrane

gives way and the mastoid cells become quickly involved; if the mastoid cells are then opened, and the inflamed area is kept for a time well cleansed by frequent daily washing from the external wound through the tympanic cavity, the fluid coming out through the external meatus as repair takes place, the almost invariable rule is that the membrane heals. I have noted this so frequently that I can with almost certainty prognosticate healing of the membrane, although the ulcerative process has destroyed a large part of it. In fact, except when the loss of tissue is small and heals up pretty soon, as so many perforations do in early life, this is not a bad way for a child to have a perforation (if I may use such an expression).

It must be allowed that for the mastoid cells to be involved used to be, and I believe generally is now, considered an unfavourable complication. With children my own experience shows that it is quite the reverse. Certainly no one will deny that the course and termination I have named—namely, inflammation, ending with a scar behind the ear and a sound membrane—is much to be preferred to a membrane remaining perforate for years, or perhaps always, with all its possible complications in view. It will be observed that I am speaking of a child, and this is a very different matter from an adult with suppuration of the mastoid cells. Still, the same principles apply in the case of adults. I would even go so far as to say in regard to perforations that the only way to learn how to treat them, or rather to

teach patients how to manage them, is to observe the behaviour of perforations after the serious complications which they so often involve. It is this fact which makes it so difficult to lay down any rules for treatment. Indeed, any one who attempts to teach how perforations should be treated on any particular plan or by any especial application shows at once that he has failed to notice carefully how they behave under certain conditions. The only way to attempt instruction in this matter is to call attention to what happens to a perforation after some special complication in which the perforation has displayed some characteristic, some capacity for repair, at a certain time during the progress of the case. For example, I have seen many instances in which this has happened. A child with a perforation and mastoid cells involved has what looks like, and is often called, a large fleshy polypus in the ear, blocking the canal. Now this is known to arise from the cavity of the tympanum. The mastoid cells are opened, the drainage I spoke of established, and in the course of a few days the large polypus (let us call it so for the moment) disappears completely.

Now suppose the mastoid had not been involved, what is the ordinary course to which this child would have been subjected? The polypus would have been extracted, the root treated with some form of caustic, various applications made to the tympanum, and perhaps in six months after all the trouble be there again exactly as before.

Does not this teach us something about polypus or so-called polypus? And does it not teach us that some discretion should be used in taking out some sort of polypus, and that this sort may be recognized and its probable future foretold?—in short, that if left alone for a time, it might soon be possible to drain and radically cure the condition? How different is the course of inflammation, in this child's case chosen as an illustration, from the tedious method which the inflammatory process pursues in adults! A number of these cases form the subject of a paper by myself in the Medical and Chirurgical Transactions on "Diseases of the Mastoid Bone." There appears to be no sort of rule or limit in these cases to the direction which pus took. Sometimes, after the tympanum became inflamed and the membrane ruptured, the mastoid was affected, and it was necessary to open the cells, the external plate being often found healthy. In others the cells were not affected, and the inflammation commenced at the outer table. At one time the pus got down the neck to the level of the first ring of the trachea, and passed under the scalp in all directions into the parietal and temporal regions, and even under the splenius capitis. It is very noteworthy that in most of these serious cases, after the recovery of the patients from the complications, the perforations gave very little trouble. Some of them healed, and this was no doubt due to the drainage which had existed for some time. By no means, however, did they all heal in the uniform manner that was observed in

children; but of those that did not, many fell into a state of marked quiescence, so marked with some that they became dry perforations. By this term "dry" I mean when not only no moisture is present, but when not even a trace of inspissated pus can be detected. Now this condition of a dry perforation has for many years been a matter of wonder to me. I can understand a perforation being dry for a few years, but I constantly see people with a complete history of how the perforation took place, and yet no knowledge of discharge for periods of twenty years and more. If ever the old proverb of "Let sleeping dogs lie" was of practical application it is in the case of a dry perforation, for the very slightest interference will bring back a discharge which may last for even the remainder of a life; and this is why I wonder how such slight irritation is avoided in ordinary life for so many years. A little water getting into the tympanum is often enough to excite suppuration. Bathing in the sea will always do it. Numberless times I have known it done by a person either getting his ear syringed or syringing it himself.

This extraordinary susceptibility was once brought most forcibly to my mind about the spring of 1876. A gentleman, thirty years old, having been deaf with one ear since he had scarlet fever as a child, thinking himself rather more so than usual, came to me for advice. The ear was filled with cerumen, and I removed a plug by gentle syringing. There then became visible a large perforation in a dry

quiescent state, from which there had been no discharge since childhood. No discomfort of any sort followed the syringing, and the hearing was improved to its wonted state. I have no doubt that a dry plug of cerumen had formed a natural protection to the tympanum. Some days after this he crossed the Channel in rough weather, and was, whilst on deck, drenched by the spray of a wave breaking. Some of the sea-water got into the ear, and shortly after this the ear began to discharge; there was profuse suppuration; a rigor followed, and he had empyema, the result of septicæmic poisoning. The pleura was tapped, and he happily recovered; but I always remember this case whenever I see a dry perforation. The folly of persons in putting every conceivable fluid into their ears is very great, and the rashness of those who without due thought suggest it is considerable; but the fact remains that for dry perforations nothing better is yet known, I believe, than a masterly inactivity, and that for them, at any rate, the limits of aural surgery have been reached when they have been discovered.

I observe in the two papers on Disease of the Mastoid in the "Transactions of the Royal Medical and Chirurgical Society" (one I have already referred to) that I made no mention of two or three conditions. One is that in which the mastoid cells become inflamed and suppurate without the tympanic cavity being at all involved. The membrane is therefore entire and the hearing good. This state of things is not at all common; and when

I have seen it I have failed to find out its origin except when it appeared traceable to a blow. Another is when the mastoid cells in very aged people have suppurated in the usual manner, but with this difference, that the process extended over many months instead of days or weeks, and that there never was any severe pain, even up to the time when an opening was made. A third condition is simple periostitis of the mastoid in children, which nothing but a free incision succeeds in removing permanently and completely.

No. XIV.

THE REMOVAL OF BONY GROWTHS FROM THE EXTERNAL AUDITORY CANAL.

British Medical Journal, September 28, 1889.

A BRIEF account of the circumstances under which the removal of bony growths from the external auditory canal by means of drilling came into use may, I think, possess some interest to this Section. Previous to the end of the year 1874 it had been present to my mind that the occasion would some day present itself when the immediate removal of a bony growth in this situation would become imperative in consequence of the obstruction which it formed to the escape of pus behind it—pus which came from a tympanic cavity through a perforation. I had previously removed bony growths in four urgent cases by a method suggested by Dr. Clarke, of Bristol, namely, by passing into the growth

through three needles a continuous current of electricity from six pairs of plates of a Stöhrer's battery. By this means the life of the growth was destroyed, and in a few weeks the dead bone became so loose as to be readily extracted. This process, however, occupied too much time to be of use in cases where it was necessary at once to give relief. The difficulty which I had anticipated came under my notice in January, 1875.

A gentleman, aged thirty, consulted me under the following conditions: A thick fetid purulent discharge from the right ear blocking up the canal, pain in the ear, dull pain and uneasy sensations in head. The perforation took place when he was four years old, after scarlet fever. It being quite obvious that the growth should be removed without delay, I obtained the assistance of Mr. George Edgelow, who was at that time dental surgeon to St. George's Hospital. After seeing what was required, he had several drills made for the purpose such as he thought would be most useful, and on January 9th I drilled away the chief part of the bony growth and gave free egress to the discharge; after which all unpleasant symptoms passed away. I may say that the base of the tumour being broad it was not cut away at the base, but the upper three-fourths ground away; the first part of the proceeding consisted in drilling a hole into the centre, and, by a process of enlarging this, drilling away the upper part and then grinding down the surface.

Within six months of this date I operated in a similar manner on three other cases, but in each

one the circumstances and the conditions were in several respects different. One was where a large bony growth filled the canal on one side, but in which there was no perforation, and it was thought best to remove it as the patient was going for several years to New Zealand, and the necessity might arise whilst he was away. This growth also had a large base, and took a long time to drill.

The next was in a gentleman who had three bony growths in each ear, meeting at their apices; a sufficiently large opening for the passage of sound was established by drilling. It was curious as showing the tendency to heredity, that five years later I operated for the same condition on this patient's brother, and that I then saw their father, who had a similar affection.

The other case was in a young man who had double perforation, and whom I had three years previously taught to use a cotton pad, and which had given him good hearing in one ear. He then presented himself with a large bony growth in the other ear, which had been there when I first saw him, but had since increased, probably from the incessant local irritation of the discharge.

In a paper on this subject in the *Lancet* of January, 1876, I mentioned that I had employed the dentist drill in the treatment of these cases, and added: "I know of no such ready method of destroying these bony growths when their removal becomes imperative." I shall state further on how some of the difficulties which attended their removal

in these early cases may be diminished. I have next to notice that in the following year, 1876, Dr. Mathewson, of Brooklyn, removed an exostosis, and that he recorded it in the report of the first International Otological Congress. In the following year I had the opportunity of seeing the first case in which Mr. Field operated. He brought the patient to me soon after the growths had been drilled away. They were completely taken away, and the meatus was filled, as it usually is at that time, with bone granulations during the process of repair. In this case, as has been recorded by Mr. Field, the relief was complete. Some time afterwards Mr. Field was good enough to show me the method which he employed by means of a steel guard to prevent the possibility of the drill slipping forward beyond the area occupied by the growth.

I will give the reasons why I have not found it necessary to employ this precautionary aid, in speaking of the methods which I have found to be the best in combating the difficulties attending the removal of these growths. These difficulties consist chiefly in the following:

1. The tediousness of the process, owing to the extreme hardness of the growths.

2. The oozing of blood, which obstructs a clear view of what is being done in the action of the drill.

3. The tendency towards a wobbling movement of the drill.

4. The danger of the drill slipping.

5. The decision which must be arrived at as to the best method of drilling in accordance with the size, position, and number of the growths.

6. The difficulties when the external opening of the meatus is very small.

It must be borne in mind that in all the cases in which I have operated I have employed reflected light, and in the first series of cases good diffused daylight.

1. As to the tediousness of the operation. In the first three cases the patients were from thirty to fifty minutes under ether. They were laid upon a sofa close to a window, an ordinary dentist drill worked with the foot by Mr. Edgelow was used, and to be level, so to speak, with the work it was necessary to kneel on the ground; this I found to be extremely fatiguing, and in the fourth case Mr. Braine, who gave ether, suggested that the patient should be placed upon a flat couch raised a little higher than an ordinary writing-table, so that I could sit upon a chair and so work with greater comfort. This idea I have followed out in all later cases, and the advantage of this I am sure will be found by every one to be very great indeed, as the fatigue experienced is greatly diminished. What, however, is of more importance is that the time occupied can be lessened to at least one-third by the use of an electric drilling machine, which was introduced to my notice by Mr. Augustus Winterbottom, now the dental surgeon to St. George's Hospital. This consists of an ordinary Cutriss electro-motor, to the spindle of which is attached a long flexible arm, terminated at its free

extremity by a hand-piece adjusted to hold any required instrument. The rate of the revolution is completely controllable by means of a resistance coil, and can be varied from 200 to 5,000 turns a minute.

It was found after various experiments that 2,500 revolutions was the limit of speed which could be used; for if the velocity was not sufficiently great, it was impossible to grind the tumours rapidly away without exerting pressure, and all such force it was most desirable to avoid for fear of slipping through the growth and injuring adjacent tissues. On the other hand, if the velocity was too great, such tremendous friction was produced that the burrs became immediately heated to a temperature which caused them to lose their temper and be blunted.

In fact, when I first began to use this machine, although, in experimenting on a piece of bone or a tooth that had been extracted, the extreme speed could be used, and rapidly cut through with extraordinary facility, it was found that twenty or thirty burrs were used up on these ivory growths, so that the speed had to be reduced to from 2,000 to 2,500 revolutions per minute. At this pace, however, the rapidity with which the growths can be ground away, compared to what can be done by a machine turned with the foot, is most remarkable.

2. The oozing of blood, which obstructs a clear view of what is being done. This used to be exceedingly troublesome. It was constantly necessary

to dry the blood with absorbent cotton, and begin again throughout the entire proceeding. At the increased velocity the bleeding gives no trouble at all; the heat produced by the friction coagulates the albumen, and so checks the hæmorrhage.

3. The tendency to a wobbling action of the drill. This is obviated by being careful that the notches in the drills are not too deep; if they are too deep, it is almost impossible to keep the instruments steady, especially when they first touch the growth.

4. The danger of the drill slipping. In the machine turned with the foot it is undoubtedly necessary to exercise a certain amount of pressure in dealing with a substance so hard as the ivory growth, and no doubt it was this necessity which induced Mr. Field to use the steel guard to which I have referred. At the increased velocity there is not the necessity to exercise anything beyond pressure so slight, that supposing the drill to have passed through or by the growth, it would be in no danger of slipping onwards, as there is not enough pressure behind to induce this movement. This I regard as an immense advantage, and particularly so inasmuch as in a large proportion of cases in which an operation is necessary the growths so fill up the meatus that there is not space enough to get anything behind. Indeed it is well known that in many cases the growths so block up the canal that the smallest probe can scarcely be passed between them or between them and the meatus.

5. The best plan to be adopted in drilling. Generally speaking the best plan will at once suggest itself when the size and position of the growths have been considered. For example, when there are several—say three, the usual number—meeting at their apices, it will be sufficient to grind down their apices till a fair-sized canal is obtained. If there is one large growth which blocks up the canal to be dealt with, I have adopted the plan of first drilling into the centre of the growth, and gradually enlarging the opening, first with fissure burrs, then with conical ones, and, finally, with oval and round borts. In this way the upper half will generally come off. In some instances it has been enough to hollow out the growth; its life has been destroyed, and some weeks later its dead and shrivelled form has become loose in the meatus, and it has been removed as a loose foreign body by a hook, forceps, or syringing. (Specimen shown.)

6. When the external meatus is unusually small and especially when added to this the growth is far enough in the meatus to make it difficult to put in a very large speculum, and so, with the speculum in position and light reflected down it, drill through this. I have not as yet had to drill with a condition like this, but, in common with others, may at any time meet with it; then I am quite sure that I shall be glad enough to make use of the plan which has been so successfully adopted by Mr. Sheild in a case which I saw exhibited at the Medical Society. Any one who

saw this case had an opportunity of observing a most perfect success; and, besides the condition which I have named, I can fancy cases in which the partial separation and turning back of the external ear, might be most desirable before commencing to remove an exostosis. There is no reason that, with this preliminary step, a drill should not be used; but whatever mode of removal be adopted, it would, without doubt, make it a comparatively easy matter, inasmuch as the growth would then present itself externally instead of in the secluded position in which it ordinarily lies.

With regard to the origin of bony growths in the external auditory canal, I have seen no reason to alter the opinions which I expressed in the paper already referred to in 1876, when I said "that they 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 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." The opinion also which I expressed at the International Medical Congress, that sea-bathing appeared to induce the formation, has been fortified by further experience.

I beg, in conclusion, to offer for consideration an opinion in regard to the removal of these bony growths—namely, that such removal should be strictly limited to cases in which they interfere with the free egress of discharge from a perforate membrane, or, by completely closing the canal, interfere with the passage of sonorous vibrations, for it should be remembered that a very small passage is quite sufficient for purposes of hearing, and that if this becomes closed by a collection of cerumen, it may readily be removed by a small hook, so that any risk of water getting behind the growths by the use of a syringe is avoided. This simple treatment, conducted about once a year, is all that is needed, and especially applies to those cases in which the growths remain, as they often do for many years, without perceptible increase. Should they increase up to complete closure, it will be time enough to remove them, or to remove sufficient of them to ensure the passage of sound, patients being, of course, carefully warned against putting their head under water either by bathing or in their bath at home.

No. XV.—THE FUNCTIONS OF THE MEMBRANA TYMPANI ILLUSTRATED BY DISEASE.

From the *International Journal of Medical Science.*

THE two following considerations will show that our knowledge of the functions of the membrana tympani may be added to by the observation of this structure when it becomes altered by disease.*

1st. *Structural changes in the tympanic membrane of a very extensive nature may exist without impaired hearing.*

This is shown by examples, in which, after as much as one-half, and sometimes more, of its area is occupied with calcareous deposit (phosphate of lime) embedded in its substance, the hearing power remains quite normal. With this deposit the membrane is three or four times thicker than usual.

Inasmuch, however, as a certain proportion of individuals, who are the subjects of this condition, have imperfect hearing, it is a fair presumption that in these latter examples the loss of hearing is due to changes behind rather than in the substance of the membrane.

The history of such cases fully bears out this view, for the patients with this deposit who hear badly are found to have at some time previously suffered from inflammation within the tympanic cavity; so that the changes then wrought by this process will sufficiently account for the failure in hearing.

* The cases of which the following remarks are based came under the writer's notice between 1873 and 1885, inclusive.

That the position of the obstacle to hearing is in the conducting media, and, therefore, in the tympanic cavity, and not in the nervous structure, can be in such cases readily demonstrated by experiments with the tuning-fork.

2nd. *Loss of continuity in the tympanic membrane does not necessarily interfere with its function, provided that the ligamentous support which it affords to the chain of ossicles is not impaired.*

In several instances where the membrane has been accidentally pierced with a very sharp-pointed object —a pin—the hearing has not been found, with the most careful tests, to be injured. In these examples, the healing process occupied from three to four days.

In one case, when a sudden explosion near the ear ruptured the membrane in two places, the hearing was perfect, and the ruptures healed in a few days. This was the only example in which, a rupture having been caused by an explosion, the hearing was uninjured. On comparing the notes of other cases in which the hearing was injured by explosions, it was found that the hearing suffered more injury when the membrane was not ruptured than when it was. It would almost seem from this (if it were possible for such an explanation to be accepted) that the force of the explosion expended itself partially in rupturing the membrane, and so, in a measure, some hearing was saved. At any rate, it appears not an unfair conclusion that the loss of hearing must be due, in all cases, to damage to the nervous structures; in other words, to what, for want of a more accurate term, must be called shock.

Certain inferences on the question of loss of continuity may also be fairly drawn from instances in which incisions of considerable length are made with a sharp instrument (in shape somewhat like a cataract needle) for surgical purposes. Such incisions are made in a vertical direction, and involve nearly the whole length of the membrane from above downward in its posterior section. They are made in cases in which the cavity of the tympanum has been the seat of inflammation which has not caused a perforation of the membrane, and where the effects produced by the inflammatory process have been marked rather on the lining membrane of the tympanic cavity and its contents than on the tympanic membrane itself; in short, where the thickness of the tympanic membrane has not been increased. So far from the incision producing a damaging effect upon the hearing, the reverse is the case, the hearing power being at once improved the moment that sonorous vibrations can pass through the opening. Indeed, were it possible to establish a permanent opening in the membrane, the hearing capacity would be in such instances continuously improved.

That loss of continuity in the tympanic membrane does not of itself interfere with its functions is still further shown by the careful and continual observation of cases in which the membrane is perforated by disease.

The utmost diversity in hearing power with a perforated membrane exists, varying from almost total loss of hearing to a loss so trifling that it is detected with difficulty.

Speaking generally, it may be said that the better degrees of hearing will be found where the perforations are of considerable size, and that the sooner the perforation takes place after the inflammatory process begins the less damage will be done to the cavity and contents of the tympana, and thus to the hearing. To illustrate further my proposition, four examples, the counterparts of which have been repeatedly under notice, may be instanced, and in all of these the tympanic membrane has been completely lost by disease.

In the first the loss of hearing has been total; in the second the loss has been of so trifling a nature as to have escaped observation, and only to be detected by the most careful tests with Hughes's sonometer; in the third and fourth the loss has been very great—that is, spoken words a few inches from the ear are not distinguishable.

In the third the application of a small disk of moistened cotton-wool adjusted with a probe by the patient, gives (by effecting pressure on the stapes) hearing that for the ordinary purposes of life is good.

In the fourth the contrivance is of no benefit.

It seems fair, therefore, to infer that the loss of hearing is due to causes which do not include the loss of continuity in the tympanic membrane.

No. XVI.—BUBBLE REMEDIES IN AURAL SURGERY.

Lancet, April 11, 1891.

It is probable that all departments of medicine or surgery are more or less liable to the introduction of what may be termed "bubble remedies" (using the word "bubble" in the same sense as it applies to companies), but naturally my cognisance of them is chiefly confined to what I learn from patients with whom I am brought in contact in the practice of my own specialty. If I could repeat a half of their experiences as related to me from time to time during the past few years, the belief in the credulity of mankind would become even greater than it must be even now amongst men who have great knowledge of the world. As might be anticipated from their nature, the life of these bubble remedies is brief, their end is occasionally sudden, and the recollection of them soon fades away; but it is, I am sure, not altogether useless to occasionally subject them to the light. They remain in the air for considerable periods before they attract attention, and then their existence is made known by the voices of those who have invested their hopes in them. In the ordinary course of events the history of any new remedy in medicine or surgery includes a trial at a hospital, a discussion at a society where physicians and surgeons give the advantage of their experience and knowledge to aid the introducer and to criticise his conclusions. A fair trial is given at other hospitals, and it lives or dies according to the

measure of its usefulness. It is very different with the bubble remedy. Its origin is at times singularly unobtrusive, and private patients have the inestimable, or questionable, advantage of an early trial. Its constitution is at this period of its life too delicate to be submitted to the full blaze of criticism above alluded to. At another time a small pamphlet is greatly circulated, or a few cases (in which it has been tried, rather, it would appear, for the relief of a symptom than a pathological condition) are reported in a medical journal. These are more suitable methods of introducing it to the world. What is better still, is that it should have been at some time previously tried by some well-known man of good reputation and subsequently abandoned. It then has an air of respectability, and so resembles an after-birth of a child who has failed to survive.

I will mention only a few examples. It seems almost incredible, but is no less a fact, that during the past year or so a company was floated in the City of London, with a capital of £100,000, the avowed purpose being to purchase a business which possessed the exclusive right of selling what were termed "artificial ear drums." It is now over fifteen years since the use of Toynbee's artificial membrane (at the time an excellent contrivance in cases of perforation of the tympanic membrane) has been given up by aural surgeons in favour of improved methods. Now practically any form of artificial membrane that is advocated pre-supposes that all perforations which require protection and pressure can have them usefully applied by one form, the fact being that each perfora-

tion requires management to be acquired only by experience, after careful examination, and when any support of the kind is wanted, it must be regulated by the patient, his sensations being the guide in regard to pressure. Also many perforations are quite intolerant of all forms of artificial covering or pressure. However, in regard to these "artificial drums." At first some time was spent in advertising a simple modification of Toynbee's artificial membrane (which, under another name, was to cure every conceivable sort of ear trouble) by means of a pamphlet full of testimonials, the value of which may be judged by the fact that the inventor quoted a long passage from one of my lectures published in 1873, leaving it to be inferred that it applied to his "ear drum." By and by the bubble was floated. The next episode in its history was an account of a meeting of the company, the vendor occupying the position of chairman. It appeared from the report that the harmony of the proceedings was somewhat marred by the presumption of an inquisitive shareholder; and I have not seen any account of subsequent meetings. That these ear drums had a considerable sale I am sure, since numbers of persons who have consulted me had bought them, I am bound to say, generally when they had no perforation at all; for if by chance they had perforations of such a kind as would receive benefit by Toynbee's artificial membrane, their hearing might probably have been helped by the use of this imitation. Now, it was in this fact that the fractional good so necessary for the success of this venture is to be found, for who could doubt that, if some deaf

people could be made to hear better, it might be the case with all? So much for the ear drums, and now for electricity.

In July, 1889, when speaking on the subject of tinnitus, I said: "Perhaps because tinnitus due to degeneration and some other causes is of a constant character, the kind of electricity which finds favour amongst its advocates is the constant current; but whether this or the interrupted is employed, it is generally the personally conducted and continuous as long as possible." This is no doubt perfectly true, but I still think that for a long though fitful life amongst all bubble remedies, for the ear at least, electricity will maintain the leading position. I will endeavour to show why this is by an illustration. Before doing so, however, lest there should be any misapprehension as to my meaning, I wish to state most emphatically that my remarks apply absolutely and entirely to the unscientific use of electricity, and it is most necessary to state this, since the scientific use of this force has achieved so much in both surgery and medicine during recent years. When the tympanic cavity becomes the seat of acute inflammation, if the aqueduct of Fallopius is destroyed by caries, the portio dura within it is also destroyed, and facial paralysis is of course in this case permanent. If, however, the inflammatory process is of a more limited character, the facial palsy recovers either completely or nearly so in a period to be counted by weeks or months, as the inflammatory products around the nerve disappear. Since many of these cases are subjected to electricity, those persons who recover

naturally attribute it to the treatment adopted. Perhaps it may be said that this process of reasoning applies so often to many other remedies employed in those forms of disease which have a tendency to recover, that it is unfair to suggest the possibility of the facial palsy getting well in the same time as if there had been no electricity. It is, however, difficult to understand how a current of electricity passed through muscles can expedite the absorption of inflammatory deposit in the aqueduct of Fallopius any more than in hemiplegia it could expedite the changes in a blood-clot in the brain. The same order of events—viz., treatment by electricity, and, if recovery, this attributable to treatment—takes place in so many nervous and inflammatory troubles connected with the ear, that it is employed for all sorts of symptoms due to permanent change in tissue down to a general tinnitus, which often comes with atheromatous arteries, the results being the same *minus* the recovery. It is thus that an agent intrinsically of great value in surgery becomes a bubble remedy.

Another reason why electricity as a remedial agent will always be more or less in request may perhaps be found in the fact that the minds of many people are peculiarly liable to its fascinations. The idea is present to them that we live in an age of electricity, and anything short of miracles—in which they also believe up to a point—may be expected from it. The knowledge, too, that, undoubtedly the use of the electric current is of very real service in some departments of surgery, tends to confirm a possibly waning faith. It can be applied, too, in such ingenious ways

to parts of the body out of sight, and this is an attractive idea. Again, if the process is attended with acute pain, the treatment is apt to come to an abrupt conclusion, but as a set-off to this what a delightful revelation it is to find that cocaine can be applied to the aperture which is being acted on—the nose, or some other opening—and any objection on the score of pain may be disposed of. To put the matter briefly, is it not within the experience of most practitioners that those who suffer from progressive disease or unrelieved symptoms, and who naturally fly to something outside the routine of treatment which they have vainly tried, turn their eyes towards electricity as offering a better chance than most of the empty helps held out to them in their dire distress? The same kind of apparent soundness at the base above alluded to—viz., the recovery *under* treatment, and not *due* to treatment—was to be noted in the wholesale injections of deaf people by pilocarpine, which quite recently took place, but the faith in which has been rudely shaken by a paper in *The Lancet* of January 3rd from Politzer, who made the original experiments with pilocarpine as far back as 1879, and who, having subsequently given his experience and views on the subject, now finds it necessary to write in such scathing terms on "the abuse" of this treatment. He there speaks of "practitioners who subject their patients to a long and wearisome course of treatment with pilocarpine," and says, "I feel it my duty to say that they are not too conscientious in the discharge of their calling." It is much to be hoped that this protest will be largely and

carefully read, for during the spring and summer of 1890 the condition of patients who consulted me after being injected in this way was almost ludicrous as to the variety of the ailments for which it had been employed. For the most part these people belonged to the unsuccessful division, and included old gentlemen who objected strenuously to senile degeneration, the middle-aged and the young whose hearing was defective from the many causes which unhappily admit of no alleviation, but they included none of whom it could be said they had not given it a fair trial. One young man out of many I especially remember, who, in consequence of central changes, was impervious to sound of every sort, both before and after he had been subjected to eighty injections, and this was after or before (I forget which, but it is unimportant) a long course of electricity. It may not unreasonably be asked why such wholesale injections did not, even before Professor Politzer's protest, elicit an outspoken disapproval of the practice? In the first place, it is a matter of common knowledge that in the secondary stage of syphilis patients often become deaf and completely recover under the ordinary constitutional measures without any especial treatment for the loss of perception to sound, the conducting power remaining good. Those who were injected of course recovered their hearing, and attributed it to the injections. In the later stages of constitutional syphilis, or in the inherited variety especially, the course of events is different. In the second place, it must be remembered that the subject of ear affections does not attract the attention of many, and so they

did not feel competent to express dissent or assent in the matter. In the third place, this is not the only occasion when injections of fluid have been practised with insufficient data, even with the highest objects in view. Indeed, have not recent events shown that there was for a moment a danger lest a wave of enthusiasm should swamp the intelligence of the College of Physicians, and this danger was only averted by the better judgment of a majority and the sagacity of its guiding spirit? This I conceive to be the explanation of the limited vitality of the pilocarpine craze—a vitality which has been further limited by Dr. Politzer, who at least, it must be admitted, may fairly claim to set bounds to the employment of an agent which he was the first to apply to ear disease.

The bubble remedy, chameleon-like in its hues, occasionally assumes the aspect of a surgical procedure. In approaching the subject as delicately as possible, let me say I have sometimes hoped it may be possible that there exists in the human mind a faculty—undeveloped unless called into activity—which permits the possessor of it to persuade himself of the inutility and general harmfulness of some portion of the human body (not in the precise instance of his own body, but in that of others). Unless this delusion is within the range of possibility, how are we to explain the determination with which some practitioners extirpate an apparently unoffending portion of the organism for reasons which appear to be not only quite illogical, but which require the profoundest ingenuity even to enunciate? For

example, I have been asked to give an opinion somewhat in this way: "I am suffering from [here follow a variety of symptoms which include deafness and tinnitus, but by no means conclude with these troubles]. Do you think I should be cured by the removal of my [right or left] middle turbinated bone?" This upon examination being found quite healthy, the opinion in the negative is given without much difficulty, without the expenditure of many words or any comments. The same question has, I know, been asked of many others beside myself. As a surgical procedure, this operation is outside the pale of serious discussion, and I mention it only as an example of a bubble remedy that the very mention of it may possibly hasten its inevitable bursting.

If this operation or mutilation (whichever the reader may elect to term it) is devoid of plausibility, it was not so with another, which is now defunct—viz., division of the tensor tympani muscle, but which, at the period of its birth and early in its brief and chequered career, attracted considerable attention. The conception was not wanting in brilliancy if the results of the proceeding included dulness (in hearing), and it was easy and reasonable at first sight to imagine that the division of this muscle would relieve permanent tension, especially if it had undergone permanent contraction. I have even heard it alluded to at one of the medical societies in London as a recognised operation. It may have been recognised, but certainly by those who were familiar with its results (and especially by those upon whom it was performed) it was recognised as a failure so far as

any change for the better in hearing was concerned, and a very decided change for the worse in the cases which came before my notice. I have elsewhere described it as including in its history "a flight of the imagination, a brief notoriety, and a burial in oblivion so rapid as falls to the lot of few achievements in surgery," and I see no reason to alter this description in paying a tribute to the dead.

Such are some of the bubble remedies which float over the area of aural surgery, but which "vanish into thin air" as they emerge into the clear light of day.

No. XVII.—CANCER OF THE EAR.

From the *Lancet, July* 2, 1892.

In the history of cancer, which is at the present time subjected to such rigid analysis and receives such able handling from the Bradshaw lecturers, it seems advisable to place on record the experiences of individuals who have more than the usual opportunities of observing the occurrence of cancer in any especial locality, so I therefore embody what experience I possess in a few observations on cancer as it has come before my notice during the past twenty years in the very limited area of the ear. With one exception, as will be noted, this area might be more limited by using the term "middle ear," and even still further by saying, "the cavity of the tympanum." In the course, then, of twenty years I have only seen six cases in all, including both hos-

pital and private practice, and, without knowing what the experience of others may have been in a similar time, I should be inclined to say that, considering the opportunities I have had, cancer of the ear is comparatively speaking a rare disease. It is to be remembered how exceedingly often the mucous membrane which lines the tympanum is left in an exposed position, this being due to the fact that an enormous number of persons pass the largest part of their lives with the perforation of the tympanic membrane in one or both ears. The first point to be observed is that in the four cases I had seen up to 1885 and in all the recorded cases I could find (and there were very few) the patients had suffered for a considerable time from a discharge from the ear, evidently arising from a perforation, before any symptoms of a malignant disease appeared, and that in the early stages the appearances most closely resembled polypus, arising from the tympanic cavity or ordinary bone granulations. Thus the presence of a constant discharge acted as a local irritation in each case. But in the first case everything, so to speak, arose *ab initio* from a local irritation, even the perforation itself. This case may be found recorded in vol. lxii. of the "Medical and Chirurgical Transactions" in a paper on "Disease of the Mastoid Bone" as follows:—

"In March, 1878, A. S——, a married woman aged thirty-two, whilst picking her left ear with a hair-pin ruptured the tympanic membrane, and soon after the accident came under my notice as an out-patient of St. George's Hospital. With the exception of this lesion she was, in all respects, in

good health. The rupture did not heal, and in a few days, from the fistulous opening thus established, there was a purulent discharge. A month later, after an attack of pain in the ear, which was followed by facial paralysis of that side, I again examined the ear, and found a polypoid mass filling up the cavity of the tympanum, the membrane having by this time quite gone. She now came into the hospital. I removed the polypoid growth, and the pains in the ear, which had previously been considerable, passed off. Her stay in hospital on this occasion was three weeks. On July 31st, when she again applied for relief and was admitted, she stated that she had suffered from no further pain until within five weeks, when acute pain in the ear came on, and soon afterwards the parts over the mastoid process became swollen and tender. Two weeks ago, she said, the skin over the swelling broke down, and a little bloody matter was discharged. The ragged wound at that time observable was the result, and from this wound had been coming ever since a quantity of watery, very foul-smelling discharge. The skin over the mass was bluish, the tissues were infiltrated, and the edges of the wound were everted and hard. In short, the disease was to all appearance malignant. There were no enlarged glands, neither was there any history to be obtained of cancer in her family. No loose bone could be detected, although a large surface of bone was exposed. From this time she rapidly wasted; the wound increased in size until it formed a large cavity, discharging most offensive matter, and she died on November 12th from ex-

haustion, without any head symptoms of hæmorrhage."

The origin of the perforation here was traumatic, but the origin of the cancer was a discharging surface. The same might be said of a case reported in the "Pathological Transactions" for 1850, by the late Mr. Cooper Forster, for although the boy was knocked down by a cab, and so received a violent blow on the head, he is said to have after this suffered from great pain in the ear, followed by facial palsy, so that although the blow was the cause of the inflammation within the tympanum, the suppuration in this cavity preceded the appearance of cancer. I am able only to mention two cases in which this precedence of suppuration did not obtain. One was in the last case which I saw—a woman about fifty years of age, on February 15th of this year with Dr. Meek, of Herne Hill. There was no history of inflammation of the tympanum. She had constant gnawing pain in the ear for three months, a partial facial paralysis coming on very gradually, and a most fetid discharge from the ear with occasional bleeding. The external canal was filled with a soft-looking, exuberant mass, which, when examined by a probe, had a spongy feel, and bled upon the most gentle manipulation. In short, it had all the appearance of a malignant growth. A distinct family history of cancer gave strong additional probability to the diagnosis. On removing the mass under ether a few days later, it was found to be soft and pulpy. On examining portions under the microscope, Dr. Rolleston, the curator of the museum at St. George's

Hospital, reported: "Sections show typical cell-nests composed of squamous epithelium surrounded by granulation tissue. The growth is therefore a squamous-celled epithelioma which has probably been growing for a considerable time." This was the character in all the cases I have seen except one, when I had not the opportunity of an examination. The patient died on May 4th, having developed a week previously some symptoms of cerebral irritation, but none of pressure. I learned this from Dr. E. H. Young's letter to Dr. Meek, Dr. Young having attended her at Okehampton up to her death. Like other cases which I had seen at the time of death, the growth had involved a considerable area. In one instance the internal carotid gave way, and the patient died in her sleep from suffocation. Amongst the six cases, the one solitary example in which the disease did not start in the tympanic cavity, it commenced by an ulceration over the mastoid process close to the junction of the outer ear and proceeded inwards, eroding the mastoid.

There is not much more to be said about cancer of the ear except to repeat that in one case only was a predisposition discoverable; in one case only did the growth commence elsewhere than in the tympanic cavity; that in two cases (and this includes Mr. Cooper Forster's) an injury started the suppuration; that they all died within six months of the discovery of the growth; that the proportion of cases in which a perforation is followed by cancer is extraordinarily rare; that there is only one case

of tympanic origin that was not preceded by suppuration; that considering how frequently the tympanic cavity is the seat of suppuration, this surface possesses a remarkable immunity from cancer; finally, that cancer of the ear is one of the rarest of diseases.

No. XVIII.—HYSTERICAL (SO-CALLED) AND FUNCTIONAL DEAFNESS.

British Medical Journal, March 16, 1895.

The "Case of Functional Deaf-Mutism" related by Dr. W. B. Ransom in the *British Medical Journal* of March 2nd induces me to offer a few remarks on a class of cases for which I suggest no name for the present, except to say that any definition hitherto in use is not strictly accurate. They are generally spoken of as hysterical deafness, sometimes as functional deafness. I do not for one moment venture to criticise Dr. Ransom's definition of his particular case, but those to which I refer present so many points of similarity that they may usefully be laid side by side with his case in order to elucidate their precise nature. I am sure that Dr. Ransom would not object to this use being made of his case under any circumstances, but it becomes especially valuable for the reason that he adopted probably the only method which would have instantaneously cured his patient, or, speaking more accurately, would have at once put an end to both the mutism and deafness, as indeed it did.

To illustrate my meaning I will briefly relate a similar case, so far as the so-termed hysterical deafness is concerned.

Some years ago a young lady, aged seventeen, in every way healthy, and exceedingly good-looking, was found one morning by her friends to be absolutely deaf to all sound. All communications had to be written, and she replied to them as usual. Her voice was not affected as to tone. After a week or so she was brought to me by her medical attendant and her mother. The external and middle ear were quite healthy. A great many attempts had been made to try if she could hear anything, on both sides, in front of her, and behind her. But do what they would, she never evinced the slightest perception or gave the slightest start, and they were one and all quite certain as to the complete deafness. I was tolerably familiar with the demeanour and voice of persons who, with good hearing to start with, had suddenly lost all perception to sound, and I was quite certain that this girl could hear as well as ever she did; so I was exceedingly careful not to let her know that I had the least suspicion she could hear, and I explained (in consultation) to the medical attendant what I believed was the state of the case. I suggested that with his consent and her mother's I should arrange that she should suddenly apparently regain what had really not been lost. My plan was simple enough—that she should walk through two rooms into a third, and that as she entered the third room, from a point where she could not see, a gun should be fired. Without any doubt she would then have

been so startled that she would have displayed to us all that she heard. From that instant she would no longer have been deaf. For reasons which may have been quite good, my friend objected to this, and especially on the grounds that her mother would never consent to it, so certain was she that her daughter was actually quite deaf. I then said it would be best to apparently accept the deafness as an incurable affection, with the perfect confidence that one day she would appear with the hearing as completely and suddenly restored as it had been completely and suddenly lost. So I saw her no more, but some months afterwards I saw a relative of hers who I happened to know, and he informed me that about six months after my examination she came down to breakfast hearing quite well.

Now, surely this case would be very inaccurately described as "hysterical" deafness. So far as I understand, if a young woman has hysterical paralysis of a limb she firmly believes that she cannot move it, and she cannot until some strong emotional influence has demonstrated to her that she can do so. In the case of a special sense like hearing, the girl cannot be under the impression that she does not hear. She cannot help hearing; it is not a question of loss of power over volition; the function is involuntary; moreover, the function is perfectly performed, so it is just as inaccurate to speak of "functional deafness."

Let me give an example of true functional deafness. A child, who had become intensely deaf without any disease of the middle ear, recovered completely after the evacuation of a large number of lumbrici; the

function of hearing had been suspended and restored. I have constantly known hearing suspended under a violent emotional influence, and under many other conditions which I need not mention here. This deafness would be accurately described as functional. What happened with this girl and others like her must surely come under the head of mental. A great mental strain must always have been going on lest inadvertently she should be surprised into evincing some perception to sound, and especially when it proceeded from behind or out of sight. I was much struck by a remark of Dr. Ransom, or rather a foot-note, in which he draws attention to the fact of the demeanour not being like a malingerer. This applies remarkably to the girl whose case I mention and to others I have seen.

I have seen malingerers who had a very strong motive to induce people to believe them deaf, and their demeanour was quite different to these girls. Probably she had no motive, or, at least, could not say what it was if she wished to do so, but the fact remains that, unlike the person who really suddenly loses hearing, she retained the most perfect modulation of her voice. From the moment that these girls unconsciously display to the bystander that they hear, the deafness goes. What interested me, therefore, so much in Dr. Ransom's case of the deaf-mute was that when he felt the faradic current through the larynx, and gave the "yell," his voice and hearing, like the girl's, returned so soon as his voice was displayed to the bystanders. There was another point of strong resemblance. In the case of the girl (as I

mentioned) the voice retained its perfect modulation; for how should she know that this would have become altered if she suddenly lost all hearing? Whilst in the case of the boy who became the deaf-mute, he was unable to emit any sound—surely the oddest kind of deaf-mute; but how should he know that deaf-mutes, whilst unable to articulate, are most noisy, and emit all sorts of inarticulate sounds? Another odd point of resemblance in all these cases is this: They are all right the night before, and always discover themselves to be deaf in the morning, when they awake and are alone. The persons who really suddenly lose all perception to sound do so at all sorts of times, and often in the presence of other people.

Dr. Ransom says, "although the deafness was not absolute when the patient came to the hospital, yet severe tests, such as the cannon, showed it to be real," and, previously, "he gave no sign of hearing a cannon let off close to him on November 5th." In reference to this, I must say that in the cases of which I have made mention the subjects who heard well would also have given no sign of hearing a cannon if they knew it was going to be fired and could see it. But if they saw no cannon (or gun, as the case might be), and the explosion was quite unexpected and near to them, they would have displayed unmistakably to the bystanders that they heard it.

The position, therefore, resolves itself into one of two, and I am prepared to accept Dr. Ransom's opinion in either case. First, he heard the cannon and showed no sign of hearing it. Then his case

comes at once into the same category as my cases. Or, secondly, he did not hear the cannon. The function of hearing had been lost, and was restored instantly by the electric shock through his larynx. In the latter case it is an unique instance, and the like of which I have hitherto regarded as impossible to bring about.

Cases of this kind are sufficiently rare to make it most important that each one should be recorded, as every fresh one not only throws new light on the subject, but in those instances where the hearing is really lost either for a time or permanently they help to show what I have for long maintained, that the sense of hearing is often apt to be lost from emotional causes, although I am quite unable to offer any reasonable explanation, and have strictly limited myself to suggestions for the consideration of others. They also help to show that there can be no true hysterical loss of hearing any more than there can be a hysterical loss of smell or of any other special sense.

No. XIX.—ADENOID GROWTHS IN THE PHARYNX.*

Lancet, November 3, 1895.

In an article on the above subject, published in the *Lancet* of October 2nd, 1886, I suggested the use

* Sequel to an article that appeared in the *Lancet* of October 2nd, 1886.

of a "steel finger nail" (a woodcut of which was appended) for the removal of adenoid growths, and the complete clearance of the pharynx under an anæsthetic. Since this article was written the practice of removing these growths under an anæsthetic has become much more general than it was at that time (I do not for a moment imply in consequence of the article), and I notice in a recent work that the instrument which I there depicted is referred to as "*the* steel nail," so it may be assumed that it is favourably regarded and employed by other surgeons.

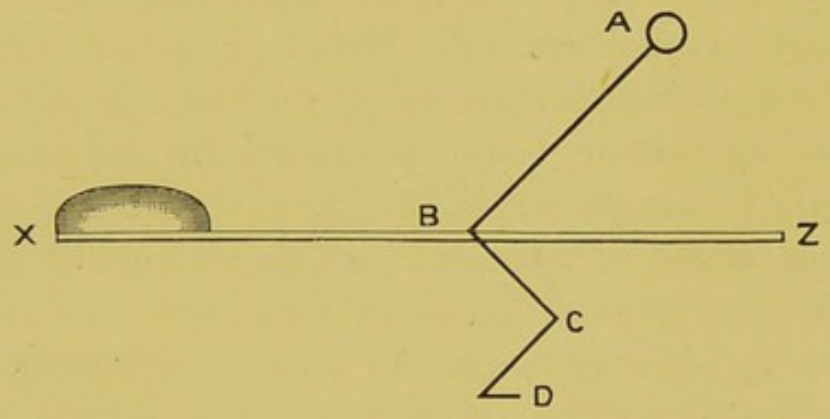

FIG. 3.

I was especially careful at the time to explain the position in which the patient should be placed in order to ensure the impossibility of any blood being inhaled or trickling down the larynx, and to avoid by this position any danger of asphyxia. It is even now worth while drawing attention to the fact that the position of the patient, as the pharynx is being cleared, is represented by two right angles, A to B being the head and trunk, B to C the pelvis to the knee, and C to D the knee to the foot, each leg being on either side of the narrow couch X to Z, on which

the patient has been given ether before he is raised into the rectangular position. An admirably depicted drawing of a patient in this position was given in a paper by Dr. Hewitt and Mr. Sheild quite recently at the Royal Medical and Chirurgical Society. Why, therefore, it may be said, be guilty of repetition in referring to this attitude apparently now recognised? Because unquestionably in consequence of malposition whilst removing adenoid growths several accidents (if such a term is allowable) have occurred, death being due to asphyxiation from the entrance of blood into the trachea. Also because after employing this rectangular position with the valuable aid of Mr. Braine for over nine years, both he and I can confidently say that no blood has ever been inhaled. In so saying there is no suggestion that this is the only position which is free from danger, as I am of course aware that several leading surgeons, who would permit no avoidable risk to a patient, employ two other positions which preclude any inhalation of blood. It is, however, natural that I, in advocating perfect safety to life, should select for emphasis the method which I have successfully employed and found more convenient than any other. The steel nail should, I think, always be used in patients after eight or nine years of age. In many children, when it is necessary to clear the pharynx before that age, and especially before the age of five or six years, the growth is usually so soft that it is broken up and removed readily by the forefinger, using the natural finger nail for the purpose. This is, however, subject to exceptions. Thus, there is no doubt that adenoid

tissue becomes the seat of hypertrophy in some children with a determined predisposition to it very soon after birth. I have occasionally seen children three or four years of age in whom the pharynx has been so filled with adenoid growth that in sleep they not only heavily snored, but seemed in danger of choking, and when not asleep, especially when eating, snuffled and snored in the most unpleasant manner. With them I have found that the adenoid growth was of the most tough consistence, and by no possibility could be removed with the finger nail. With them, also, it is not easy, owing to want of space, to move at once the steel nail around the pharynx, so that I have first passed into the pharynx the "curved ring knife,"* and cut away large hard lumps of growth: then finished the clearance with the space thus obtained by the steel nail.

There is still another condition which requires mention, and which must have come under the observation of those who deal considerably with these matters. It is the greatly enlarged pharyngeal tonsil which occasionally alone occupies the pharynx, unaccompanied by adenoid growths, and exhibiting to the sensation of touch something quite different from the pharynx filled with adenoid growth, something of itself with a smooth surface, but none the less requiring removal in early life from its effects on nasal respiration. This also is very tough tissue, and requires cutting away rather than scraping or scooping. Further knowledge derived from experience, information from varied sources, published accounts,

* *Vide* the *Lancet*, October 2, 1886.

or even hearsay, has so increased the interest in this subject that what was unknown in 1868 was recognised by a few in 1881, was then chiefly removed by Löwenberg's forceps in many sittings, and was subsequently removed in various ways under an anæsthetic, is now not only generally recognised by the medical profession, but talked about familiarly by the public as "adenoids." In short, the aspect of this matter is so changed that there is an appreciable risk of its becoming regarded by those who have no real knowledge as a universal inheritance of man. This idea of adenoids must have become very general with the public when children (in whom they are absent) are brought for their removal to relieve stammering and stuttering, or imperfect articulation due rather to failure in hearing or imperfect brain development. I have even known a lady over sixty years of age in whom it was proposed to "scrape her pharynx" for sub-acute catarrh of the middle ear. If an imagination can be so active as to suggest adenoids in such an instance we may reasonably infer that some pharynges may, in the exuberance of zeal, be submitted to active measures with questionable advantage.

Whilst regarding the abnormal amount of adenoid tissue as a true hypertrophy which requires removal because of its interference with nasal respiration, and as an exciting cause of middle-ear disease, together with the fact that the disappearance of this tissue commences and progresses to completeness after the age of puberty, it might naturally be anticipated that when the pharynx is cleared at about the age of from

ten to twelve years, there would be an end of the matter, and this is so. Now, if this hypertrophy exists in a moderate degree in much earlier life, the mischievous increase often takes place rapidly in a few months, and the exciting cause of the rapid increase is frequently an attack of measles, scarlet fever, diphtheria, or whooping-cough. Also, when in early life the pharynx is cleared absolutely there will occur sometimes, either with or without these exciting causes, a renewed activity. So that we occasionally find a child, say, five years old, in whom the growths have been removed, remaining perfectly free for several years, and active growth again commencing some time before the arrival of puberty. These are the occasional cases in which a second operation becomes necessary, and it is desirable that this occasional necessity be understood so as to dispel any idea of an imperfectly performed operation.

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