On a new method of applying remedial agents to the cavity of the tympanum / by Edward Bishop.

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ON

A NEW METHOD

OF

APPLYING REMEDIAL AGENTS

TO THE

CAVITY OF THE TYMPANUM.

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ON A NEW METHOD OF APPLYING REMEDIAL AGENTS, &c.

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To the Editor of the *Medical Press and Circular.*

SIR,

Notwithstanding the great improvements which have been effected of late years in the treatment of diseases of the Ear, it must be confessed that much remains to be done.

The patient and practical investigations of our own countrymen, amongst whom stand pre-eminent the names of Yearsley, Toynbee, Wilde, and others, as well as those of our Continental and Transatlantic brethren, are worthy of all praise, having done much to raise the treatment of diseases of the "Ear" in professional and general estimation, and, as a natural result, to take it out of the hands of a class of unprincipled charlatans, who preyed on public credulity. It must, however, be acknowledged that the means at present at our command for treating several forms of aural disease, particularly those having their *habitat* within the cavity of the tympanum, or middle ear, are few and often inefficient; the prejudice at one time existing against catheterism of the Eustachian passages, and also against insufflation of the middle ear, is rapidly dying out, and the opinion of Rau would now be very generally endorsed—viz., that the opposition to catheterism arises chiefly from a want of dexterity in the use of that instrument.

Politser's method, which is nothing more than *incomplete catheterism,* is practised and eulogised by some aural surgeons,

and doubtless is an excellent alternative, where, from peculiarity of conformation, or from disease, there is some impediment to the complete passage of the catheter, or where the mucous membrane is so irritable, and the tensor and levator palati are prone to spasm from the slightest touch of the instrument; but such cases are rare—the exception and not the rule.

At the Metropolitan Infirmary for Diseases of the Ear, Sackville street, this method of Politser's has been adopted in a large number of cases, and the result compared with ordinary catheterism—the latter mode of treatment in the majority of cases being greatly superior to the former—and this is the *practical test.* I do not wish to detract from the merits of Politser's plan, as it is really valuable in the cases to which I have referred; nor is my object to write an article on the use of the Eustachian catheter, whether considered as a *curative* agent or as a means of *diagnosis*, but to bring before the profession a mode of applying remedial agents *directly to the seat of lesion*, in those cases where disease exists in the middle ear, or in the passage leading to it. As far as I am aware this plan is novel, yet I venture to hope it will prove useful, and become an adjunct to the means we already possess. I am induced to place confidence in it from the trials to which it has been subjected at the Metropolitan Infirmary, the details of a few of which I send you for publication.

It is impossible to over-estimate the good that has been accomplished of late years, and the light thrown on this form of disease; or it would be more correct, perhaps, to say, on the enunciation of the FACT, that in a very large majority of cases the *mucous membrane*, with its numerous ramifications and connections is the SEAT of disease. A gentleman, whose extensive hospital and private experience, and whose accuracy of observation entitle his opinion to the greatest weight, writes as follows:—"Almost all diseases of the ear, associated with deafness, originate in a morbid

condition of the mucous membrane of the throat, nose, and ear, which membrane becomes affected from a variety of causes, among which cold, the eruptive fevers or exanthemata (especially scarlatina), and stomach derangement, stand pre-eminent; and according as the disease terminates in simple thickening of the membrane, in adhesions, in disorganisation of the whole mucous lining, in partial or total loss of the membrana tympani, in loss of the ossicula, or of the inner membrane of the fenestræ, so is the deafness more or less intense and confirmed."*

It is a remarkable fact, which, by your kind permission, I will take an early opportunity of showing in your journal, that there are comparatively few cases of deafness in which the disease ought to be attributed to the internal ear. The time has gone by when we can screen ourselves behind the term "nervous deafness," which, it must be confessed, was often made use of to hide our ignorance, and operated as a direct hinderance to a discriminating diagnosis.

The principal means available at present for treating affections of the tympanic cavity locally (the membrane of the tympanum remaining entire) are, *insufflation* by the *lungs* or by an *air press;* the *injection* of *steam, simple* or *medicated,* and the *injection* of *tepid water,* or *medicated solutions.* With respect to the last method, if sufficient quantity be used to come into contact with the whole of the lining membrane—which must be the case to do much good—mischief of one kind or another will result; the mastoid cells, lying on the same plane as the entrance of the Eustachian canal, and the minute crannies in the cavity of the tympanum, are filled up, and often remain so, producing mechanical irritation and swelling of the lining membrane, the mischief being still greater if a medicated solution has been used. There are other objections, which your space will forbid my referring to;

* See Yearsley on "Throat Deafness." 10th Edition.

and I believe this operation will shortly be, if it is not already, abandoned by the best aural surgeons.

The first two methods are certainly valuable in many cases —the use of an air press in the hands of an experienced operator being perfectly free from danger. The same objections may be urged against it as were formerly against insufflation by the lungs—viz., that the redundant and accumulated mucus in the tube may be driven into the cavity of the tympanum; that the current of air may break down too forcibly any existing old adhesions or anchyloses in the cavity left by previous inflammatory attacks; that it may luxate one or more of the articulations of the ossicula, &c., Practical experience, however, shows that, as in the latter case, these objections are more imaginary than real and that insufflation by the lungs or the air-press may be adopted with perfect safety. It is also equally practicable to send vapour, medicated or otherwise, into the cavity, and to do this with advantage in some few cases; but it is evident those medicaments only are available which are volatile and will pass off in solution in steam.

The importance of local treatment for the cure of disease purely local in its character is generally acknowledged, and one of the most valuable practical teachings of modern surgery is the recognition of the fact of how much may be done, and that with impunity, *within the cavities of the body;* therefore, any means by which we can safely apply a remedy to the seat of disease must be more or less valuable. Even within the "tympanic cavity," contiguous to such delicate and sensitive parts, much may be attempted, though great care is necessary in the manipulation, as well as in the selection of suitable agents.

The method I am adopting at the hospital is to apply a lotion containing such soluble remedial agents as may be considered appropriate, by means of tepid pulverised water. It is evident, as far as the *principle* is concerned, lotions of

any strength, up to the point of saturation, may be used, but the quantity required to come into contact with the whole lining membrane is so small that there is not the least fear of mechanical injury, and by slightly turning the point of the instrument, the pharynx, the nasal passages, and the parts connected therewith, may all be subjected to the action of the remedy—an important fact, as it is found that the whole tract of mucous membrane lining these parts is generally suffering from the same morbid condition. As the pulverised lotion is driven off in the finest state of subdivision, it may be sent into the cavity of the larynx; but on this point I have not yet had much experience, and, therefore, refer to it with diffidence. In the treatment of ozena, however, I have found it useful; a solution of such agents as carbolic acid or creosote may be sent into every crevice and cranny of the tortuous nasal passages and the parts connected with them.

The apparatus consists of a small graduated glass syringe similar to that used for subcutaneous injection. The solution is gently forced guttatim into a cylinder, and at the point where it leaves the nozzle of the syringe it is caught by a current of the air sent by a pump worked with a proper degree of force by the hand. This drives the fluid forward in a pulverised state. This small apparatus is then attached to an ordinary Eustachian catheter previously introduced, and suspended by a suitable apparatus. To ensure complete pulverisation, the end of the catheter is covered by fine gauze wire. Some amount of dexterity is required in the successful use of the instrument, but this is soon accomplished by any one accustomed to the introduction of the catheter.

It is equally applicable to those cases where it is thought desirable to use Politsers's catheter, introduced a short distance only within the nasal passage—the pulverised solution finding its way through the Eustachian tube into the cavity of the tympanum during the act of swallowing.

The instrument described above has been made for me by Weiss and Son, Strand, London. I am conscious it is capable of much improvement, and, in the hands of those highly scientific gentlemen has already been put into a *more* practical form than I at first anticipated.

In reporting the cases selected for treatment by means of pulverized fluids and catheterism at the Metropolitan Infirmary for Diseases of the Ear, Sackville street, I have not included those attended with considerable disorganization, cases, I may add, frequently met with in ordinary practice, a large proportion of which might have been cured by timely treatment; but it is only right to state, in some of these, of a very unpromising character, considerable relief has been afforded, several at present under treatment showing daily symptoms of improvement.

The kind of cases likely to receive the greatest benefit are those attended with closure of the Eustachian canal, either at its faucial or tympanic extremity, or its entire length. This closure may be the result of inflammation and thickening of the mucous membrane, commencing in the fauces and extending up the tube, or it may be the result of inflammation commencing in the tympanic cavity, from cold, fever, or other exciting cause, very frequently observed in children.

Practically, in these cases it is found that associated with obstruction of the Eustachian canal, there is either a dry condition of the lining membrane of the tympanic cavity, or the secretion is too abundant, producing in each case, singular as it may appear, the same distressing *tinnitus*, or singing in the ear, and this quite out of all proportion to the deafness existing at the time. When tinnitus can reasonably be referred to disease of the middle ear and its appendages, it may generally be attributed to pressure, for where the secretion is too abundant, and the natural outlet closed or contracted, the cavity of the tympanum is filled, the ossicula and the contents of the middle ear are compressed; and, as the mem-

brana tympani is very unyielding, the stapes is driven against the inner membrane, and pressure is produced upon the fluid in the cavities of the internal ear, and is felt by the delicate expansion of the auditory nerve. Other structures also are involved, which it is unnecessary to refer to here.

The fact, however, is illustrated by the immediate cessation of tinnitus, when, in acute abscess of the middle ear, the membrane ruptures, and the pressure is suddenly removed.

In cases where there is a mere closure of the Eustachian canal, attended or not by a dry condition of the mucous membrane, tinnitus often exists, but the pressure is produced in a different way. The Eustachian canal is not only intended as an outlet for the natural secretion, but for the entrance of atmospheric air. When, therefore, the latter is excluded by closure of the passage, there is not sufficient resistance to the pressure of the external atmosphere, and the membrana tympani is forced inwards. The contents of the cavity are gradually compressed, the ossicula being pressed against the opposite wall of the tympanum.

It is an *interesting* as well as important fact that so many cases of deafness are caused by disease of the mucous membrane, and it is in these, I believe, the use of pulverized fluids will be found valuable.

Case 1.—W. P., aged thirty-seven, a waterman, admitted October 17th, 1865, a robust, healthy-looking man, much exposed to the weather, complains of frequent cold in the head, totally deaf, as he expresses it, of the right ear, and gradually becoming so of the left. Lost the hearing on the right side fifteen years since after an attack of small-pox, when he had violent pain for three or four days, followed by copious discharge of matter. After this he became gradually deaf on this side, and at present can only hear very loud noises close to the ear. He can, however, faintly perceive the ticking of a loud watch over the mastoid process; the external meatus dry and devoid of wax, the surface of the membrana tympani

desquamating, and there is the mark of an old cicatrix in a line with the handle of the malleus. An exostosis at the point of junction between the membrane and the meatus is apparent, and the whole membrane is very concave. Valsalva's method of forcing air into the tympanum produces no effect, nor does the more potent one of Politser answer any better. The attempt, also, to introduce the Eustachian catheter failed, so that so far as this ear was concerned, the case appeared very unpromising.

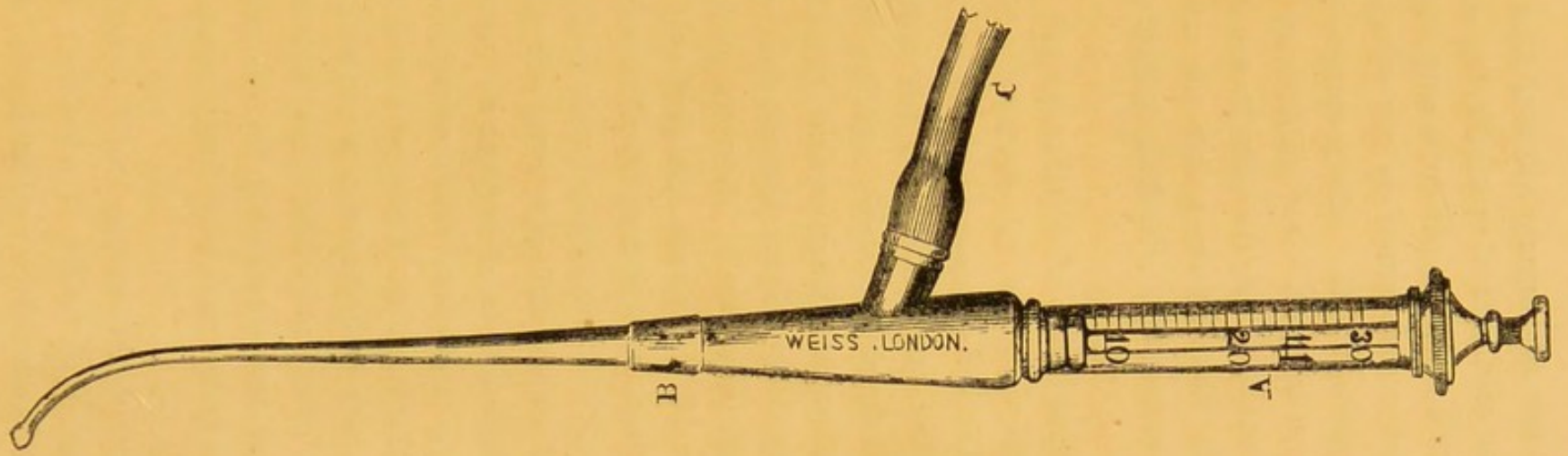
On the other side, the *left*, the deafness was less complete, though gradually getting worse, the watch could be heard only when in contact with the ear, there was continual and distressing tinnitus. The mucous membrane of the fauces was congested and irritable, the tonsils slightly swollen, and the nasal passages obstructed, the patient breathing continually with the mouth open. On this side both Valsalva's and Politser's methods of insufflation were successful, and the Eustachian catheter passed easily, the cavity of the tympanum being readily inflated through it, a part of the operation of much importance, if it is not *essential* to its completion.

Auscultation of this ear detected increased secretion.

Diagnosis on the *right* side, obstruction probably the entire length of the Eustachian canal, cicatrization and general thickening of the membrana tympani, and probably adhesions within the cavity of the tympanum.

On the *left*, closure of the Eustachian canal at its faucial extremity, with relaxed and unhealthy condition of the lining membrane of the tympanic cavity, with accumulation of mucus.

Treatment.—This at first was confined to the left ear, and consisted in the application of a solution of nitrate of silver, twenty grains to the ounce of distilled water several times to the fauces—the passage of a Eustachian catheter made by Weiss and Son (see Engraving), so constructed as to transmit



A. Glass Syringe graduated in minims.

B. Eustachian Tube Catheter, which fits the body of the instrument, and which is capable of being turned in any direction.

C. Elastic Tube, to which an india-rubber Air Syringe is attached.

pulverized fluid into the tympanum, *via* the Eustachian tube. The fluid for pulverization in this case was solution of nitrate of silver, two grains to the ounce. The operation was performed daily for ten or twelve days, and nothing has been done now for three weeks. His hearing on this side is much improved; he says he can "hear quite well enough." The watch he hears readily at the distance of two yards. The noise in the ear was relieved after the third and fourth operation; it then gradually disappeared, and he has not had it since.

During the attendance of this patient at the hospital I made several attempts to blow air into the cavity of the tympanum on the right side by Politser's method, but failed. I then tried my pulverizer, and eventually succeeded in opening the passage. The improvement in this ear was soon so manifest as to encourage me to go on with the case at a future time, his present employment preventing his further attendance at present. I may add that I consider the condition of the tympanic cavity, on the right side in this case, totally different from the left, that there was too little natural secretion, and that I shall hereafter succeed more effectually in restoring the ear to a healthier state by injecting pulverized alkaline fluid—a method I am adopting with marked success. It seems singular that conditions so essentially dissimilar should be found to coexist in the same patient. It is probably explicable by the fact that the mucous membrane of the Eustachian canal and tympanum on the right side was completely cut off by the closure of the former from the morbid action which had been going on for some time in the fauces.

Case 2.—C. V., æt. thirty-five, a dressmaker and milliner, admitted October 17, 1865, pale and delicate-looking, of strumous constitution: complains of gradually increasing deafness of both ears, with intolerable tinnitus and occasional deep-seated pain; has frequent coryza and has suffered several times from hay fever.

Says she is seldom free from what she terms "cold in the head."

The fauces highly inflamed and deglutition painful, each meatus auditorius somewhat swollen, and the whole organ so painful as scarcely to admit of examination; hearing distance one inch from left ear; right ear in contact only.

Prescribed, one leech to each ear, to be followed by poultices, and to take a warm aperient mixture.

October 19*th.*—Pain and inflammation much relieved, throat also improved and deglutition easier, but the tinnitus more distressing than ever. More careful examination could now be made; the left membrana tympani showed considerable inflammation still going on, the right was dry and collapsed, permitting the projecting malleus to be distinctly seen.

Passed the Eustachian catheter on this side, with immediate relief to the tinnitus and improvement in the hearing, the patient remarking, "I can hear so well at this moment that I am quite confused." This improvement of course passed away during the day, and the ear gradually relapsed into its former condition. Prescribed another leech to the left ear; to take mist. ferri co., with decoct. aloes co.

23*rd.*—All active symptoms abated; the tinnitus almost gone from left ear, but continues the same in the right; passed the catheter on both sides, and very cautiously inflated the tympanum. Some improvement of hearing followed immediately on this operation being completed; to continue the mixture.

25*th.*—Tinnitus nearly gone from both ears; hearing distance three inches from left ear, seven inches from right. Auscultation reveals a dry condition of tympanic cavity; blew pulverized lotion of liq. potassæ into the cavity of the tympanum.

This operation was repeated daily for eight or nine days, when the patient was requested to absent herself for a fortnight; she could now hear the tick of a watch fourteen inches from the left ear, and three feet from the right; she

was requested to make use of Valsalva's experiment, once at least daily during her absence. It is scarcely necessary to remind your readers that this consists simply in closing the mouth and nostrils and attempting a forced expiration, by which air is driven into the middle ear, and the patency of the Eustachian passages secured after they have been once opened by the catheter. This experiment is as old as the hills, as every schoolboy knows, though it is to Valsalva we are said to be indebted for its use as a means of diagnosis.

Nov. 7th.—Reports herself as *hearing perfectly.* This, however, is not quite correct, as there is still a marked difference between the two ears. The left, which suffered more from inflammation than the right, has not improved as much as the latter, with which she can hear the tick of the watch three or four yards distant.

Injected pulverized solution of liq. potassæ into each ear, and repeated the operation every other day for twelve days, at the expiration of which period the tinnitus had quite gone, and the hearing distance was daily improving.

Dec. 12th.—Hearing distance: left ear nearly three feet; right, four yards nearly. She was now discharged, and reminded not to abandon the occasional insufflation of the ears as before directed.

I may observe that in this case the Schneiderian membrane was implicated. This is of frequent occurrence, and to that I applied the pulverized lotion as well as to the mucous membrane of the fauces.

I have now supplied her with Yearsley's elastic tube and bottle, by means of which she will be able to secure a patent condition of the nasal passages, and to inject a stream of water into the fauces—a method of treatment found highly serviceable, enabling the patient to breathe more freely through the nasal passages, the water acting as a tonic to the mucous membrane.

It is always pleasant to find some amount of good result-

ing from measures adopted in cases where all hope appeared to be abandoned, and the patient, with as much resignation as can be reasonably expected, having given up the bare idea of relief, because not only does the medical man feel that he has contributed to the happiness and comfort of a fellow mortal, but it also shows that there is much good to be done in many diseases, and particularly those affecting the ear, which are usually written down incurable.

CASE 3.—The following case illustrates these remarks :—

Miss E. E., aged thirty-seven, formerly governess in a gentleman's family, admitted to the Ear Infirmary the 10th day of October, 1865, lost the hearing of the right ear when a child, having suffered severely from scarlet fever. For a long time was distressed with discharge of a highly offensive character from this ear, and suffered very acute pain at intervals. She has been for thirty years, as she describes it, totally deaf on this side, and to her great distress, ten or eleven years ago she began to suffer from the most intolerable noises in the left ear. She had no pain nor swimming in the head. The general health was good, but she says she was very often suffering from cold in the head, attended with discharge from the nose and eyes. This noise became ultimately so very distressing, she was obliged to abandon her occupation, and has since that time, even with the occasional help of her friends, spent all the little hoard she had saved to supply the wants of advanced life. Has been under several aurists, as well as physicians of eminence in the profession, without obtaining the least relief.

On admission she presented a haggard and anxious appearance, very pale and very nervous, eagerly desirous of trying anything that could be suggested, yet working herself up to the highest pitch of excitement when the time for action arrived.

On the right side the meatus was moist but devoid of wax. A little oozing of serous fluid was going on from the bottom

of the passage, and all that remained of the membrana tympani was concealed by white curdy flakes of lymph. She was very deaf of this ear, could only hear the very loudest noises, but there was no tinnitus whatever on this side. On making a forced expiration with the nostrils closed, air could be blown through the cavity of the tympanum, thus giving undoubted evidence of perforation, which the flakey character of the adherent lymph attached to the membrane, concealed from view even after careful syringing.

On the left side, the meatus was moist, there was a slight secretion of natural healthy wax on the sides of the meatus, but the membrane was uncovered, of a dull, leaden hue, and highly convex and prominent. The noise in this ear was most intolerable, and had not ceased for many years, though it had varied considerably in character and intensity. Auscultation detected the closure of the Eustachian canal, and the watch could be scarcely, if at all, heard when in contact with the ear. The fauces were inflamed and swollen; the nostrils very much obstructed, the patient always breathing through the mouth.

This case was exactly the one in which to try the effects of catheterism on the one side and of the artificial tympanum on the other, and to the great delight of my patient, in both instances it was attended with success. She was, however, somewhat unwilling to have the catheter passed as she had undergone the operation several times without deriving any benefit. On explaining to her that there was a strong probability that the cavity of the drum of the ear was filled with unhealthy mucus, which could not escape in consequence of the closure of the natural outlets, and that this was the only means to accomplish that object, by which alone the noise in the ear could be removed, she submitted; the catheter was passed, and air blown in through the catheter by means of an elastic force pump; to her great delight the tinnitus was immediately relieved, and she certainly could hear a little

better, but she was so accustomed to a rushing noise that when she came to be free from it she was, for a time, bewildered. On her next visit I found the noise had again returned, and she was quite disheartened, but determined, however, to continue the treatment. Pulverized lotion of solution of iodine (the compound tincture) was injected into the cavity of the tympanum, the mucous membrane of the Eustachian tube and the pharynx and fauces also participating in the application. The operation was very beneficial, and was repeated almost daily for a fortnight, at the expiration of which time she could hear the watch at a distance of two yards from this ear, and could enter into and enjoy general conversation with little difficulty.

As to her right ear, on her second visit I ascertained that a perforation of the membrana tympani had been diagnosed by one or two aurists, and several attempts made to apply artificial means, not only without success, but with positive injury from the irritation and distress they occasioned. I ascertained however that she had never tried the bit of wetted cotton as used by Dr. Yearsley, of Savile Row, and known as the Artificial Tympanum, and that it was the hope of deriving some relief therefrom that had induced her to apply at this hospital. I introduced this at once and with the best result. As soon as it was adjusted she could hear the tick of the metronome which she could not do before, but she could not distinguish the bell. In less than a week, however, when I became more *au fait* at finding the exact spot where the support and pressure of the cotton were required she could hear the bell distinctly, and she can now adjust it for herself with great ease. This simple remedy has been highly eulogised, and most deservedly. I shall, in reporting future cases, revert again to this subject, as I think it is not sufficiently known in the profession. I often meet with medical men in active practice who have only heard of it in a very indirect sort of a way. But in my humble

opinion it is one of those discoveries which ought to be more generally known.

At the present date, December 29th, 1865, this patient is able to hear general conversation comfortably, has completely lost the noise from the left ear, and can hear the watch four yards from it, and has not been subjected to treatment of any kind for the last *six weeks.*

CASE 4.—Mrs. S. S. H,, was brought to me by Mr. Dalton, of Sackville street, Surgeon, on the 25th day of January last, in order that she might be subjected to my treatment, as he thought it a suitable case to test its merits. Her history is briefly as follows :—For some years she has been engaged in the occupation of keeping a school, and is in fear of being compelled to abandon it from increasing deafness. The right ear she lost a long time ago after scarlet fever, and has had occasional discharge therefrom ever since, the hearing being very deficient. Ten or eleven years since she caught a severe cold, suffering very much in her head, and rapidly became deaf of the left ear. As the cold subsided the hearing improved a little, though not much, and matters were in this state when one evening she was sitting in a warm room and perspiring freely, and after a sudden crack she regained her hearing, and remained better for a considerable time. Some months ago, however, she found her hearing on this side becoming gradually worse, and for some weeks, though not suffering from any cold, nor having done so for a long time, she has been exceedingly deaf. At present she can only distinguish the stroke of a loud-ticking watch when in contact with the ear.

On the other side, the right, there was no difficulty in ascertaining the fact that perforation of the membrane of the drum of the ear had taken place, and that the inner surface of the cavity was suppurating ; matter of a greenish yellow colour was at the time lying on the floor of the meatus. The patient was most anxious, and though very timid and fright-

ened, was desirous of carrying out the wishes of her medical adviser. With a little persuasion she submitted to the operation of catheterism, and I injected a weak solution of nitrate of silver into the Eustachian passage and cavity of the drum of the ear on each side. I ought to state that in the left ear, where the membrana tympani was not injured, there was a continual distressing noise like the ringing of bells, and that the meatus was very dry and nearly devoid of the natural secretion of wax. The Otoscope enabled me to ascertain that on both sides the Eustachian passage was closed. The operation immediately relieved her of noise, but she was in a highly nervous state, her general health being very delicate, and I directed her to repeat her visit in a few days.

January 31*st.*—Hearing much improved; on the left, the very deaf side, she could hear the watch at a distance of two feet, and has no noise in the ear. Says she feels nearly cured, and can go through her duties with comfort. Repeated the operation, using no other treatment, taking care, however, to let the mucous membrane of the pharynx and nasal passages partake freely of the astringent application, which was used considerably stronger than on the last occasion.

February 3*rd.*—Hearing distance five feet on the left (the very deaf side), and twelve inches on the other. Again operated in the presence of her medical attendant.

I am induced to report this case in the present stage of the treatment, as it shows how in some instances immediate relief may be afforded on opening the Eustachian passages, and by inducing a more healthy condition of the mucous membrane.

I have lately heard the objection raised that the injection even of pulverized lotion into the tympanic cavity is not unattended with danger. This is exactly what has been urged against catheterism. The truth is, any delicate operation on sensitive and important organs, if performed *unskilfully* and without the *requisite precautions*, may be made dangerous. I have now been in the habit of injecting different fluids in

a pulverized state in hospital practice for a considerable period, and in many hundreds of cases, and I can with the utmost confidence assert, that with proper care it is not attended with the slightest risk. I might appeal to the testimony of medical men who have witnessed the operation, but I deem it quite unnecessary. I may, however, just add, that Dr. F. Weber, of Berlin, an aurist in extensive practice, on a recent visit to London, witnessed the operation in a very successful case in my rooms, and is so impressed with the remedial value of my new treatment that, he has ordered one of my pulverizers to be made for him by Weiss and Son, with the view of introducing the plan to the notice of his countrymen in Germany.

Permit me, in conclusion, to express the pleasure it will at all times give me to exhibit my apparatus, and manipulate in the presence of any of my medical brethren who may honour me with a visit.

Yours, &c.,

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