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President—W. J. HARRISON, M.B.

The treatment of Chronic Catarrhal Otitis Media (excluding Otosclerosis), and of Deafness and Dry Suppurative Otitis Media

MR. W. M. MOLLISON : Chronic catarrhal otitis media is, to my mind, a gloomy phrase, and to diagnose this disease means a gloomy prognosis, a few kind words to the patient, and advice about some kind of " aid ". The treatment, therefore, to be effective, must be largely concerned with the beginning of the disease, though one may help the chronic cases that suddenly become worse owing to reinfections.

Dry suppurative otitis media is in itself a contradiction in terms, but I take it that this phrase means the condition remaining in the middle ear when suppuration has been brought to an end and the membrane, or what is left of it, shows scars or dry perforations.

Both the conditions, chronic catarrhal otitis media and dry suppurative otitis media, are the results of previous subacute or acute inflammation in the middle-ear tract. In the first, perforation of the membrane has not occurred ; in the second, perforation of the membrane has occurred and there has been suppuration, persisting for a shorter or longer time.

In the former cases the membrane is often nearly normal in appearance, though it may show opaque patches—so-called calcareous patches, or radiating lines, and it may be retracted and lacking the normal light reflex. When it is studied through the Siegle's speculum, movement may be defective or even absent, or may be obtained only over a small area (so-called " atrophic patches "). The Eustachian tube may be obstructed or patent, as evidenced by the sound in the otoscope when inflation through the catheter is practised.

Just as acute suppurative otitis media leads to perforation of the membrane and, later, to dry perforations, so acute catarrhal otitis media leads to exudative otitis media, acute or subacute and, if unrelieved, results in chronic catarrhal otitis media. It follows that

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early treatment of all ear infections is the only efficient method of treating subsequent deafness.

We have had the importance of perseverance in the treatment of acute suppurative otitis media drilled into us for many years. My earliest recollection of this was from Sir William Milligan ; his ideal was that correct treatment of the " acute ear " should always result in normal hearing, and do away with the chronic suppurating ear and, therefore, of the deafness left when that suppuration ceased and left the dry suppurative otitis media. Mr. Charles Heath preached the same sermon and now, twenty years later, the lesson has borne fruit and we may flatter ourselves that there is less deafness as the result of acute middle-ear suppuration than formerly.

The non-suppurative cases are still a real difficulty. I think that from the standpoint of deafness, it is better to have a suppurating ear than a catarrhal one.

Acute catarrhal otitis media may affect the Eustachian tube and the middle ear, the tube alone, or the middle ear alone—the tube escaping, or recovering from, the infection. If the catarrh is a mild one and in a child, attention is not drawn to it as there may be no pain, or pain so transient that it is disregarded, and certainly the deafness is not noticed. We, as aurists, know how even considerable degrees of deafness in children escape the notice of parents and teachers, and now with the use of the audiometer in the examination of school children this knowledge is spreading to school officers. This discovery of deaf children will lead to treatment and doubtless to a diminution of chronic catarrhal otitis media. Once established in children, a catarrhal otitis media leads to increasing deafness, compensated for in the young, but becoming worse with age. If the catarrh occurs in older children or in adults the fact is more readily appreciated and patients present themselves for treatment.

Treatment of tube and middle ear.—It has been stated that all catarrhal deafness is " moist ", and it is tempting to accept this dictum and to incise every membrane so as to evacuate the mucus. Actually, I have incised some membranes that appeared to be entirely normal in the hope of finding fluid but have been disappointed. Perhaps there had once been fluid but it had already disappeared.

It would appear that we have not advanced a great distance during the last sixty years in our knowledge of exudative otitis media. James Hinton, aural surgeon to Guy's Hospital from 1863 till 1874 when he retired, in his " Questions on Aural Surgery ", wrote of " accumulation of mucus in the tympanum ".

" This result of the milder and more chronic forms of catarrhal inflammation of the tympanum comes before us in two forms, or rather stages ; those, namely, of recent secretion and of old accumulation.

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" Every case of catarrh in which the secretion does not discharge itself through the membrane or completely escape by the tube, presents the former condition. In how large a proportion of cases of the latter condition—that of old accumulation remaining after all inflammatory action has ceased—exists and constitutes a main cause of impaired function, is a question for the future. My own little experience would tend to assign it a very important part."

and then of treatment :—

" Accordingly two methods have been proposed for the evacuation of the secretion : one, the incision of the membrane, revived recently by Schwartze ; the other the introduction of a very thin elastic catheter through the Eustachian tube completely into the tympanum, to withdraw the contained secretion by suction ; suggested by Weber-Leil [*sic*]."

I should like to emphasize that the diagnosis of exudative otitis media is sometimes easy, sometimes very difficult. To see the hair-line of fluid through the membrane that moves with movements of the head, or small bubbles, is easy and gives the clue to the treatment, but there are cases in which no line is to be seen, in which the membrane is often substantially normal though sometimes lacking the normal sheen and typical normal appearance, though the history of the cases suggests fluid. Inflation with the catheter helps ; in the first group the typical sound of fluid is easily heard, but in the second there is no " fluid sound " ; instead, the sound is perfectly clear—in fact, too clear. I would go so far as to suggest that this too easily heard sound indicates exudation.

Diagnosis and treatment go hand in hand in these cases. Steps must be taken to remove the fluid. In the first place the Weber-Leil tube is passed through the catheter into the tympanum and suction applied—in the first or hair-line cases, fluid may be sucked out ; this suction may need to be repeated two or three times before hearing is normal. In the second group, suction may reveal fluid and so establish the diagnosis. If the Weber-Leil tube does not succeed in this, incision of the membrane should be performed and the patient be made to perform Valsalva's self-inflation. In addition, drops of glyc. ac. carbol. may be prescribed, and small doses of potassium iodide internally.

It is in this second " hidden fluid " group that cases escape diagnosis and, therefore, treatment and pass on to chronic catarrhal otitis media. They certainly have escaped me.

Examples.—A patient complained of deafness in one ear, of three months' standing ; he had been examined by two competent aurists who both gave a hopeless prognosis, as they found a clear Eustachian tube with normal membrane and the tests gave a response suggestive

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of otosclerosis. On listening through the auscultation tube the sound of inflation struck me as too clear, without any suggestion of " fluid sound ". Nevertheless, by suction through a Weber-Leil tube, a fluid was drawn out and the hearing returned to normal.

Recently a patient was seen who complained of deafness in the left ear, of three months' duration. The membrane was a little dull but moved with Siegle's speculum. The noise on inflation was very clear. Incision of the membrane and suction through a speculum produced a small amount of fluid, but when the patient " blew up " her ear a quantity of thick mucoid material filled the meatus and the hearing became normal. I have no doubt I have overlooked many such cases.

Does exudative otitis media ever pass to the antrum and mastoid cells as in suppurative cases? Four or five years ago there was under my care at Guy's Hospital a case that suggested this possibility. A child suffered from a clear mucoid discharge from the ear which persisted for weeks. Operation on the mastoid revealed similar clear mucoid discharge in all the cells and in the antrum; the discharge from the ear then ceased.

I do not know when an acute catarrhal otitis media becomes chronic. Physicians used to find some mystic significance in the period of three months: many of us will remember that an acute nephritis automatically became chronic nephritis at the end of that time! I do not think that aurists can fix arbitrary time limits. How long can a catarrhal deafness persist before it refuses to be cured by inflation or other treatment? Recently a girl, aged 10, was brought to me on account of deafness of three or four years' duration, with exacerbations whenever she had a cold. The throat had been operated upon twice and was clear: nasal and X-ray examination excluded sinus infection. The child could hear spoken words only at six inches from either ear and I feared permanent damage. However, Politzerization was performed six or seven times and hearing was completely restored. I doubt if after four years' deafness such recovery could have resulted in an adult.

Here is another case that emphasizes this " time " difficulty. John R., aged 12, had been deaf for some months. He heard spoken words only at a few inches from either ear; he had been under treatment by an aural surgeon by inflation, with only temporary improvement, for some months. He was found to have suppuration in both maxillary antra—a drainage operation was performed. Subsequently the Eustachian catheter was used to inflate the tubes and it was six months before normal hearing was restored; I hope that this boy has been saved from chronic catarrhal otitis media.

The moral of such cases is that in children one need not despair of recovery of hearing even after long periods, and, that sources of infection must be removed both from the nasopharynx and sinuses.

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Inflation of the tube in adults is not always easy and the passage of a bougie is often helpful. In passing, it is of interest to note that the bougie need not always be passed through the tubal isthmus but only up to the isthmus to allow of the subsequent passage of air to the middle ear. We all know of cases in which this manœuvre gives great relief of deafness in chronic catarrh. As well as the passage of a bougie other treatments of the tube have been advocated. Various fluids or gases may be blown through the catheter, e.g. 5 per cent. methyl salicylate in liquid paraffin ; iodine in paraffin ; or mercuric iodide gr. 2 in lanoline (R. Lake) ; chloroform vapour ; hot air. Electric currents have been passed through metal bougies. Painting on a layer of flexible collodion helps temporarily flaccid membranes. Local treatment of the membrane may be attempted. Vibratory massage had its vogue. Making a permanent opening in the membrane has been successful in the hands of some. With the idea of softening adhesions in the middle ear, fibrolysin injections used to be given, but, personally, I never saw good results.

With the same idea, presumably, radium is applied to the mastoid, and in some hands ionization is reputed to have been of considerable help. It is, however, difficult to dissociate the psychological effects of such treatments, from the physical.

I have no experience of the Zünd-Burguet method of treatment.

Treatment of deafness in dry suppurative otitis media.—One must first remark on the excellent hearing of many patients with old dry perforations, some indeed hear approximately normally even with large perforations exposing the stapes. Most patients, however, with dry perforations suffer from a considerable degree of deafness ; some are helped by an artificial drum of wool and, lately, cellophane has been used and should be useful. Closure of perforations certainly helps, as Sir James Dundas-Grant has demonstrated. We must also include the use of various aids to hearing and lip-reading.

To sum up.—Unless we can treat effectively the early stages of catarrhal otitis by removing infective foci in the nasopharynx and accessory sinuses in addition to removing the exudate, we shall not have progressed further than did our predecessors of sixty years ago. By prompt treatment of suppuration in the middle ear we may hope to eliminate " dry suppurative otitis media ".

Discussion.

Mr. C. P. Wilson : Treatment of any condition, unless purely empirical, must be founded on an appreciation of the pathology underlying the condition. Our ideas of the pathology of this disease are almost identical with those of the old masters of otology such as Politzer, and we have comfortably accepted their views because they seemed probable, and, with very little reason or critical research, we have assumed their theories to be proven facts.

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We hear a great deal of the ultimate stages of catarrhal deafness ; adhesions, atrophy of the membrana tympani and mucous membrane of the middle ear, and fibrosis of the submucous tissue of the Eustachian tubes. Adhesive processes I have seen, but the only cases I have seen pathologically in which one expected to find these atrophic changes have all shown the presence of otosclerosis, and I have never yet seen a case which would agree with our orthodox views of the pathology of the late stages of the atrophic type of catarrhal deafness.

It is my opinion that cases of catarrhal deafness with atrophic changes of the membrana tympani and widely open fibrotic Eustachian tubes have also the condition of otosclerosis. When a case has reached this stage I know of no treatment which can be satisfactorily shown to have improved the physical capability of hearing of a simple note and, further, I think that any active local treatment is more likely than not to increase the rate of progress of the disease.

The treatment of patients in these late cases is purely educational and designed to improve their hearing from a social point of view—that is, their compensation of hearing. The social improvement in hearing as a result, for example, of electrical treatment can be amazing, as we have seen to-day, and I am enthusiastic about its value in the treatment of the disability which the deafness brings.

Now with regard to the treatment of earlier cases of catarrhal deafness : I would suggest first that the anatomy of the Eustachian tube is a factor of more importance than we usually consider. The normal tube is a long narrow tube, but there is a small percentage of people who have a short, relatively wide tube. This class of case with a short wide tube is more vulnerable to the spread of infection from the nasopharynx than the normal tube, but rarely becomes obstructed, and unless the infection is a virulent one, when an acute suppuration will probably supervene with extreme destruction of the drum, suppuration resulting from obstruction rarely occurs.

The ciliary action of the Eustachian tube is sufficient to help the draining of the middle ear. People with Eustachian tubes of this type have frequent attacks of a mild subacute catarrh with very little, if any, pain associated with the attacks, because there is no distension of the middle ear, but the recurrent attacks of mild inflammation leave them with one of two conditions : (1) An infiltration of the mucosal folds of the middle ear with, later, fibrosis and contraction, resulting in indrawing of the membrana tympani ; but still a patent Eustachian tube. (2) The general onset and acceleration of an otosclerotic process with thinning of the membrana tympani and atrophy and degeneration of the mucosa of the middle ear.

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Lately, it has been said that the deafness in these cases is due to thickening of the mucosa around the stapes, and this condition has been allied with otosclerosis and called peri-otic deafness. This again is a theory without pathological foundation, and I am not prepared to accept that these cases are not otosclerotic until I have seen a case which does not show otosclerotic changes pathologically.

The treatment in this class of case must never be local in the ear; manipulative treatment or catheterization cannot possibly be of use and will probably increase the fibrosis and the progress of deafness in those cases with an added otosclerotic element. Treatment is preventive and must be directed to the nasopharynx and pharynx.

I endorse everything which Mr. Mollison has said in this connection. Adenoids and chronic infection of the maxillary antra are the most common causes of trouble. Correction of septal deformities is also important. Removal of tonsils, however, in the presence of a chronic infection in the nose does, in my opinion, more harm than good. If the tonsils are removed and the sinus infection persists, there is always an increase of lymphoid tissue on the lateral wall of the pharynx and nasopharynx around the Eustachian tubes. The nasal infection must be cleared up first, and conservative treatment of the tonsils may be part of the treatment for the nose; if the tonsils are so infected as to be incapable of recovery, then they may be removed later, but on no account should tonsils be removed until the nasal sepsis has been attacked.

Now what is to be done if such a case is seen with a moderate degree of already existing deafness? (and they are rarely seen in the early stages because the symptoms are so slight). The nose and nasopharynx must be tackled first, and then if Eustachian catheterization shows the tube to be clear and widely open, local treatment to the ear must be stopped and any treatment of the deafness must be directed towards improving the compensation of hearing.

Catheterization in these people may apparently improve the hearing somewhat for the time being; this may be owing to the increased vascularity, stretching of adhesions, etc., but the hearing will quickly return to its previous level and the temporary gain may be obtained only at the expense of progressive diminution.

The only hope for these patients is to check the infective processes in the nasopharynx, damage the ear no further, and improve the compensation.

The patients with long narrow Eustachian tubes have fewer attacks of infection from the nasopharynx, but those attacks that they do get are associated with Eustachian obstruction, exudate in the middle ear and, possibly, suppuration. These are the people whose hearing is immediately restored during the settling down of an acute attack, by catheterization or Politzerization and to whom

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Mr. Mollison has referred as the subjects of exudative catarrh. They are the subjects of catarrhal infection and Eustachian obstruction, varying in severity from the mildly obstructed Eustachian tube with discomfort and slight deafness, to the reddened drumhead, with some bulging and considerable pain ; in these cases we may consider the advisability of paracentesis. It is this group to which the majority of cases belong and it is in these cases, I think, that local treatment is of value.

It is when an acute attack is settling down that treatment is important in the prevention of chronic deafness later. In the acute stages the treatment is mostly nasal—i.e. inhalations of menthol and Friar's balsam, sprays, etc., and in a majority of cases the acute condition clears up without leaving any obvious residual signs of the attack, except probably a mild degree of deafness unnoticed by the patient. It is when the attack becomes subacute, or if it is of a mild nature at the beginning, with predominance of the obstructive symptoms, that the treatment is of importance.

The following is the routine treatment I adopt in these cases. Three times a day a solution of 10 per cent. argyrol containing ʒi glycerin to ʒi and a few drops of adrenalin, is dropped into the nostril with the head tilted towards the affected ear, and the drops are allowed to trickle towards the nasopharynx and collect around the Eustachian tube. A few minutes later the nose is gently blown to clear away any mucus and surplus drops, and a spray, such as a De Vilbiss with olive end, is then used to spray the nose with liquid paraffin containing a little menthol and chloretone. The nose is sprayed two or three times on each side and the patient swallows as the nose is sprayed with the object of opening up the Eustachian tube. The opposite nostril is not closed, so that increase in pressure is so slight that there is no danger of mucus being blown into the tympanum, but as the tube is pulled open during the act of swallowing, a certain amount of oil will pass into the opening, stimulate the ciliary action, and help to prevent the closing of that section of the tube which has opened up.

As a rule this treatment will, after a few days, result in one spraying eventually opening the tube throughout its length, and the hearing will then immediately be greatly improved. If this desired result does not occur after a week or ten days of the treatment, provided there are no acute symptoms present other than the deafness, the hearing is tested, and if there is any definite improvement in hearing the patient is instructed to carry on with the same treatment until such time as there is no longer any improvement, although the hearing has not returned to normal. When this stationary point has been reached, catheterization is performed and the treatment continued. Sometimes the hearing improves after the catheterization, only to deteriorate again within a few hours or

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days; in such a case the catheterization must be repeated at intervals, care being taken that the blowing of air into the tympanum is done gently and without force, and it is done until the hearing returns to normal or until improvement no longer results.

If a stationary point is reached and the hearing is not normal, then it is probable that it was not normal before the attack and that the best level of hearing in that patient has been reached. After catheterization I, personally, blow along the catheter a solution of argyrol or chloretone inhalant.

Otosclerosis is a much discussed subject, and I believe that it is a much more common complication of catarrhal deafness than is generally realized, and if it is at all comparable with other diseases, it will be influenced in its progress by repeated infection and by trauma. Repeated infection is most common in the short wide tube group, and these are the cases with the late atrophic changes that I have mentioned. In the long narrow group too, however, there is also the possibility that repeated trauma in the shape of recurrent forcible Eustachian catheterization may predispose to the onset and progress of the complication, and catheterization should be undertaken only when there is definite Eustachian obstruction and continued only if it results in definite improvement of hearing. For the treatment of these cases, inflation by Valsalva's method or Politzerization is, in my opinion, unsound, unscientific, and unsafe.

After repeated attacks which are neglected in that the hearing has not returned completely to normal, examination may show chronic indrawing of the membrana tympani and limitation in the movements of the ossicular joints. When this stage has been reached, Eustachian catheterization is the only treatment of value. It should be combined, I think, with oto-massage, the most important point in the massage being to make sure that the first stroke is a stroke of suction and not a stroke of compression, but once again I would like to stress that this treatment should be continued only if improvement in hearing results.

With regard to catheterization in these cases which, when first seen, already show existing chronic changes, there is one small point to which I will draw attention. In treating some of these cases which seemed to have marked Eustachian obstruction, one occasionally obtained perfectly free entry at one catheterization but without greater improvement in hearing than at other times when no air entry was obtained. I made a practice of passing a naso-pharyngoscope on these cases and discovered that the cause of failure to catheterize successfully was the anatomical shape of the floor of the nose which was convex from before backwards and made it impossible to turn the point of the catheter outwards into the orifice of the tube, the beak of the catheter always passing above the tube, however much the tip of the nose was tilted upwards.

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I found that if the catheter was bent 1 inch from the beak slightly downwards at right angles to its usual curve, the beak then lay at a lower plane than usual and passed into the tube quite easily. I think this is worth bearing in mind when a Eustachian tube presents difficulty in catheterization.

Dr. ALBERT A. GRAY : The pathological changes which are found in the middle ear in the conditions under discussion are represented in the photographs now shown on the screen. The first shows a fairly early stage of the adhesions which may occur after an acute or subacute middle-ear inflammation which has not gone to the stage of suppuration. In these cases the adhesions may be found in various regions of the middle ear, but are perhaps most common about the head of the malleus and body of the incus.

The second photograph shows the adhesions which may be found after the drying up of a chronic middle-ear suppuration. Not infrequently these adhesions bind down the remains of the tympanic membrane to the promontory. Both of these conditions are the result of inflammation, either acute or chronic.

But there is another condition in which newly formed fibrous tissue may be found in the middle ear without any preceding inflammation or exudation, and I cannot help thinking that many of these cases have given rise to the legend of " dry catarrh of the middle ear ", or " adhesive processes in the middle ear ". The change consists in a very slow increase of the connective tissue in the muco-periosteum of the middle ear. It is found in the region of the footplate of the stapes. It is not inflammatory in character. There is no round-cell infiltration and the epithelial covering is not broken, and there is no dilatation of the blood-vessels. It is in fact a degenerative process and, so far as my investigations go, it never occurs except in association with otosclerosis. An interesting feature of these cases is the fact that this newly formed connective tissue sometimes absorbs the newly formed otosclerotic bone with which it lies in contact.

Now, as Mr. Wilson has pointed out, inflation could not possibly benefit these cases, because they are in reality cases of otosclerosis in which bony ankylosis at the stapedio-vestibular articulation has either already occurred or will occur. Inflation can do no good and will very probably do harm.

Mr. A. LOWNDES YATES showed graphs illustrating a new method, known as the progress graph, which he had introduced for the purpose of recording improvement or deterioration in the hearing. The number of units of deafness for air conduction for notes of 64, 512 and 2,048 double vibrations per second were recorded before treatment each time the patient came. It was thus possible to determine the degree of the improvement and to alter the treatment if it were found that this was not effecting the desired results.

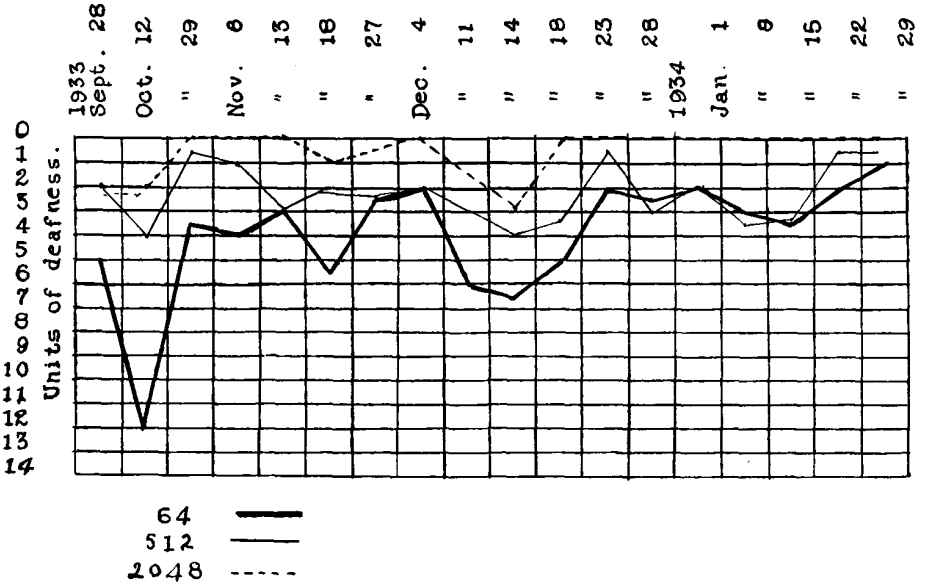
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Graph 1 showed a case which illustrated the method. Graph 2 was shown because the patient had made no improvement in actual hearing as a result of treatment but was quite confident that his hearing had improved. This graph was shown to demonstrate how easy it was to form the opinion that the treatment had effected an improvement if one relied only on the statement of the patient and did not use some form of quantitative test. Graph 3 was a record of the hearing of a patient who, when he first came for treatment, had a history of increasing difficulty in hearing for fifteen months. There were 5 units of deafness for bone-conducted sounds for a note of 1,024, and 2 units for a note of 512. This deafness for bone-conducted sounds was not shown upon the graph, which gave the air conduction. It will be seen that the hearing returned to normal and it may be stated that bone-conducted sounds were also heard quite normally at the end of treatment.

These cases were treated by a method which he thought had proved to be of use. In the earlier cases which had been treated, Eustachian aspiration by catheter had been practised. He had found, however, that this occupied much time and, in the three cases which were recorded in the progress graphs, the aspiration of the Eustachian tubes had been accomplished by a method very similar to that of Proetz, in which 3 c.cm. of liquid paraffin was introduced into the nasopharynx, the patient lying on his back, and a negative pressure was then induced within the nose. If when the patient came for treatment it was found that the treatment at the last attendance had not improved the hearing, the inflammatory condition of the sinuses was also dealt with by a modified method of displacement. This seemed to give good results and he now employed the tympanic catheter only in those cases in which no benefit had resulted from this simpler form of aspiration. Mr. Wilson had referred in his paper to the injection of argyrol into the Eustachian tube, and the speaker asked what effect that had upon the cilia. He (Mr. Yates) thought from the experimental evidence he had collected that it tended to cause ciliary palsy.

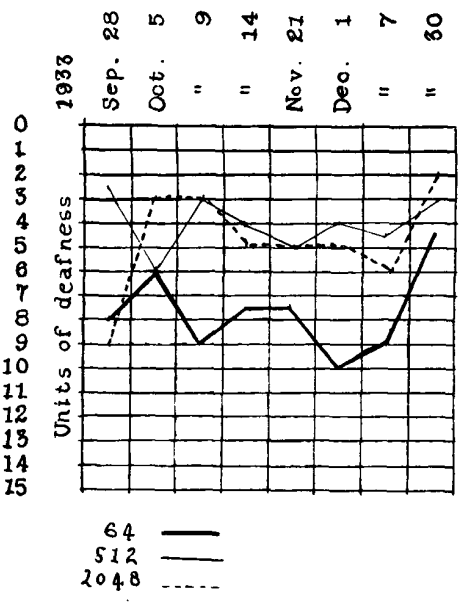
Mr. THACKER NEVILLE said that in the case of chronic catarrhal deafness anything which dilated the blood-vessels of the inner ear seemed to help. Recently rheumatic specialists had been using histamine for rheumatism, and one patient who was having this treatment said that her hearing was much improved. Histamine, however, caused redness and œdema of the skin, and headaches. The other treatment was diathermy, and this he used as a routine in all cases of catarrhal deafness. By it one applied heat to the ears for twenty minutes. He also used it to coagulate the inferior turbinates, having excluded maxillary sinusitis. This procedure could be done under gas-and-oxygen anæsthesia and it improved the hearing.

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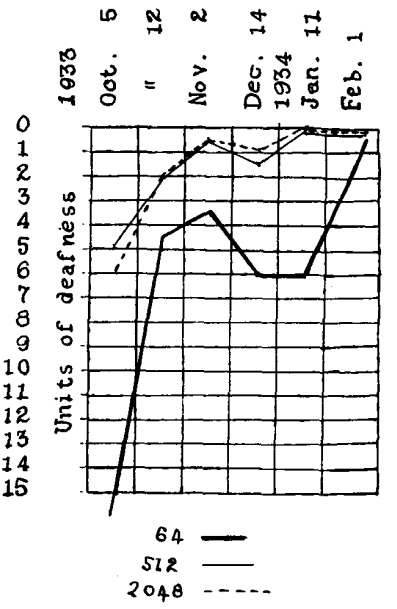


GRAPH 1.

The numbers of units of deafness indicate the number of times the intensity of a sound audible to the normal ear has to be doubled before the patient hears it.



GRAPH 2.



GRAPH 3.

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He had tried ionization but the ions used had to be introduced from the negative pole, which is unpleasant.

A treatment, which was much neglected in England for this condition, was spa treatment. The French had treated these cases with sulphur vapours insufflated through a catheter, besides ordering sulphur waters to be drunk. The sulphur, which is excreted through the respiratory tract, is anti-catarrhal. In France, children, after removal of adenoids, underwent a course of sulphur water for this affection.

Dr. A. R. FRIEL: Eustachian obstruction and catarrhal otitis media in children are usually accompanied or preceded by rhinitis. Any treatment which is effective for the rhinitis is a preventive or curative agent for the ear condition. Such a treatment is that devised and perfected by Dr. Gautier of Paris and called diastolization.

Acute rhinitis may readily become chronic owing to retention of infected mucopurulent secretion in the posterior part of the floor of the nose. It is retained there owing to the inability of the child to blow his nose on account of the swelling of the inferior turbinate. When this swelling is reduced the passage is open, the secretion can be expelled, and the patient quickly recovers. Moreover the irritation of adenoid tissue in the nasopharynx by this discharge is also removed and the swelling due to the irritation subsides.

Diastolization consists in the introduction of soft rubber hollow bougies along the floor of the nose into the space between the inferior turbinate and the septum. The mild stimulus causes, by reflex action, contraction of the blood-vessels in the turbinate and the latter shrinks and the passage becomes open. This treatment is of economic importance because the condition for which it is of use is very common. The treatment is easily carried out, is usually painless, and is effective for this congestive condition.

As the nose and nasopharynx recover, the Eustachian congestion subsides. If this is of some duration, vibration with a wire, inside the bougie and attached to an iron rod placed between the poles of an electromagnet which is energized by an alternating current, hastens recovery. The vibration should not be kept up for long without making a pause, as the reflex would be worn out.

I have also found a weak solution of nitrate of silver applied by Yankauer's applicators of use. These are easily made by taking fifteen inches of fine stainless steel wire doubling it and twisting it with a rotating apparatus such as a lathe or hand drill. An inch of the closed end is covered with a little cotton-wool, passed through a Eustachian catheter, dipped in a weak solution of cocaine or percaine, and passed into the tube. It is left there for a few minutes and the process is repeated with nitrate of silver which is left in position for three or four minutes.

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To restore the position of the drum membrane, as well as to open the Eustachian tube, Politzerization is employed. The results of treatment are checked by the audiometer.

The best way to prevent the results of chronic catarrhal otitis media in adults is to treat the children.

Mr. T. B. LAYTON said that the part of the body concerned in this discussion was one in which it was difficult to work out the pathological anatomy. For many years changes in the middle ear had been assumed to be the physical basis of the deafness in cases such as were being considered that day, and changes in the osseous tissue around the labyrinth had been demonstrated in these other cases that were called otosclerosis. There was a third possibility, namely that changes in and around the mastoid antrum afforded the physical basis of deafness in one or both of these groups.

The mastoid antrum was not usually considered to be a part of the organ of hearing, and so far as he knew, no physiologist had considered it in relation to any theory of it, but he felt that it must have something to do with this special sense. There were two things that made him think this: one was anatomical, the other a clinical observation.

It was, with him, an article of faith that structure was the basis of all function. The mastoid bone was a part of the musculo-articular system of the body, an excrescence of bone for the better attachment of the sternomastoid muscle analogous to the lesser trochanter with the ilio-psoas. But into this mastoid process there extended the middle-ear cleft, and if the middle-ear cleft was a part of the organ of hearing, the farthest end of this diverticulum must have something to do with this function.

The clinical observation he owed, in the first place, to Mr. Mollison, and he was the more impressed by it because for long he had refused to believe it. A person suffering from otitis media was not usually deaf, but if he were so it was certain that the inflammation had extended into and involved the tissues of the mastoid region. This had been definitely proved by clinical observation on the operating table and by radiography, and it would seem that the deafness was more noticeable when the mucous membrane was swollen than when actual suppuration had taken place. If, then, obliteration of the cavity caused deafness it was clear that the cavity had some rôle in the function of hearing.

He suggested that some such changes might also occur in catarrhal inflammations, and that in the case of the child—in which there was evidence of a free entry of air into the middle ear—the fluid sucked out by Mr. Mollison came across that cavity from the mastoid antrum and its associated cells. He further suggested that the reason why such cases did not recover in the adult was that sclerosis of bone around the antrum had already occurred and was a

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factor in the deterioration of hearing, whereas in children sclerosis of the bone in this region had not yet taken place.

He admitted that these suggestions were theoretical but they were based upon the two definite facts, and indicated a line along which investigations might be made, based upon clinical observations and radiography.

Mr. ERIC WATSON-WILLIAMS thought that one point was worthy of emphasis, namely, how very little the appearance and condition of the tympanic membrane was correlated with the degree of deafness. One saw a patient fairly deaf (not otosclerotic) but with little change in the tympanic membrane. One also saw patients who showed big distortions of membrane with distortion, scars and perforations, but whose hearing was apparently unaffected. The condition of the tympanic membrane was as often misleading as it was helpful in giving a clue as to the cause of the deafness.

Mr. Wilson had mentioned a class of case having short Eustachian tubes : he (the speaker) would like more detail about this. Obviously the Eustachian tube reached the middle ear ; did Mr. Wilson mean that the Eustachian cushion was further back in the nasopharynx than normal ?

He had been disappointed in not hearing more about the medicinal treatment of these patients. There was a definite group in which the trouble seemed to be a degenerative process affecting the mucous membranes of nose, pharynx, and ear (he was not referring to the mucosal degeneration of otosclerosis). These patients appeared to be suffering from iodine deficiency, and he had been having a certain amount of success by treating them with thyroid gland substance.

Mr. HAROLD KISCH said he supposed most members of the Section had been faced with the problem whether or not to perform submucous resection or other operation for nasal obstruction so as to help cases of chronic deafness. He had a test which he regarded as of some use. If one tested the hearing of a patient before carrying out any manipulation, and then sprayed the nose with a solution of cocaine and adrenalin, in a certain number of the cases the hearing could be demonstrated to have improved, and in these he had found that operation for the nasal obstruction was helpful.

Mr. J. F. O'MALLEY said he thought the ground had already been extensively explored in this discussion, but speakers seemed to have gone over the views which had been prevalent for many years, though the two openers presented them in a fresh garb. What seemed necessary in order to improve the position of otologists in regard to treatment was to gain a better understanding of the physiology of the air movement influences in the middle-ear cavity, which was essentially an air cavity, with variations of pressure from time to time. All the methods, such as inflation and aspiration,

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offering prospects of benefit, seemed to be concerned with altering the air pressure in the middle ear. Mr. Layton approached this conception when he spoke of the whole middle ear cleft, as there was a passage of air all through the Eustachian tube and into the mastoid antrum, and if the maintenance of air contents of these cavities was efficient and capable of varying, hearing seemed to be satisfactory. Conditions which altered these seemed to be conditions which deteriorated the functions of the ear.

Mr. GILROY GLASS asked if the fluid in the middle ear in catarrhal otitis media might not be the cause of a certain number of the cases in which a mastoid wound refused to heal. He had recently had a patient with such a condition who, by blowing his nose, could expel fluid from the post-aural sinus. It would appear in this case, to be a sequel of purulent otitis media.

As regards treatment by diathermy, recently, in collaboration with Mr. Alex Tweedie, he had tried this in about thirty cases. A few reported improvement in hearing, but accurate testing did not confirm this, and indeed showed a deterioration in some cases.

Mr. H. V. FORSTER said that the late Sir William Milligan had suggested that deafness in the so-called chronic catarrhal types of otitis media might be explained by thickening about the round window, but since then Hughson and Crowe, following Wever and Bray, had shown how the intensity of transmitted sounds of certain frequencies appeared to be increased in the cat after loading the round window.*

He was interested in Mr. Mollison's remarks about the more easily heard inflation sounds in cases of tympanic exudate and noticed that the Weber-Leil catheter passed easily up the Eustachian tube. He did not believe that the catarrhal exudate was a vacuum exudate in the average case. Fairly strong suction was needed to draw off exudate through the Weber-Leil catheter. He used the stiff bulb of Siegle's speculum.

With regard to what Mr. E. Watson-Williams had said, he was first impressed after the routine examination of the drumheads of school children when, in so many cases of affected tympanic membranes, deafness had not been noticed.

Mr. WILSON (in reply) said he did not think that argyrol had any detrimental effect on the ciliae. He said this partly on clinical observation, but mostly considering its effect in infected antra. If argyrol was instilled after puncture, as a rule, cases in which it returned very slowly did not get better, and required to be drained. The cases in which the argyrol returned quickly, recovered without

* Hughson, Walter, and Crowe, S. J. (Baltimore), "Experimental investigation of the physiology of the ear," *Acta Oto-Laryngol.*, xviii., Fasc. 3.

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operation, so that the argyrol had not had any marked ill-effect on the ciliae.

He had not mentioned suction because Mr. Mollison had already referred to it. He thought suction before inflation should be practised, particularly when catheterizing the patient for the first time. Inflation should be practised after suction.

Mr. Layton had referred to the importance of the pathology of the disease, and that was what he (the speaker) tried to stress. He and his colleagues at the Ferens Institute had tried to perfect the cutting of temporal bone sections, but they could not get enough suitable cases. He hoped members of the Section would send bones from cases whose clinical history was known to them.

In answer to Mr. Watson-Williams, the shortness of the Eustachian tube was possibly a developmental defect, possibly an anatomical variation. In childhood the tube was wider and shorter and more horizontal than in the adult. Heads also varied in shape, but when one saw a long head it did not necessarily follow that this was associated with a long and narrow Eustachian tube. In such a case the length of the nose from the anterior to posterior nares was greater than would be thought, judging by the length of the head, and the Eustachian tube might still be short and wide.

CASES

Palato-pharyngo-laryngeal Paralysis as a Complication of Thrombosis of the Lateral Sinus.—W. M. MOLLISON, M.Ch.

Walter B., aged 16, was admitted to Guy's Hospital on *November 1st*, 1933, with symptoms of left acute mastoiditis and a swelling in the upper part of the anterior triangle of the neck. Operation was performed. Pus was found in all the cells, and the lower part of the lateral sinus was roughened. Anti-streptococcal serum was given on two occasions. Five days later, on account of a rigor and a temperature which rose to 105° F., the sinus was further explored and opened; pus was found. An attempt to ligature the internal jugular vein was abandoned on account of extensive infiltration of the tissues around the carotid sheath, but upward pressure in the wound caused pus to well up into the opened lateral sinus. The patient was extremely pale and anæmic. Serum and mercurochrome were given intravenously on two occasions, and later a blood transfusion was carried out. Recovery followed, and the patient was discharged on *December 13th*.

On *November 2nd*, the day after the first operation, difficulty in swallowing developed, and it was found that the left side of the soft palate was paralysed, as was the left side of the pharynx and the left vocal cord. The patient regained control over swallowing in three or four days, but the paralyses remained though they were less marked.

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Politzer gives references to five cases of the condition ; of these I have been able to find only

(*I*) *Case quoted by Stacke and Kretschmann* (1884).

Patient, a man, aged 35. Left suppurative otitis media. Rigors, headaches. Operation. Difficulty in swallowing noticed the same day ; tenderness along internal jugular ; hoarseness, dyspnœa and, finally, aphonia. Death three days after operation. *Post mortem*, lateral sinus and internal jugular vein were found to be filled with soft clot ; subdural abscess in middle fossa.

(*II*) *Case published by Ludewig* (1890).

A girl, aged 17, had influenza. Left acute otitis media ; spontaneous perforation ; three weeks later rigors. Mastoid operation : four days later paralysis of the soft palate, so that fluids returned through the nose ; three days later the paralysis had disappeared ; four days later the patient died.

Post mortem, in the region of the jugular foramen destruction of the wall of the sinus was seen to have occurred over an area of 2 c.mm.

DISCUSSION.

Mr. HERBERT TILLEY said he had never had experience of " associated paralysis " following suppurative inflammation in the ear ; but he had shown a male patient in the Laryngological Section who had pachymeningitis involving the right jugular foramen, associated with paralysis of the corresponding vocal cord, palatal and pharyngeal muscles and the sternomastoid and upper part of the trapezius muscles.

Mr. CHARLES BENEY said that a fortnight previously he had had a case which seemed to him worth recording. The child was five years of age and had had measles in December, from which it recovered. On Christmas Day both ears began to discharge. On admission to hospital the child was desperately ill. A week before admission the mother noticed that the child could not walk properly and would not eat.

On admission to hospital there was paralysis of the palate and pharynx—it was impossible to be sure about the larynx, but the voice was altered and the speech slow. There was marked spasticity of all the limbs and on attempting to walk, the child fell over. Apart from the palato-pharyngeal paralysis the central nervous system was normal. The cerebrospinal fluid was normal. A swab was negative to Klebs-Loeffler bacillus. There were no definite signs of mastoid involvement.

At operation, the mastoid was found to be necrotic and full of pus ; the lower part of the lateral sinus was unhealthy, but was left alone. A wide area of dura was exposed and the temporo-sphenoidal lobe was explored in many directions without finding pus.

On lifting the dura, a small quantity of gas escaped. A paracentesis was performed on the opposite side.

Three days later the paralysis and spasticity had disappeared. For a few days there was a gelatinous discharge from the operated ear. The child is making an uninterrupted recovery.

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Mr. T. H. JUST said that he also had had a case with similar symptoms which came on after operation. It was a case of lateral sinus thrombosis, with the clot spreading down towards the bulb. The sinus was opened and packed firmly. Signs of involvement of the eleventh and twelfth nerves, and of raised intracranial pressure came on after operation. These cleared up rapidly on removal of the pack, showing that they must have been due to pressure in the region of the jugular foramen.

Two Cases of Unsuspected Fractures of the Base of the Skull.—HAROLD KISCH, F.R.C.S.

(I) I.C., a boy, aged 17 years and 10 months, was sent to hospital by his doctor on account of discharge from the left ear and pain in the head, on 25.9.33.

History.—Two weeks and four days previously he had fallen from a diving board on to paving-stones; he did not lose consciousness, and went home as usual. In the evening there was some watery discharge from the left ear, and this discharge was somewhat red the next morning. He had had discharge from this ear when 11 years old, and again one year ago.

On examination.—Purulent discharge; antero-inferior perforation of the drum. Hearing diminished a little on the left side, but bone conduction normal. No nystagmus; labyrinthine reactions normal.

X-ray report.—V-shaped fracture of the posterior fossa. One arm runs into the petrous bone, and the other into the left mastoid process.

Recovery uneventful.

(II) S.S., widow, aged 61, came to hospital 18.12.33, complaining of bleeding from the left ear.

On 12.12.33, she fell from a tram on to her buttocks, but did not hit her head in any way. She went into the London Hospital, where she was receiving treatment for varicose veins, but did not mention the accident. She felt a little shaky, but otherwise had no discomfort until 16.12.33, four days later, when she had a curious feeling in the heart and blood gushed out of the ear. There was an "awful" noise in the ear, and she was unable to hear with it. Two days later she came to hospital.

On examination a little blood-clot was found in the meatus; no perforation in the drum could be seen, but there was a scar in the posterior quadrant. Hearing was reduced in the left ear (watch, 2 in.) but there was no indication of injury to the labyrinth. A skiagram taken some days later showed a fracture of the petrous portion of the left temporal bone. Recovery was uneventful. The X-ray reports are by Dr. Graham Hodgson.

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I am showing these cases partly because of a discussion which took place here in which considerable doubt was thrown on the use of X-ray examination in the diagnosis of fracture of the skull. In the two cases I now show I do not think a certain diagnosis could have been made in any other way.

DISCUSSION.

Mr. RITCHIE RODGER said that sometimes radiological examination was unreliable. Two months ago a case of injury had been passed on to him by a surgeon because a little swelling had developed behind the ear. The radiological examination had not revealed any fracture. The presence of a meatal discharge, with tympanic perforation and mastoid swelling indicated the need for mastoid operation. He, the speaker, made the incision for exposure a little longer in the upward direction, and saw a fracture, 1½ in. long, running up into the squama ; he did not elevate the periosteum further than was necessary. There was infection of the mastoid process, beginning at the lower part of the fracture. He performed the mastoid operation as gently as possible, so as not to disturb the fracture, and an excellent recovery ensued.

Mr. P. J. JORY asked why Mr. Kisch had had a skiagram taken of the case if he did not suspect a fracture.

The PRESIDENT said that skiagraphy was often useful in detecting such fractures. He did not think that one ought to declare that a certain method was of no use generally because in one or two cases it did not prove to be so. He had had cases of fracture of the base to operate on, and had found X-rays useful in some ; they at times gave a good idea of where the fracture was, and the condition the surgeon was up against.

Mr. KISCH (in reply to Mr. Jory) said that fracture of the skull had not been suspected before the cases were seen by him.

Recovery of Hearing after Serous Labyrinthitis and Apparent Complete Loss Seven Months Previously.

—F. C. W. CAPPS, F.R.C.S.

G.E.H., aged 22, was admitted to hospital on *May 10th*, 1933, with acute suppurative otitis media on the left side of six weeks' duration.

He had been treated elsewhere by syringing, but was referred to me as he did not appear to be making satisfactory progress and had on that day begun to vomit and feel giddy.

On examination.—Copious discharge from the left ear from an attic perforation ; a typical fistula sign. There was an old radical mastoid cavity on the right side ; the operation had been performed when the patient was eight years old. Temperature, normal ; pulse 85.

Operation.—May 11th, 1933.—The mastoid cavity was filled with pus and necrotic bone. The cranial sinus and the dura of the middle fossa were exposed. There were cholesteatoma in the antrum and

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aditus. Part of the bridge was removed, exposing the floor of the aditus, when a typical fistula into the semicircular canal was then seen. The cavity was widely opened, packed with bipped gauze and allowed to heal by granulation.

When the hearing was tested before discharge he was found to be stone deaf in the left ear both by air and bone conduction. There was no longer any fistula sign, and a cold caloric test produced no reaction on the left side.

The patient was well except for slight giddiness until *November*, 1933, when he had an attack of erysipelas starting from the right ear and spreading across to the left. He was seen at hospital again on *December 20th*, with a recurrence of pain in the left ear, and a temperature of 99°. He had a large furuncle and general otitis externa which developed into a typical erysipeloid cellulitis.

He was admitted to hospital, and the condition in the left ear gradually cleared up, the inflammation in the meantime proceeding across to the right side. The focus of infection would appear to have been a crack in the right external meatus.

The patient is now quite well but the attic perforation is still moist. To my surprise, on recovering from the above condition, he again had definite hearing in the left ear. He now hears Bezold's forks from 90 upwards and up to 20 cm. by air conduction on the monochord. A cold caloric test by cold-air douche gave a normal reaction after 70 seconds.

Mr. LIONEL COLLEDGE said he recalled a case in which erysipelas had taken a peculiar course similar to that in this instance. The patient, a middle-aged man, had had a radical operation performed on the left ear, followed by erysipelas from perichondritis on the left side. This crossed his face to the right ear, which swelled up, and it tracked round the back of the head to the left ear, which again swelled. Then it crossed his face and the right ear swelled again. After going twice round the head and halfway back the erysipelas had died away on the back of the head.

With serous labyrinthitis one might expect hearing in a patient who had simply an ordinary Schwartze operation done for acute middle-ear suppuration. A girl, aged 16, had nystagmus and all the signs of acute labyrinthitis following operation. Sir Charles Ballance saw the patient with him (the speaker) and thought nothing operative should be done. Ten days afterwards the nystagmus had disappeared, and the patient ultimately had perfect hearing.

Bilateral Tuberculous Mastoiditis.

—F. C. ORMEROD, F.R.C.S.

Edith W., aged 25. Previously shown *February*, 1931.

Attended Westminster Hospital, *January*, 1928. Had had operations on both mastoids two years previously. Right ear dry

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and healed. Left ear discharging, with granulation tissue. *February*, 1928: left mastoid reopened; necrosed bone and granulations removed. *June*, 1928: left radical mastoid operation; giant cells found in granulation tissue. Post-aural wound broke down. Several operations to clear granulation tissue and to close wound during 1928-9. During 1930 empyema of the maxillary antrum developed: antrum drained intranasally. *January*, 1931: right ear recommenced to discharge and the post-aural wound broke down; left ear still discharging. At this point patient was exhibited at a meeting of the Section. X-rays showed recent absorption of bone on right side and sequestra on left side. *February*, 1931: right radical mastoid operation with removal of large area of necrosed bone. Post-aural wound left open; healed by epithelialization with wide post-aural fistula. *May*, 1931: removal of further necrosed bone and granulation tissue from left ear. Similar operations *July* and *August*, 1931, *January* and *September*, 1932, and *February* and *July*, 1933. On the last occasion a flap of the posterior meatal wall was stitched back to the skin of the back of the pinna and the ear became dry during *October*, 1933, with an epithelialized fistula.

The case is shown as an example of the persistent formation of granulation tissue and of new bone which very rapidly became necrotic. There have never been any signs of pulmonary phthisis.

The hearing in the left ear is very slight, as far as air conduction is concerned, and there is normal bone conduction. Hearing is improved in the right ear if the post-aural opening is kept plugged with cotton-wool. The patient's hearing is better after inflation with the Eustachian catheter or by Valsalva's method—a phenomenon often found with dry radical mastoid cavities.

Discussion.

Mr. Somerville Hastings asked whether the organism was actually found in this case and, if so, whether it was of the bovine or the human type. Nowadays he saw very few cases of tuberculous mastoids, certainly fewer than he met with twenty years ago. He asked whether that was the general experience.

Mr. H. V. Forster said he would be glad of Mr. Ormerod's advice about a case of otitis media in a pulmonary tuberculous subject, a colleague of his. He had subacute middle-ear disease on the right side, with a drum which was intact but remained congested. Was it right to perform an exploratory puncture or a paracentesis? There was no pain now, though a little had been noticed two or three weeks ago.

Mr. Ormerod (in reply) said that the tubercle bacillus was not found in this ear; the case was diagnosed by the presence of giant cells. He had never, in such cases, been able to find the bacillus in the granulation tissue in the mastoid.

In Mr. Forster's case he would puncture and draw off some of the fluid from the middle ear; he would not make an incision. As in the

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case of tuberculosis in the larynx, if the chest was improving the larynx generally improved too ; so would the ear in this case. He would do as little as possible in the case at present.

Seven Patients illustrating Alleviation of Deafness and Tinnitus by the Zünd-Burguet Electrophonoïde Method.

—G. C. CATHCART, M.D.

All of these patients have suffered from chronic catarrhal otitis media. Four, in addition, have had suppurative otitis media, and one has had a radical mastoid operation. All of them have had the usual classical methods of treatment, which have failed to do any good to the deafness or the tinnitus. B. T.=before treatment and A. T.=after treatment. V.=my ordinary conversational voice, which normally can be heard at a distance of 80 feet, and Wh.=my whisper after deflating the chest, which normally can be heard at a distance of 20 feet.

Master F. L., aged 12, seen *April*, 1933. When 2 years old, discharge from left ear ; this dried up. Deaf since then. Operation for tonsils and adenoids when aged 3 at Gray's Inn Road Hospital and again last year at Fitzroy Square Hospital.

	Left ear.	Right ear.
B. T.	V. 6 ft., Wh. nil.	V. 12 ft., Wh. nil.
A. T.	,, 18 ft., ,, 1 ft.	,, 25 ft., ,, 1 ft.
Second T. Jan., 1934 ..	,, 20 ft., ,, 1 ft. 6 in.	,, 30 ft., ,, 1 ft. 6 in.

Tinnitus ceased after first course.

Mr. D. T., aged 19, seen *January*, 1929. Operation for glands in neck at age of 9 months ; measles at age of 6 years ; always deaf since. Tonsils and adenoids operation at 15 ; perforation and débris in left ear, and most of drum gone in right ; both ears dried up under the treatment.

	Left ear.	Right ear.
B. T.	V. 15 ft., Wh. nil.	V. 2 ft., Wh. nil.
A. T.	,, 30 ft., ,, 6 in.	,, 10 ft., ,, 3 in.
Third T. Jan., 1934 ..	,, 35 ft., ,, 1 ft.	,, 14 ft., ,, 4 in

Tinnitus ceased after first course.

Mr. J. B., aged 38, *August 23rd*, 1930. Some years ago Mr. C. Heath blistered the drums and made the deafness worse than it was before.

	Left ear.	Right ear.
B. T.	V. 8 ft., Wh. 2 in.	V. 6 in., Wh. nil.
A. T.	,, 35 ft., ,, 4 in.	,, 8 ft., ,, at ear.
Second T. Jan., 1934 ..	,, 40 ft., ,, 4 in.	,, 18 ft., ,, ,, ,,

Tinnitus ceased after first course.

Mr. H. P., aged 43. Since infancy has had discharge and deafness in the right ear. At 7 years had mumps, and the left ear, which

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was very deaf before, became much worse, and remained so until he had the Zünd-Burguet treatment. At 20 had radical mastoid operation on right ear, and was almost completely deaf after it. Then went to learn lip-reading, as he was told he would become completely deaf. At 23 had Zünd-Burguet Electrophonoïde treatment, which improved his hearing to such an extent that he abandoned learning lip-reading, and during the War he was passed B2 for the Army. He had constant tinnitus for many years, which was cured by the Zünd-Burguet Electrophonoïde treatment and has never returned.

	Left ear.	Right ear.
B. T.	V. 1 ft., Wh. nil.	V. 1 ft., Wh. nil.
A. T.	,, 6 ft., ,, ,,	,, 10 ft., ,, ,,
	Tinnitus ceased and has never returned.	
Second T.	V. 8 ft., Wh. nil.	V. 16 ft., Wh. nil.
Third T.	,, 12 ft., ,, ,,	,, 20 ft., ,, ,,

Mrs. R., aged 44, seen *October*, 1927. Deaf for 17 years; had abscess in left ear some years ago; seen several aurists; told nothing could be done.

	Left ear.	Right ear.
B. T.	V. shout at ear, Wh. nil.	V. 4 ft., Wh. nil.
A. T.	,, 3 ft., ,, ,,	,, 16 ft., ,, at ear.
Second T. Oct., 1930 ..	Noises not come back and hearing gone back only a little.	
Third T. Jan., 1934 ..	V. 4 ft., Wh. nil.	V. 20 ft., Wh. at ear.
	Tinnitus ceased after first course.	

Miss H. D., aged 58, seen *January*, 1932. Deaf several years; interfered with pianoforte teaching three years ago, when she also lost her sense of pitch.

	Left ear.	Right ear.
B. T.	V. 3 ft., Wh. nil.	V. 2 ft., Wh. nil.
A. T.	,, 30 ft., ,, at ear.	,, 15 ft., ,, at ear.
Second T. Jan., 1934 ..	,, 30 ft., ,, ,, ,,	,, 15 ft., ,, ,, ,,
	Tinnitus ceased after first course and sense of pitch was restored.	

Mr. J. W. M., aged 59, seen *October*, 1933. Deaf for some years. In *June* very severe cold in head and deafness became much worse; ears syringed and then buzzing set in and has remained ever since.

	Left ear.	Right ear.
B. T.	V. 12 ft., Wh. 9 in.	V. 1 ft., Wh. nil.
A. T.	,, 35 ft., ,, 6 ft.	,, 18 ft., ,, 6 in.
	Tinnitus still present but less.	

It is to be noted that in all these cases there was tinnitus. In one the tinnitus has been alleviated only, and in the others it has been cured—i.e. a percentage of eighty-five cures in these cases of tinnitus treated by this method.

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DISCUSSION.

Mr. CHARLES BENEY said he believed that he had been the second person in London to get an electrophonoïde instrument. He had treated many patients in this way, with some startling results, but also with a number of disappointments, and during the last year or two he had been less inclined to use it, as the results did not seem to justify the labour of the treatment.

Mr. THACKER NEVILLE said that he had used the treatment, having been taught how to do so by Mr. Cathcart. He had found it of value. For example, he had had a patient who was going to be married in a week and had troublesome tinnitus, which, however, was of recent origin. It was cured in three treatments. Another patient had about forty treatments and her hearing was improved.

Mr. E. H. RICHARDS, whilst acknowledging with gratitude continued help and encouragement from Mr. Cathcart, said that he had had no appreciable results either in deafness or in tinnitus in a series of cases in which active " catarrh " had been excluded. The criterion was testing with the whispered and spoken voice. A noticeable feature in Mr. Cathcart's series was that the nasal symptoms subsided as the hearing improved—in some this was apparently due to recent operation. He wondered whether the Zünd-Burguet vibrations might possibly relieve nasal " catarrh ".

Mr. J. ACOMB said that he had the apparatus and had seen it worked in Paris by M. Zünd-Burguet. After a year's work he had had very discouraging results and he could remember only one patient who was distinctly benefited. The method did, however, alleviate tinnitus.

Mr. R. SCOTT STEVENSON said that he had used this apparatus for ten years, but he now employed it only in conjunction with Eustachian catheterization. Sometimes patients were not improved by the apparatus and improved by Eustachian inflation, sometimes they were improved by it and not by Eustachian inflation. The word " alleviation " of deafness used by Dr. Cathcart should be emphasized ; the method did not cure deafness. Rather more than half the patients he had treated with it had improved to a certain extent ; some were not improved at all, and even those who had improved had to come back for further treatment. There was no exact scientific method yet of estimating the hearing, so that testing by the voice should not be scorned ; he had found some patients changed from a negative to a positive Rinne after treatment. Until there was some more exact method of testing than tuning-forks or the audiometer, it was of no use to rely on anything but the capacity to hear the human conversational voice, which was what the patient wanted. With this apparatus he did not really think there was any question of re-education ; it was a mild oto-massage which, in conjunction with Eustachian catheterization, helped a certain proportion of people who had chronic otitis media.

Mr. J. F. O'MALLEY said he would like to see a case of the usual type of middle-ear trouble, diagnosed under that name, treated by middle-ear inflation or, if necessary, by oto-massage of the drum, and see what result ensued. Then, having ascertained that, to see what the electrophonoïde method would do. During the last month he had had a case

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of the type which would improve if treated by this method, just as it had improved after treatment by inflation and oto-massage. When examined a month ago the patient was Rinne-negative, and a whisper could not be heard at a further distance than 2 ft. On the day of the treatment, however, quiet conversation could be heard and a whisper at 15 ft. When seen a few days ago the patient was Rinne-positive. He (the speaker) thought the old-fashioned methods should first be tried, and when these had improved the hearing as far as possible, this instrument should be used and, if it carried the improvement further, special credit could be given to it. He feared that none of the available methods of testing were exact.

Mr. W. STUART-LOW said that the apparatus had certainly, in these cases, relieved the tinnitus—the bugbear of otology. He had questioned the patients, and all admitted improvement in their general health, and a more hopeful outlook, as they felt something tangible was being done for them. In some of the cases the hearing had been improved. And simply the fact that they slept better made the apparatus worth while. Such results as these should be brought to the notice of neurologists, who then might send these difficult cases to the otologist.

Dr. CATHCART (in reply) said that all his patients stated that the treatment made them sleep better. He had kept one patient at the head of a very large business for ten years by this treatment. Formerly he came once or twice a year, now he came three times a year for ten days, not because of deafness, but because the treatment gave him satisfactory sleep in the intervals.

As the patients knew nothing about this possibility, he, the speaker, maintained that the good effect which this method of treatment had on so many cases of deafness and tinnitus was a physiological, not a psychological, one.

Complete Stapes thrown off during Chronic Suppurative Otitis Media, ? Tuberculosis.

—W. J. HARRISON, M.B. (President).

Mr. T. had returned from a sanatorium in Switzerland in *March*, 1933, and was still confined to bed when I was asked to see him on account of deafness, and distressing tinnitus in the right ear. Four to five years previously this ear had discharged for a short time. At the time of examination there was no discharge and the membrane was intact.

I did not see him again until he came to consult me on 13.11.33 with the following history :

In *May*, without any pain, the ear had begun to discharge a thin, watery, rather offensive fluid. He had occasionally had pain of a shooting character in the mastoid at night. He had been syringing his ear with boric lotion and instilling drops (his doctor informed me these were 50 per cent. spirit). When he was using the syringe on 10.11.33 a " piece of bone " came away, which he brought to me, and I found it to be the stapes shown.

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Examination showed complete destruction of the membrane and ossicles, and the inner wall of the middle ear covered with granulations. There was slight tenderness over the mastoid. Hearing had deteriorated rapidly after the discharge appeared, and the ear is now quite useless : AC –, BC –, Rinne –.

He was leaving Northumberland to live on the South Coast in a few days and he did not come to see me again.

The following instruments were shown by W. S. Thacker Neville, F.R.C.S.Ed.

(I) Wells' Electric Iodine Vaporizer.

Thirty grains of powder, consisting of iodine, boric acid, camphor, menthol, powdered cubebs, each 4 per cent., with thymol 1 per cent., are placed in the electric heater. The current is turned on. As soon as the heat reaches a sufficient degree, a cloud of smoke emerges from the outlet tip and this can be pumped through a catheter into the middle ear.

(II) Fowler's Auto-insufflator.

To inflate the ear, insert into one nostril, close the other and blow up the balloon.

(III) Lester's Pneumo-tympanic Masseur.

Insert into the ear. Squeeze rubber ball. If this is attached to a Siegle's speculum, the tympanic membrane will be seen to move in and out.

ABSTRACTS

EAR

The Pressure of the Cerebrospinal Fluid in Complications of Otitis Clinically Extradural. D. Van Caneghem. (*Les Annales d'Oto-Laryngologie*, Dec., 1933.)

After an exhaustive study of this question the author draws the following conclusions :

Extradural complications of otitis cause a hypertension of the cerebrospinal fluid in half the number of cases.

In cases of acute mastoiditis the extradural abscess almost always causes a fairly large hypertension (more than 30 cm.). If, therefore, in the case of a mastoiditis one finds a hypertension greater than 30 cm., it is probable that one will find an extradural abscess. A normal tension, however, does not exclude the possibility of an extradural abscess. The hypertension of the liquid does not

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