

## SOCIETIES' PROCEEDINGS

### THE SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY

THE Forty-sixth Meeting of the Society was held in the Ear, Nose and Throat Department of the Royal Infirmary, Edinburgh, on Saturday, November 27th, 1937. Dr. J. P. Stewart, the President, was in the chair. A demonstration of hearing aids was given by several of the leading manufacturers and, later, papers were read by Dr. Kerr Love, Mr. Terence Cawthorne and Dr. Phyllis Kerridge.\* These were followed by a general discussion.

#### **The Hearing Aid and the Insured Patient**

By JAMES KERR LOVE (Glasgow)

I REMEMBER some years ago, before these valve aids came along, talking to one of the makers in London and saying, "Why do you tell such lies about these instruments?" "My dear sir," he said, "unless we exaggerate one hundred per cent. we would never sell a single instrument." That is the atmosphere my Committee (the Medical Committee of the National Institute for the Deaf) had to face. We created a list of those who should be admitted to our patronage and who were more or less truthful in what they said—chiefly less, I think, but still there were degrees in truth. These approved lists were accepted. It was an ethical Committee. We insisted that every deaf person should have a trial for a fortnight or so before he bought the instrument; that if he were a relatively poor man he should have a certain reduction of price. These were the objects of the Committee. It was not a scientific Committee, it had no complicated electrical problem to discuss, there were no valve aids—nothing of that kind. You had simply a telephone receiver, a small battery and a microphone and you could make it quite ornamental. This list which I have here does not represent twenty different types of instrument. In fact it does not consist entirely of makers at all; many are simply people who collect, who assemble the different parts. My old gardener called me into the greenhouse one day and he said, "Doctor, I have got a new tattie here. I got it frae a man up the road. He didna ken the name so I juist ca'd it efter mysel'." Even surgeons have been

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\* This paper is reported on p. 370 of this Journal.

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known to adopt this method of naming. The moral of this is that if you appoint a Committee for the study of the valve aid and the more complicated type of aid, you should have a physicist as well as otologists.

The next point is in connection with the work of the League for the Hard of Hearing. We in Glasgow have the oldest League. It is fifteen years old and it has 150 members. Nearly all these people have tried hearing aids—hearing aids of a kind other than valve aids. They are beginning to work with that now. The objects of this Society are to teach people to lip-read, to relieve them from isolation, and to find employment for them if they fall out of work. They have nearly all tried these aids. I asked the Treasurer to get me a vote last Monday night on the subject of how many of our 150 members would use valve aids if they got them all cheaply (they were asked to say the best one they saw in the other room for £5). Half of them said they might try them. Then she asked how many would use a valve aid or lip-reading. Nearly the whole of them said “Lip-reading for me.” One should have said, “How many would like valve aids to assist their lip-reading?” and I think they would have got a margin in favour of that. The point I want to make is this—that for those who care to study lip-reading, it is the best aid to hearing. There is nothing approaching it.

Now the next point I want to make is—what is the best all-round aid to hearing? After lip-reading, the ordinary hearing trumpet is the most acceptable to the largest number of deaf people. You will find men like Mr. Pettifor say that, also the deaf themselves, but the ordinary hearing trumpet has limitations. It can be used only within a yard of the speaker. It is very conspicuous. It does not leave the hands free—it has to be held. The running costs are nothing. It is not very dear to begin with and there is no upkeep, so that taking the majority of people into account, if they will put their vanity into their pocket and use what is best for them, the ordinary hearing trumpet is the next best aid to hearing.

Now we come to the chief subject of our discussion to-day, namely, Does the panel patient want a hearing aid? On the face of it I should say he does, but he does not know anything about it. I wish I could use a wealth of material which has been sent to me from Liverpool during the present week, by Mr. Tumarkin, because he can tell us of the difficulty of this kind of service better than anybody I know. The paper is here and is far too long for me to use. It consists, however, of letters to medical men telling them how to manage these patients, how to send them and where they should be sent for examination, how they should have audiograms taken, how they should apply, and where they should apply for the best advice. That has been going on for a year or two in Liverpool. The Amplivox has been offered for about £6 or £7 and they have

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not been able to sell a single instrument. Why? Because the salesmanship is not managed properly? Mr. Tumarkin does not pretend to be a salesman. He pretends to take the audiograms and to tell the patient where he should apply for a good type of instrument. So you see it is not very easy to answer the question—Does the panel patient want a hearing aid? In Liverpool the distribution is under the control of the Personal Service Society—something like our Charity Organization Society in Glasgow. I would like you to understand that this valve type of hearing aid has not yet finished its evolution; one of the problems just now is that of weight and bulk. I have been weighing some of those instruments and the average weight of good valve sets is 2 to 3 lb., say  $2\frac{1}{2}$  lb. In Liverpool an almoner is appointed and several visitors who assist this organization in the management of these cases. The cost of course has to be considered, first of all the original price. The cost of a non-valve hearing aid is about 35s. or less, and it is usually sold for anything up to 25 guineas. The cost of a valve aid comes to about £7 and of course it is sold—and must be sold unless the sales become very much extended—for at least twice that price or a little more. We much acknowledge the debt which we owe to the hearing-aid engineers who have given us these very valuable instruments, because I think they are valuable. The running costs of these—I am speaking of the valve sets now—is 1s. per week. I have a patient using a Sonotone and it costs him between £5 and £6 a year to run his set, but we will put it down at 1s. a week, which does not include repairs. The cost of this might easily be reduced to £3 or £4. The cost of the best valve sets is anything from 14 to 18 guineas. The objection to the valve set is that the manual worker cannot use it as he must have his hands free. A man may dispose of them in outside pockets, but there is this difficulty. However, apart from the man's work, these aids might and must become very valuable to him in his home, in his Church, to the typist—who can put it on her table, to the cashier, to every deaf man who is in a committee room. It was found by Mr. Tumarkin that about 15 per cent. of the patients who were sent to his hearing aid clinic could not be fitted with any hearing aid. I don't know why. Nearly all the others could be helped by valve sets.

I want to tell you what an ideal Hearing Aid Clinic should consist of. There should be an almoner, for the investigation of patients; an otologist for the examination of patients; an audiometrist for the taking of records, and a disinterested distributor of aids. I think we can fit most cases without an audiometer, but I am talking of a system which should start as perfectly as possible and I think we must have an audiometer, perhaps two—a pure tone one and a gramophone audiometer. Americans envisage a period in which every person who pretends to be an aural surgeon will have

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an audiometer in his consulting room and I tremble for my own consulting room, which Gavin Young has filled up sufficiently already! I would suggest that there should be a common audiometer centre for panel patients. There should also be an arrangement with a technician who will do repairs, because if you remember the time when you put a motor car into a garage and were charged for four hours' work which really took five minutes, you will see what I mean.

Now, talking of the efficiency of these aids—are we approaching or have we reached the same relation to the deaf man that the optician has reached with regard to the refraction type of defective sight? That is what we have in view. We ought, theoretically, to be able to provide a hearing aid with as much precision as the optician does for a refraction type of defective sight. We are not nearly at that yet, but we are going to aim at that.

### CONCLUSIONS

1. That in view of the complexity of electrical aids, a Committee of our Society appointed to deal with such aids should not only be an ethical body but should also be clinical in its character and should have one or more physicists in its membership.

2. That Leagues for the Hard of Hearing in addition to practising lip-reading should be encouraged to make use of the best types of electrical and other aids to hearing. Lip-reading is, however, the best single aid and is available always, except in the dark.

3. That for the use of panel patients every effort should be made to secure the best aids at the lowest prices.

4. That a Hearing Aid Clinic should be fully equipped with means for securing a clinical report, an audiogram taken by a competent operator, and testing by a selection of "aids".

5. That in recommending an aid, the probable cost of upkeep should be plainly put before the patient and instructions given for keeping the set up to the mark.

6. That the time has now come for an approach to the Government with the purpose of securing for deaf insured persons the same advantages which are now extended to the blind or those with defective sight, to the lame, and to those requiring other mechanical appliances.

### Hearing Aids

By TERENCE CAWTHORNE (London)

THE advent of the wireless valve has so increased the scope and extent of the spoken word that it has regained its former supremacy over the written word as the principal channel to the human mind. To the large majority of people the gramophone, wireless and talking

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picture, play an essential part in the everyday life of the community. Moreover, the microphone has proved itself to be an important factor in the rise to power of political dictators.

As a result of this increasing importance of the spoken word, the incurably deafened feel, more than ever before, that they are cut off from a normal life. Before resigning themselves to the awful world of silence most of these unfortunates will try any device, however far-fetched, that promises to restore their hearing. Unlike the drowning man who prefers a lifebelt to a straw as a means of support, the deafened reject the solid help of the orthodox hearing aid for the ephemeral fancies of the unscrupulous advertisers. These commercial adventurers exploit the sensitive feelings of the deaf for their own ends and make extravagant promises that cannot possibly be fulfilled. To quote from a current advertisement, for instance: "Perfect hearing now available for all, by means of our latest invention, a masterpiece of ingenuity and craftsmanship . . . this is a new aid of unusual power and efficiency—yet so minute that it may be entirely concealed!" The consequence of this state of affairs is that our deaf patients have been educated to expect invisible aids capable of unlimited and, of course, undistorted amplification. Many of them are sufficiently sensible to resist the lure of such advertisements, but even so they nearly all resent the fact that modern science has not yet evolved a hearing aid to come up to their advertisement-educated ideas. Probably the greatest harm done by these misleading claims is that the deafened who have wasted their time and money on them are so embittered and disillusioned that they often refuse to believe that any aid at all can help them.

At first sight it may seem surprising that the deafened do not seek expert medical advice sooner. We all know of cases who pay their first visit to an otologist after years of unrelieved deafness. Why do they not go sooner? Possibly because they have been brought up not to expect any help from him. After all, who can blame them? When a case of deafness does not respond to the limited treatment at his disposal, the otologist says he can do no more, gives the patient the name and address of a hearing aid retailer and washes his hands of the case. I wonder what we would think if, after paying an ophthalmic surgeon his fee, we heard him say: "You cannot see very well. I am not able to help you, but here is the name and address of a spectacle-maker who may be able to show you something useful." Or the dentist who, after a careful examination, said, "You have no teeth. I would advise you to go to a dental mechanic who may have some that will fit you." I think that the time has come for us as otologists to make it our business, not only to instruct our deafened patients in their choice of a hearing aid, but also to see that it fits them afterwards.

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There are, then, two great services that we, as otologists, can and should offer our incurably deafened patients: firstly, to help them to readjust their lives to the changing conditions caused by their deafness. Secondly, to guide them in their choice and encourage and teach them to use a hearing aid.

The first service is of paramount importance, and I shall say more about this in a few minutes. The second service is our principal concern to-day, but before passing on to a critical description of the various types of aid that are now on the market, many examples of which you have seen this afternoon, I should like to air a few generalities on the present state of affairs in the world of hearing aids.

In the first place, I think that there are too many aids of the same class, each bearing a different name and each having, more or less, the same performance. This tends to confuse both the otologist and the patient. What is worse, the firms manufacturing these aids hamper progress by wasteful competition, and any new device is, whenever possible, protected by patents so as to prevent its general adoption. One realizes that these firms must act as they do in order to protect their own interests, but it seems a pity that they cannot all pool their research resources and reserve their competition and patents for improving the outward appearance and for methods of camouflaging aids. It is on the upward path of co-operation that progress in hearing aids lies, rather than on the downward path of cut-throat, dog-in-the-manger competition.

I look forward to the day when standards of performance are established for the different types of aid, so that manufacturers and retailers will no longer be compelled to sacrifice efficiency of performance on the greedy altar of appearance. Even more than this, I would like to see a series of advertised statements to the general public issued under the auspices of some national body, in which the public could be told in simple language about the different types of hearing aid and what to expect from each. This would do more than anything else to counteract the effects produced by the misleading advertisements that constantly catch the eye of the hard of hearing.

To return to the matter in hand, which is a consideration of the different types of aid at present available, with a description of their advantages and limitations. First of all let us consider the non-electrical aids.

### NON-ELECTRICAL

These include speaking tubes, horns, auricles and trumpets. Their power of amplification is very limited indeed, and their main value lies not so much in amplifying as in collecting sounds and conveying them undisturbed to the listener's ear. Thus their

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action is to bring the speaker nearer to the listener, and, in the case of horns and auricles, to act like direction-finders and to collect the desired sound whilst shutting out unwanted and confusing background noises. The freedom from distortion combined with the exclusion of unwanted background noise in these aids enables the severely nerve-deafened to hear individual conversation when other types of aid might only cause confusion and discomfort from distortion and over-stimulation. This class of aid has the great advantage of being relatively cheap, and they require little or no attention to keep them in good working order. Against these advantages we have the facts that they amplify but little and their appearance is against them. Unfortunately the ear trumpet has always been connected with doddering senility, and has been part of the stock-in-trade of the professional humorist, so that their appearance and the fear of ridicule has caused much prejudice against them.

### ELECTRICAL AIDS

These are divided into microtelephones and valve amplifiers. In both varieties sound is picked up by a microphone, amplified by an electrical circuit, and reproduced in or behind the ear by a receiver. The degree of amplification depends upon the electrical circuit, but in any case is much greater than in the non-electrical aids. However, the reproduced sounds, especially speech sounds, lose some of their naturalness because of the difficulty in finding a microphone and receiver that will give an even response over the whole speech frequency range. Also it is difficult to prevent unwanted noises from being picked up and amplified, especially when using the sensitive carbon microphone.

*The Microtelephone.* The first electrical hearing aid was a microtelephone and was introduced by Alt of Vienna. In this connection it is interesting to recall that Alexander Bell, the inventor of the telephone, was a teacher of the deaf who left his native country—Scotland—for America, where in the 1870's he stumbled on the discovery of the telephone whilst trying to devise a deaf aid which he could use for conversing with his deaf wife and pupils.

The microtelephone set consists of a carbon granule microphone, pocket dry battery such as is used for cycle lamps, with some form of miniature amplifier and an earpiece for air conduction, or a special flat oscillator for bone conduction. Only the carbon-granule microphone gives a strong enough response for the pocket battery of the microtelephone set to use. This microphone is very sensitive, especially for the lower frequencies, but it responds poorly, if at all, to the higher frequencies in the speech range. This uneven amplification of speech frequencies, accentuation of low-pitched background noise, and also a varying amount of internal noise developed

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by the set, combine to limit the usefulness of this type of aid. Its chief use is in cases of conduction deafness for individual conversation where the speaker is near the microphone and the amplified voice is sufficiently powerful to drown any background noise. For distant use in a Church, at a lecture, or in a theatre it rarely helps. It does not help very much in nerve deafness where there is usually a marked loss for high tones. In order to bring the higher tones within the audible range of the defective cochlea, the low tones are so accentuated that they produce a masking effect and may even cause actual discomfort. Despite these drawbacks, this type of aid is often chosen by the deafened because it is portable and lends itself to camouflage. Another consideration, unfortunately important with many, is that it can be sold at a price within the reach of the humblest pocket. I say "can be sold", because many aids of this class are offered to the public at a staggering price out of all proportion to their cost. It requires less attention than the valve amplifier to keep it in working order, but there is little difference in the cost of upkeep.

Thus microtelephones provide limited amplification over the lower part of the speech frequency band, and because of their portability and inconspicuousness may be preferred by sensitive patients with conduction deafness, for individual conversation. Their cost of production is relatively small, but their performance is in every way inferior to that of the valve amplifier, which I will now describe.

*The Valve Amplifier.* This is nothing more or less than a miniature public address system in which sounds from a microphone are amplified to the required strength by wireless valves and passed on to a receiver. The amount of amplification is governed by the valves, but in any case it is sufficient to pick up and amplify the relatively weak responses that are given by high quality selective microphones. The type frequently employed is a crystal microphone, which has many advantages over the carbon granule microphone. It will respond, reasonably faithfully, over the whole range of speech frequencies, and because of its selectivity, background noise is considerably reduced. Also there is less tendency to develop internal noises with this type of set. The principal drawbacks are its size (so that it does not easily lend itself to camouflage), the upkeep, and the cost of production. There have recently been put on the market, valve aids that can be more or less concealed, but the most efficient type of valve aid is still about the size of a box camera. Maintenance is important and involves frequent changing of batteries and occasional renewal of valves. This is not a costly process but calls for more time and trouble than some patients are prepared, or able, to give. The cost of production, it is hoped, will be brought down by the increasing demand for this class of aid.



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Both in quality of tone and quantity of sound the valve aid is immeasurably superior to the microtelephone, and all deafened patients should be advised to try one. For conduction deafness it is always to be preferred, but in advanced perception deafness a non-electrical aid may be of greater help.

*Earpiece.* To turn for a moment to the question of the earpiece. This is the weakest link in the chain, because it is difficult to find an earpiece of small size to reproduce faithfully all the speech frequencies. The miniature receivers that fit into the meatus sacrifice too much to be recommended in preference to the ordinary earpiece. With regard to bone conduction receivers, I have seen these used only with microtelephone sets, and in addition to the drawbacks already mentioned in such a set, we have the fact that the bone conduction receiver requires much more power to make it effective. In their present form these receivers are not an economical way of using the power available, and their value is somewhat limited.

Finally, I should like briefly to review the factors concerned when prescribing a hearing aid.

1. *The Hearing Defect.* A knowledge of the hearing capacity for both speech and pure tones is required. Methods of testing speech hearing capacity vary with the individual tester, but it would seem that some standard set of speech sounds such as are used by telephone engineers could with advantage be universally adopted. An audiometer test of the hearing capacity for pure tones is of the greatest help in prescribing a hearing aid, although the day has not yet arrived when we can match an aid to a hearing defect with any degree of accuracy. Certainly this is the most important information we are able to pass on to a hearing aid retailer when we send him a patient to choose an aid.

2. *The Hearing Aid.* Although the patient is the final arbiter as to which aid is the most suitable, we can usually tell as a result of our test which aid is most likely to be helpful, and certainly which aid or aids are to be avoided.

Advanced perception deafness in the elderly is not likely to benefit from electrical aids. Certainly not from a microtelephone or, of course, a bone conduction receiver. These cases may be tried with a high-quality valve set, but should be advised to consider a non-electrical aid. Moderate perception deafness, with, as is usually the case, high tone loss, can usually be helped with a valve aid, especially for long distance hearing. For individual conversation they may prefer a non-electrical aid.

All cases of conduction deafness should be encouraged to use a valve aid. For them the microtelephone is not so efficient, either for individual conversation or for long distance hearing. If they

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insist on a microtelephone because of appearance, they should be advised that if their means permit, it will be worth their while to have a valve aid for long distance use.

At present bone conduction receivers can be recommended only for the rare severe cases of conduction deafness without any nerve or perception deafness. All patients should be encouraged to return to their otologist after choosing an aid, so that he can re-test their speech hearing capacity with the aid.

3. *The Personal Feelings and Pocket of the Patient.* This is the most difficult factor with which we have to contend, but, so far as my own experience goes, I am glad to say that the increasing efficiency of aids is gradually reducing the reluctance of the deafened towards using a visible aid. As regards price, this is largely governed by the demand, and I think we can look forward to the not distant date when the best type of set will be within the reach of all. The question of upkeep is important, and for the hospital patient will, I think, best be solved by special hearing aid clinics acting as service stations.

4. *The Conditions under which the Aid is used.* As I have already said, the principal point is to know whether the aid is wanted primarily for individual conversation or for long distance hearing. It is important to know, as far as possible, the exact conditions under which the aid is to be used. That is to say, the type of room or house, and an idea of the background noise, and the pitch and articulation of the principal voices to which the deaf patient will have to listen. This information is frequently not available, and so it is important that the patient shall have the chosen aid on trial, so that it may be tested under home conditions, because they are so often quite different from the quiet consulting room of the otologist or the showroom of the hearing aid retailer, both of whom articulate with practised perfection. Much can be done by explaining to the patient how his friends should speak into the aid so as to get the best results.

5. *Re-education of Hearing.* Many deafened patients will not consent to use a hearing aid until their defect is very advanced. They have become accustomed to living in a world of silence, through which sounds occasionally penetrate. Listening to a powerful valve aid may suddenly shatter this silence and cause confusion and bewilderment. Not unlike being transported from a dark room to dazzling sunlight with the power of accommodation paralysed. If it is to succeed, the re-education of the severely deafened patient must proceed gradually, and every effort should be made to restrain the enthusiastic patient from overtaxing his resources. This aspect of the hearing aid problem has not received the attention it deserves, and neglect to explain the whole position

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to the patient may lead to an aid being abandoned before it has been given a fair trial.

6. *Lip-reading.* No discussion on the prescribing of hearing aids would be complete without a consideration of this valuable adjunct. All incurably deafened patients should be urged to try to master the elements of lip-reading. An adept pupil of this admittedly difficult art can, with the help of an aid, take part in everyday life so that his defect may pass almost unnoticed.

In this short talk I have tried to give you a somewhat sketchy outline of a few of the problems with which this subject bristles.

I should like to recommend to those of you who are interested, the inspired writings of Dr. Kerr Love, Dr. Phyllis Kerridge, Dr. and Mrs. Ewing, Dr. Littler and, in America, Drs. Jones and Knudsen. To all of these I owe a large debt of gratitude for what I have learnt from them, and for stimulating my interest in what is, to me, a most fascinating subject.

### DISCUSSION.

Dr. ADAM said the papers had been very interesting but there was one hearing aid which had not been mentioned, and it was cheaper and more efficient than any of them, especially in certain cases such as deafness due to chronic suppurative otitis media. A friend of his, an architect, sent Dr. Adam his office cleaner who was very deaf and one had to shout to her. She had seen the advertisement to which Mr. Cawthorne referred and had gone to the shop in Glasgow and found that the hearing aid recommended was twelve or fourteen guineas. She had been saving up her money for a year or two but she was not able to afford that. They then suggested she should try a cheaper one at five guineas. She paid the money and went home—and found she could not hear any better with it. Her employer was indignant and sent her back to the shop to ask for her money back, and they refused. The architect had a lawyer friend who wrote letters to this firm, but they just bluffed him. He, Dr. Adam, told him to bring an action. When she first came to him it suddenly dawned on him to remember a thing that very many authorities are apt to forget, and that was Toynbee's tip, or rather Yearsley's. He put a little cotton wool in the patient's ear and she could hear him talking in an ordinary conversational voice across the room; so that it cost her only 2s. 6d. for a pair of forceps to insert the cotton wool plug. When the lawyer threatened to bring an action, the firm returned the money at once. He would be interested to hear if that device was tried before the ten guinea instruments were prescribed.

Mr. SCOTT STEVENSON said he would like to correct Dr. Adam about what he called "Toynbee's tip", the artificial tympanum. This, as a matter of fact, was invented, not by Toynbee, but by James Yearsley, as was universally acknowledged by his contemporaries. James Yearsley however was primarily a clinician, while Toynbee was a scientist, indeed an F.R.S., and was popularly given priority as the father of English

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otology, an honour he did not really deserve. Yearsley's text-book antedated that of Toynbee's by twenty years and he had a greater claim to the title of father of English otology than Toynbee. The speaker knew these facts because he had recently been studying contemporary documents relating to Yearsley, who founded the Metropolitan Ear, Nose and Throat Hospital, with which he was connected, a hundred years ago next year.

Dr. MATHERS asked Mr. Cawthorne if he could say whether a claim made by one of these valve amplifier makers was based on any solid foundation, namely that the continued use of one of these aids to hearing would improve the deaf patient's hearing.

Dr. DOUGLAS GUTHRIE remarked that a good deal had been said regarding the possibility of "fitting" a hearing aid as one might fit a pair of spectacles, but in order to do so one must have a definitely accurate audiometer which one could not at present obtain. He stated that some investigations had recently been made in the United States on the efficiency of various types of audiometer and the results had recently been published in the *Archives of Otolaryngology* ("Characteristics of Modern Electrically Operated Audiometers", by M. S. Ersner, L. Podolsky and D. Myers (Philadelphia), *Archives of Otolaryngology*, October, 1937, xxvi, 4). Five well-known audiometers were selected for testing. The names, naturally, were not given, each being denoted by a number. One instrument could not be tested at all because it did not appear to have been calibrated to any standard. Only a series of numbers indicated the various sounds and the tones were not pure tones. There was about 40 per cent. pure tone content and the rest were harmonics, so that the instrument was valueless. The other four were carefully tested by physical methods in a sound-proof room, details of the method being given in the paper. Expressed as a percentage loss of hearing, the results varied as much as from 13 to 52 per cent., which meant that the instruments were to a greater or lesser extent useless from the point of view of the accurate assessment of hearing. The writers express the hope that the makers of audiometers may adopt a definite system of calibration (just as the clinical thermometer is calibrated at a central station, in this country at Kew), so that one may have an instrument on which one can depend. Dr. Guthrie said that as matters stood at present, if those observers were correct, one did not know whether one was testing the hearing accurately or not, as the audiograms from different audiometers might vary enormously.

The PRESIDENT asked Dr. Kerridge if an artificial aid to hearing caused any deterioration of the hearing, at what stage of the deafness should an aid be ordered and what period of time should be given in a free trial scheme.

Dr. OTTY asked Dr. Kerridge in what sort of room she made these tests. He understood from a recent publication of Dr. Kerridge's that a sound-proof room was not necessary. He was under the impression that at University College they had a sound-proof room and he wondered whether the work was done in a sound-proof room or just in an ordinary quiet room.

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Dr. EWART MARTIN said that he hoped that clinics for advice about deaf aids would be established in connection with every Ear, Nose and Throat Department, although not necessarily run by the Ear, Nose and Throat Department. The National Institute for the Deaf could not prevent the advertisements appearing in the Government publications, or even in Church publications, for deaf aids. Although these aids may be sufficient for a small group of deaf cases they were not universally so, in fact in most cases they were detrimental to the patient's failing ear.

In an opening discussion on aids to hearing in Oxford two years ago he was satisfied that many of these instruments were useless. It was rather curious that the meeting was reported only in the newspapers which did not have advertisements for these deaf aids. It is unfortunate that the work of the National Institute for the Deaf is not universally known. It is a common practice in the Ear, Nose and Throat Department in a General Hospital to find patients who have already spent a great deal of their savings on useless deaf aids, coming up asking for free advice. It is impossible to advise people through the medium of a daily newspaper to ask for advice before they have spent money on useless deaf aids when the papers are full of glowing advertisements for aids for the deaf.

Dr. FULTON CHRISTIE said apropos of Dr. Ewart Martin's remarks, he had noticed for some time what he considered to be a rather disgraceful state of affairs. Certain magazines published a number of advertisements for hearing aids. He took exception to two in particular. One was for the small, invisible, no batteries and no wires type of aid, and the other stated in large print "FREE HOME TEST". He (Dr. Christie) discovered, only last week, that a "free home test" and a "free home trial" are two entirely different things. A "test" is done by a firm's representative and may take, possibly, half an hour, whereas in the case of a "trial" the patient may have an instrument for a period, usually a week or a fortnight. He thought that this somewhat subtle distinction might be overlooked by others as well as himself. He believed that a certain selection is exercised in accepting advertisements and he thought a certain element of recommendation almost was implied. He (Dr. Christie) suggested that the Society should send a letter to the editor stating they were of opinion that, in the best interests of deaf people, these advertisements should be left out. To publish them was to aid in the exploitation of the deaf.

Dr. I. SIMSON HALL said: It would appear from what the speakers have just said that propaganda forms an important part in the treatment of patients who require artificial aids. One of the greatest difficulties encountered by consultants in prescribing such aids to deaf people is the fact that deafness is still regarded as a handicap which must be concealed. Although people are willing to wear horn-rimmed spectacles to advertise the lack of eyesight, the fact of a small telephone earpiece in the ear seems to carry a stigma. That this attitude is not merely over-sensitiveness on the part of the deaf is emphasized by the view taken by many public bodies with regard to deafness.

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Medical examinations for public services are frequently carried out with spectacles to aid defective sight ; but no aids are allowed to assist defective hearing. As long as this state of things exists, defective hearing must in many cases be concealed if possible. The fact that such an attitude exists shows the necessity for public education in the matter, and until this attitude is changed the hearing aid clinic will not have a free hand, so to speak, to do the best possible for its patients.

Dr. H. D. BROWN KELLY said : Dr. Kerr Love had mentioned the extortionate charges made for repairs to aids. There was another point in this connection—the cost of the batteries seemed excessive, and their useful life was usually short. Most of the microtelephone instruments use a battery similar to that employed in flashlamps, but instead of costing 6d. (or perhaps even 3d. at Woolworth's) they are priced at 1s. 8d. or 2s. The patients are forced to use the batteries supplied by the maker of their aid because the connections are so arranged that they cannot use any other. Dr. Brown Kelly thought it was a shame that after buying an expensive instrument the patient should have to pay more for the batteries than was necessary.

Dr. LAND said that the best type of hearing aid appeared to be a valve amplifier with a crystal microphone, and Mr. Cawthorne had indicated that, with few exceptions, this type was the most suitable in the various forms of deafness. Dr. Kerridge had shown, however, that it was not always necessary to advise such an instrument, for instance in cases in which the loss for higher frequencies was so complete that reproduction at that level was superfluous. The problem reduced itself to this, in Dr. Land's mind : " If this type of hearing aid were available at economically possible figures and in suitably practicable forms, would it not be universally useful for all types of hearing defect ? " The problem of the accurate determination of hearing loss at the various levels by the audiometer had been raised by Dr. Guthrie, and he had shown that widely varying results were obtained on different makes of instrument. Drs. Ewing and Littler, in a recent report, appeared to indicate that a hearing aid which amplified evenly throughout the frequency range was more effective than one which attempted to boost up the frequencies at which the patient was most affected. Dr. Land asked if Mr. Cawthorne or Dr. Kerridge would tell him to what extent they considered an accurate determination of the hearing defect at various frequencies to be essential in the practical issue of advising a hearing aid to a patient.

Dr. COLLINS said that these discussions so often ended with no concrete result that he would like to suggest that some such motion as the following might be passed :—

" That this Society deprecates the exploitation of the public by certain firms with regard to hearing aids, and advocates the establishment of National Hearing Aid Centres in the larger cities of Scotland."

Dr. Collins thought that by this means they would have an authoritative expression of opinion from a Society of standing.

Dr. KERR LOVE (in reply) said there was so much to reply to that it would take him till dinnertime if he attempted them all, but there

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were one or two points. First of all, as to the beginning of these ordinary electrical hearing aids, they extended back, to his knowledge, beyond 1900. It was an American instrument which was presented at the British Medical Association meeting at Manchester about 1896. An American was then testing the late Queen Alexandra's hearing. The instrument was called the Acousticon. It had once been the Acoulallion, if he remembered rightly.

There was another point about hearing the telephone. Dr. Kerr Love understood that the Telephone Company supplied a special bell for use of people who were deaf. He suggested that a committee should be appointed to co-operate with existing agencies for the furthering of the supply of hearing aids to panel patients. He (Dr. Kerr Love) wrote a paper for the *Glasgow Medical Journal* on this subject in April, 1937. He saw Dr. Kennedy, who is the head of the panel system in Glasgow. The latter wrote to Edinburgh and got a sympathetic letter but got no promise of funds. Dr. Kerr Love did not think we had so many extra-mural societies to help as they seemed to have in London, but his point was that they should press the Scottish Office to give help not depending on the particular society, whether it could afford it or not, but depending on the need which the individual had for a deaf aid. He thought a committee should be appointed to co-operate, for instance, with his committee in London, with the committee which they appointed lately for the League for the Hard of Hearing, each operating in its own country or department but all pointing towards the establishment of an agency which would press the Government to get what in the meantime they say they cannot afford but what the deaf deserve as well as the blind and the lame. If it were possible to second the resolution which had been made, he, Dr. Kerr Love, would do so, but he would like it in the terms which he had mentioned now. He was told by Dr. Kennedy that the proper man to tackle on the lines indicated was a Mr. Douglas in the Department of Health.

Mr. CAWTHORNE (in reply) said that Dr. Adam had mentioned the cotton wool plug. He, Mr. Cawthorne, had noticed that in some cases of deafness with perforation, such a plug had to be inserted before a hearing aid could be used.

Dr. Mathers had asked if the use of an aid improved the hearing. He, Mr. Cawthorne, thought that an aid which made anyone hear who had not been hearing for a long time would exercise his word appreciation centre, and it was in this way that improvement might occur.

With regard to this question of Government advertising in the book of stamps, Mr. Cawthorne had mentioned that deliberately in his talk because he had been told by an official in the Post Office that they were not in a position to refuse one advertisement but accept another without some good reason, especially as quite recently a Parliamentary report to stiffen regulations concerning patent medicines and drugs had been unsuccessful. With regard to the question of the Press not being willing to co-operate, Mr. Cawthorne reminded the meeting that, about 1923, a national daily paper conducted a large and successful campaign against a certain patent medicine. If they could find some

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benevolent newspaper owner who was deaf and who had been victimized by unscrupulous retailers, there might be some hope of repeating the previous exposure.

Dr. KERRIDGE (in reply) said that with regard to audiometers she quite agreed that the calibration was extremely important. It has occurred to several manufacturers to make a cheap audiometer, as they think a lot of otologists are not purchasing audiometers on account of the expense. Dr. Kerridge thought that one must either buy an audiometer from a firm with a large physical research laboratory, for which one had to pay, or else one must insist on calibration by the National Physical Laboratory. Smaller firms could make audiometers but had inadequate facilities for proper calibration, without which such an instrument was most misleading. The expense of official calibration might be such that the audiometers made by the smaller firms would no longer be cheaper.

She, personally, would like to see National Physical Laboratory calibration also of hearing aids. Dr. Kerridge had talked this over with the National Physical Laboratory some years ago and they were prepared to co-operate, but at the time the scheme was frustrated because the hearing aid manufacturers would not co-operate. The reason they gave was that the honest purveyors suffered so much on account of the excessive advertising of other firms that nothing could counterbalance this, and they urged that some action should be taken on the latter question. But there are now a great many more firms in the hearing aid world. Most of the people demonstrating that day were representatives of well-known firms, but Dr. Kerridge said she was rather sorry not to see several instruments which she used a great deal, which were made by certain firms as a sideline to their other business. One often got as good instruments at much less cost because all the overhead expenses of the firm were not added to the price of the hearing aid.

Someone had asked her to explain about hearing loss expressed in decibels, which was rather difficult to do shortly, but Dr. Kerridge said that it expressed the ratio between the physical power of the faintest sound a deaf person could hear and the faintest sound a normal person could hear at the same pitch. Referring again to audiometers, Dr. Kerridge said that although they were valuable instruments, much could be done from practical assessments of deafness as indicated in her paper, and she did not think any hearing aid clinic scheme should be held up for lack of one. She agreed with what Mr. Cawthorne said about the improvement in hearing. She did not think hearing improved with the use of an aid, but in some cases it got more exercise, and deaf persons came to pay more attention to what they heard than they had done previously when hearing had been difficult. There was a great deal of feeling about this question when Dr. Kerridge was testing the deaf schoolchildren in London. The teachers were anxious to know whether the hearing had improved after use of an amplifier, and it did not improve, as shown by short scientific hearing tests. But some of the teachers said certain children could now hear the postman knock, or a dog bark even without a hearing aid, whereas before they used an



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aid in school they heard nothing. Here again, Dr. Kerridge thought that the apparent improvement was due to the children taking more notice of auditory stimuli.

With regard to possible deterioration of hearing, Dr. Kerridge did not think the hearing deteriorated with the use of an aid, but that there was a danger that if people used an aid for a year, and they then found they could not hear so well as formerly, they said their hearing was getting worse; whereas if they took the instrument back to the makers for an overhaul they would find that they were wrong. She always impressed upon people that their instruments should be overhauled regularly. The great difference between the good microtelephones and the bad ones was that the former needed overhauling about once a year and the latter once a month.

With regard to the degree of deafness at which a hearing aid was required, Dr. Kerridge said she found that her failures were with the slightly deaf, the people who were handicapped only at the theatre or at a lecture. These people expect an instrument to give them perfect hearing at a great distance, without any inconvenience; and they are able to detect and dislike the slightest distortion of sound, or adventitious "background" noise. Generally speaking, deaf people will not trouble to use a hearing aid until they have difficulty in hearing general conversation. There are, however, exceptions. A lady doctor came to her the other day whose deafness was not apparent socially at all, but she was taking a postgraduate course, and she could not hear some of the lecturers even from the front row unless she used an instrument.

As to the time of trial, one week was usually sufficient, but very often one needed an extra period of time because of some misunderstanding on the part of the patient regarding the use of the instrument. Dr. Kerridge considered that all patients should be seen one week after they have obtained their aid.

Dr. Kerridge had the use of a sound-proof room at University College Hospital, which was a great advantage, but not essential for the routine work of the clinic.

With regard to the Press and complaints, the National Institute for the Deaf had done a great deal. They had written about the advertisements in the books of stamps and had not got a satisfactory answer, but that was no reason why this Society should not bother the Postmaster-General as well. They had been in touch with the Poor Man's Lawyers about unfair dealings in England, and had been given some advice about how to tackle the exploitation question.

Dr. Kerridge said that if people threatened to take legal action, the case was often settled out of court in their favour.

The question of batteries was a very important one. Anyone with a little knowledge of electrical matters could change the contacts so that cheaper and more easily obtainable batteries would do. Incidentally, the batteries would serve for bicycle lamps after they were useless for hearing aids.

Dr. Kerridge thought that the valve amplifier with a crystal microphone was a very valuable instrument in severely deaf cases, and particularly those with marked high tone deafness. She did not,

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however, think it a universal instrument. She said this led to the question of prescription. She agreed that one could not prescribe hearing aids exactly as spectacles, but what little could be done in that direction had given very good results, which suggested that the ear was not nearly so sensitive to distortion as the eyes.

The instrument designed at the Department for Education of the Deaf of Manchester University has got a very good response curve and it was very useful, but Dr. Kerridge did not think that it was necessarily the ideal instrument for all deaf people.

Although she was not a member of this Society, Dr. Kerridge said she would like to support very strongly the motion that some definite action should be taken by Scottish otologists regarding hearing aids. The clinic at University College Hospital was started largely as an experiment, but the almost overwhelming response to it emphasized greatly the need and neglect of deaf people.

The PRESIDENT said he felt they had had a most interesting afternoon and he asked the Society to express their gratitude to those who had read papers and taken part in the discussion. He asked if it was the wish of the Society that the Secretary should write to the firms who had demonstrated their appliances that afternoon and thank them for their demonstrations.

## ABSTRACTS

### EAR

*Audiometers and Hearing Aids.* AUSTIN A. HAYDEN, M.D.  
(Chicago). (*Jour. A.M.A.*, March 5th, 1938, cx, 10.)

The audiometer is an electrical instrument for measuring hearing and should be used in a quiet room. Direct or alternating current may be used. It measures loss of hearing in decibels at calibrated frequencies and supplants such old methods as the voice, watch and tuning forks. In general the results of tests with the audiometer are plotted so that frequency runs horizontally across the chart from 64 to 8,192 or over and is calibrated in octaves, half-octaves and/or octave letters. Intensity is measured in decibels and is charted vertically.

Electric hearing aids raise the sound level for transmission by air to the drum and by bone through the mastoid to the inner ear. They are portable, semi-portable and stationary. The first uses small dry cells, the second either large dry cells, mains current or both, and the last mains supply only.

Portables are amplified or non-amplified. They are specially adapted telephone hook-ups, consisting essentially of a transmitter, receiver and battery. In the amplified set an amplifier or booster, with its second circuit, is added. The frequency range of portables lies principally between 256 and 2,000 cycles per second, corresponding with conversational tones. By altering the construction