Section of Otology

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President's Address

placed to know the incidence and results of otitis media, and figures indicating the number requiring treatment or observation appear in the reports of the Chief Medical Officer of the Ministry of Education. They show wide variations in different localities, often with no apparent climatic or social explanation, and it is difficult to avoid the conclusion that much depends upon the interest taken in aural disease and the efficiency of aural examination. The reports cannot indicate the severity or clinical course of the disease, and it is the case of established otitis media that is likely to come to the notice of the School Medical Officer. The latest report gives the incidence of otitis media requiring treatment as 3·1 per 1,000 children, requiring observation as 8·4 per 1,000. The last but one report, published in 1958, looks back, and demonstrates for how much we have to be thankful. As recently as 1903, of children attending Board Schools in Edinburgh, 52% had nose and throat disease, 42% had defective hearing. In England and Wales in 1861–70 the four great zymotic diseases, scarlet fever, pertussis, measles and diphtheria, killed each year 5,924 per million children aged 14 and under, in 1957 only 17 per million. When one remembers the damage done to ears by these diseases – in scarlet fever middle-ear suppuration, often of very destructive form, occurred in 7–8% of cases – we must indeed be grateful that we no longer have to deal with problems on that scale.

From the schools one turns to the general practitioner, and first to the report of the Medical Research Council's Working Party (1957) for research in general practice. The survey extended over the year 1955; the sample was an adequate one, with 28 doctors and some 10,000 patients aged 2–14 years. Of these children 8% had otitis media during the year, and of these 13·7% had 2 attacks, 2·7% had three or more attacks; in the 6-year-old group no less than 20% had otitis media during the year. Treatment was by sulpha drugs in 27% of cases, by oral antibiotic in 41%, by parenteral antibiotic in 27%. Myringotomy was performed in one case only, mastoid operation in one case. All the patients, except one who

Deafness in Children

Otitis media and other Causes; a Selective Survey of Prevention and Treatment and of Educational Problems

by T A Clarke MD FRCSEd (*Canterbury*)

Deafness in children is a subject of the greatest importance; a discussion was held in this Section in 1959 (*Proc. R. Soc. Med.* 1959), and some otologists attended the Manchester Congress in 1958 (Ewing 1960), but to me it appears that there has been in our own specialist circles some neglect of the subject; for example, at the recent International Congress in Paris, of some 250 otological contributions only 6 concerned the child. This relative neglect is no doubt due to the attention being paid to the surgery of otosclerosis, on which an immense mass of literature is being accumulated, and in which surgical technique is almost as mobile as the stapes is fixed. Work with children is, with few exceptions, less dramatic, but major problems of prevention of disease, diagnosis, treatment and education still remain.

Acute Otitis Media

Otitis media falls to be considered first, because it is a disease in the care of which otologists and practitioners often fall short of perfection. Moreover it is an extremely common condition which may lead to gross defect of hearing but which frequently, and sometimes unnecessarily, leads to degrees of deafness, smaller but nevertheless very important causes of educational retardation.

Discussion of acute otitis media immediately raises the question 'Who is best informed?' The otologist in this country sees only a small fraction of the cases, and those on a strictly selected basis; that may not be true in other countries where the family doctor system does not exist, but to go abroad introduces other difficulties, the variations in the incidence and clinical course of the disease in different parts of the world.

The School Medical Officer should be well

died from meningitis seven weeks after the otitis, were seen six months after the onset of the acute otitis; 3% of the infants, 4·3% of children aged 2–14 years, and 22·6% of those aged 15 or more, showed residual signs or symptoms, deafness, discharge or perforation; of patients who had two or more attacks during the year, 12% showed residual damage. It is a serious matter when a condition which attacked 8% of the children during the year – and unless the year was exceptional, every year – should leave behind so high an incidence of persisting damage; it is all the more serious when the position is apparently accepted as satisfactory, for no correspondence followed this important publication.

Working in better social conditions Fry (1961) has published his experience. In his practice, over a period of ten years, with an average of 785 children at risk, 333 children had 778 attacks of acute otitis media. He was sparing in his use of antibiotics, giving them only to 21% of cases having pain and a red drum as the presenting features and to 37% of those with aural discharge. No myringotomies were done, two mastoids were opened surgically. Simple hearing tests twelve months after the last attack were said to show residual deafness in 1·2% of cases.

Information from less favourable social circumstances comes from the second report of the Nuffield Foundation investigation in Newcastle upon Tyne (Miller *et al.* 1960). Children were observed over the first ten years of life; of 847 observed, 163 (21%) had acute otitis media, with 260 separate attacks. The incidence of 21% in ten years, 2·1% per annum, appears low when compared with the 8% per annum in the M.R.C. report, and the 10% reported by Fry, but clearly the more severe cases only are included, since aural discharge occurred in 90% of the Newcastle cases, as compared with less than 35% in the M.R.C. series and the 36% recorded by Fry. It is this kind of difference which makes comparison of medical statistics so difficult. The Newcastle report gives no good information on residual deafness, but does state that 16 cases of chronic otorrhœa were found; this is an incidence of 1·9%. Some of these would no doubt have cholesteatomata, some would be accepted as cases of acute otitis in which treatment had failed. Some otologists would group all together under the second heading, but whatever the views on that may be, it will be agreed that again there is demonstrated a common condition which frequently leaves permanent damage.

I wrote earlier that otologists in this country see only selected cases of otitis media, and that there are dangers in looking abroad. One is, however, justified in looking at Finland, where social conditions are not very different, and where an otological department sees patients from start to finish. Palva & Pulkkinen (1959) have described their experience in 1954–58 in 12,781 cases of acute otitis media: only 365 were admitted to hospital; 400 myringotomies were done, and 58 (0·43%) were submitted to mastoid operation, the indication for operation being failure of the ear to heal in three weeks despite appropriate antibiotic treatment. This early operation in 38 patients resulted in a hearing level at critical frequencies within 10 db of normal in 25, within 20 db of normal in 13. The twenty operations performed later produced little recovery of hearing.

Acute otitis media of to-day is very different from that prevailing twenty or more years ago; an otitis in which the need for operation rarely arises, in which complications seldom occur, and in which the emphasis is not so much on the acute condition as on the final functional result. In the more severe case the change may be due to the powerful drugs we now have, but in general undoubtedly the major factors are a change in the virulence of the infecting organisms and, probably, a change in the susceptibility and resistance of the population. Better housing, better clothing, better medical care, all may have contributed; better diet, with more protein and less carbohydrate, may also have played a part in increasing resistance to coccal and other bacterial infection – perhaps at the cost of increased activity of the viruses (Holt *et al.* 1960); the medical history of recent years may well support the suggestion. That may be speculative, but the decreased power of the streptococcus is undoubted. Wilson (1959) suggested that the work of Miot and Faraci in treating otosclerosis by direct attack on the stapes was not followed up by the otologists of the day because they were fully occupied in dealing with pyococcal infection. How different is the position to-day! Wilson also drew attention to the cyclical variations in bacterial virulence, the cycle tending to be of thirty to fifty years between peaks; despite antibiotics we may not enjoy our present comfortable state indefinitely.

However, the immediate matter under discussion is the end-result of acute otitis media, and the avoidance of a permanently damaged middle ear. It is not necessary to discuss treatment at length, but there are a few major points which can be mentioned – antibiotics, myringotomy, mastoid operation, and ancillary treatment of the nose and pharynx. It is frequently said that penicillin is given too often. It is easy to say that from the second-line position in which otologists are found, but one must sympathize with the family doctor. The child has acute otitis media, perhaps a mild infection; it may get worse; it may leave permanent damage; penicillin is effective, so even

the patient with mild infection gets the drug. The fairer criticism is that penicillin is frequently given inadequately; it cannot be repeated too often that in otitis media that is a serious failure. If we want to lay down a standard we should say adequate dosage for a minimum of six days. My own practice in hospital is to advise penicillin in every case of acute otitis media; if the child is already receiving the drug a change from oral to parenteral administration, or a marked increase in dosage will often give rapid results. I have not found bacteriological examinations useful; the membrane may be intact and no specimen available – the nose and throat flora are irrelevant. Swabs from aural discharge are often misleading, those from operation often reported as sterile; frequently by the time a report 'penicillin-resistant organism' is received, the infection has made a rapid response under penicillin treatment.

As to other antibiotics, my experience may be unusual, but I have not known another antibiotic to be successful when penicillin has failed. That may be because the disease is too advanced by the time the second antibiotic is given, but I record my experience, since other antibiotics carry some risk of toxicity or of upsetting the normal bacterial flora. This preference for penicillin rests upon personal experience, but I note a recent article by Garrod (1960) who believes that *in vitro* tests are not good clinical guides, and who finds that otitis media resolves more slowly with tetracycline than with penicillin.

Myringotomy is never necessary when the patient is first seen. In theory it may be done if a full middle ear and pain are continuing twenty-four to forty-eight hours after initiation of adequate treatment; in practice that does not occur. Myringotomy is valuable in the five- to fourteen-day period, if a full middle ear and deafness are persisting.

Mastoid operation is not necessary, however acute the symptoms, until the patient is under the influence of adequate antibiotic treatment – even subperiosteal abscess does not call for immediate incision, as Munro Black (1951) demonstrated, though few would entirely agree with him. The operation is in fact rarely necessary, indeed in less than 1 % of cases; the usual time for operation is two to four weeks after the onset of otitis, the indications are persisting deafness, persisting fulness of the middle ear, perhaps persistent discharge. Once again, it should be stated that these are sufficient criteria; that pain, fever, swelling, profuse discharge, may occur but that these are supporting and not essential features. Blood counts and X-rays are unnecessary and usually unhelpful; leucocytosis may be minimal, and cell outlines are often clear when operation discloses pus and infective material in the antrum and cells fully justifying operation. The extensive series of cases in Finland (Palva & Pulkkinen 1959) showed that operation should not be delayed beyond the third week if recovery of good hearing is to be expected.

Mentioned earlier was the need for ancillary treatment of the nose and pharynx. In the early stage simple shrinking nasal instillations, and in obstinate cases antral puncture lavage, removal of adenoids and sometimes of tonsils, may be desirable in some cases, but these clearly show themselves by the nature which the otitis assumes, the perforation becoming anterior and the discharge rather mucoid; in other types of suppurative otitis media such treatment is not helpful and possibly harmful.

I have found a particular group of patients difficult, the very young child or infant with frequently recurring acute otitis media; there is often a healthy nose and adenoids are not abnormal; the attacks occur at intervals of three to six weeks, the middle ear looking normal in the interval; the condition may or may not coincide with the cutting of teeth, it appears unrelated. Diamant *et al.* (1961) attribute the condition to diminished resistance, and advise the giving of a monthly injection of gamma-globulin, even if, as often, the blood level is found to be normal. The results appeared to be encouraging. I have twice used it with apparent success.

In acute otitis media the gospel which we accept is still not sufficiently propagated, that it is necessary to maintain a careful watch on the child, with knowledgeable inspection of the middle ear and assessment of hearing; that, if permanent damage to hearing is to be avoided, rapid and full resolution must be obtained, a return of the middle ear and the hearing to the condition and level prevailing before the acute attack. This must be the objective, and I think that no otologist would feel that his time was wasted if every patient failing to reach the objective were referred to his clinic at most three weeks from the onset of the infection. A practitioner failing to do this in my opinion incurs grave responsibility. Equally the otologist in the clinic incurs responsibility when the patient is referred, and in greater degree; he has the knowledge, and he has the means of treatment. Of course, he will have failures, patients who do not make complete objective and functional recovery, but in each one he must ask himself the question: 'What went wrong?' Most of these individuals can be dealt with as outpatients, but any failure to attend must be rigorously followed up, the surgeon himself must see the patient at short intervals, and none should be discharged except on his direct authority.

There are, of course, other forms of otitis media and middle-ear damage very much related to deafness in children, but I shall not discuss them, because the last Presidential address dealt with them (Monkhouse 1961). One point only I would make, the need for an efficient follow-up system, which is equally important in otitis with effusion, adhesive otitis, chronic suppurative otitis and cases of epitheliosis, operated or not operated. This follow-up may in some cases last for years, but observation of hearing levels must be made, and opportunities for treatment seized. Even slight degrees of residual deafness, of the order of 15 db, are likely to lead to backwardness, as was shown in Reading with such basic subjects as English and Arithmetic (Ling 1961); regular reports must be made to the school authorities; failing that, backward or naughty will the child be labelled, and backward and naughty will he become. This system of sustained follow-up of children with otitis or impaired hearing must be at least as efficient as that used for all cases of malignant disease; and in terms of human happiness it will pay greater dividends.

Deafness Not Due to Otitis Media

I wish now to discuss some other conditions producing deafness in which the otologist is only concerned in assessment and advice, and where work is going on which may well lead to reduction of resulting deafness.

Deafness acquired in the perinatal period is for the most part due to anoxia or kernicterus; in both cases the damage is to the cochlear nuclei, and Fisch & Osborn (1954) make the statement that these nuclei are the seat of maximum metabolic activity and hence most easily damaged by oxygen lack. With the increased care now given to premature babies and the more frequent arrangement for difficult deliveries to take place in hospital, it is to be expected that the asphyxial group will diminish.

Interesting work is going on with kernicterus, which occurs in the rhesus baby and in the premature infant, associated with excessive bilirubin in the circulation. Particularly in the latter it may well be that another factor is operating, as suggested by Fisch & Norman (1961). These authors think it possible that the vitamin K given to these premature infants (in the expectation of lessening their tendency to hæmorrhage) damages the liver and, with the excess bilirubin already in the blood, causes increased damage to the nuclei. Of babies born in a large hospital between late 1953 and the end of 1954 and showing neonatal jaundice, six showed bilateral perceptive deafness; all had received vitamin K in the then prevailing dosage. At the end of 1954 the maximum dose was reduced to 2 mg, and of the children born in the subsequent two and a half years, examined in 1961, none showed deafness. This paper reminds us again of the need for care in the use of drugs; we remember the damage done by streptomycin and dihydrostreptomycin (one still sees disastrous cases); one reads that neomycin given parenterally and kanamycin and other drugs may produce deafness. Only two or three months ago the popular press carried a headline 'Witch Doctors Blind Thousands' – their remedies did more harm than good. Will future generations look back on us and say the same?

Whatever the part played by vitamin K in those cases, it is clear that excessive bilirubin in the blood can produce kernicterus, with cerebral palsy, mental defect or deafness of varying degree. That rhesus damage can be prevented is suggested in a recent article by Finn *et al.* (1961). The maternal antibodies (which cause hæmolysis in subsequent children) result from the entry of antigens through the placenta into the mother's circulation; this occurs almost wholly during labour, and the antigens persist long enough to cause antibody formation. It seems likely that an anti-antigen serum can be produced, which can be safely injected into the mother at the end of labour; providing temporary immunity, it will prevent antibody formation and the resulting damage to subsequent children. Rhesus deafness and cerebral palsy are not rare; one must hope that this work leads to early practical results.

Exchange transfusion is the treatment of the established or threatened jaundice in the rhesus baby, and Harrison (1960) quotes an experience with twins: one, treated by this method one hour after birth, remained well; the other, treated two days after appearance of severe jaundice, appeared profoundly deaf. Odell & Cohen of the Johns Hopkins Hospital, quoted by Dunn (1961), state that preliminary intravenous infusion of the infant with human albumin, prior to the exchange transfusion, materially increases the elimination of bilirubin, and this may be a useful advance. In the jaundice of the premature infant the risks of exchange transfusion are great, and the possible advantages have to be weighed against these. Trolle (1961) reported the risk of death after transfusion as being four times the expectancy of athetosis, which implies some twenty times the risk of deafness.

Of the true congenital or prenatal group of patients, if we exclude genetic control it seems that only the deafness caused by rubella in the first twelve to fourteen weeks of pregnancy lends itself to prophylactic measures, and the official policy now is that mothers who have not had rubella should receive gammaglobulin injection early in pregnancy if they should have contact with the disease, however remote. This policy

may be doubly rewarding, since gammaglobulin may produce relative immunity against viruses less well known than that of rubella, but perhaps at least as damaging to the developing cochlea.

Of the many other varieties of congenital deafness it would not seem that prevention or treatment is possible except in the case of congenital anomalies of the ossicular chain, of which an interesting series is described by Ombrédanne (1959), and congenital absence of the external auditory meatus. When the latter occurs as a bilateral defect (which is fortunately rare), Livingstone (1959) would appear to be correct in advocating early surgery, if this can be successfully accomplished, as his results suggest. Certainly it is in accord with modern concepts of hearing and speech development.

In the established congenital or neonatal perceptive deafness it does not seem that remedial measures are possible. Garnett Passe (1953) and Wilson (1959) described 8 and 10 cases respectively submitted to sympathetic surgery, and thought the results encouraging, but difficult to assess. To me the work did not seem convincing, and I do not think it has been pursued. Study of analyses of the causes of deafness in children, such as those by Fry & Whetnall (1954) or by Harrison (1960), suggests that with modern knowledge and capacity for treatment, and given early diagnosis, some 75% of cases of acquired deafness and 33% of cases of congenital or neonatal deafness should be preventable in whole or part.

Recognition and Assessment

Recognition of deafness in the child demands first that all concerned, mother, teacher, doctor, hospital staff, should be alive to the possibility; and lack of expected progress, poor language development, and speech defect, should certainly lead to examination for hearing defect of varying degree and scope – the possibility being always in mind that frequently in children the defect may vary greatly from time to time. In the infant the difficulty is much greater, but agreement is now universal that the earlier the diagnosis is established the better, though not everyone could follow Murphy of Reading in his interesting work on the response to sound of the fœtus *in utero*.

In practice the ordinary otological department in this country has still much to do before it can be satisfied with its arrangements and facilities if it is to play in the early recognition of deafness in infancy and early childhood its proper part. I use that term deliberately because the otologist and hospital have only a part to play; the mother, with her role, has been mentioned; the health visitor can be valuable, and the Manchester scheme for the training of visitors in the screening of infants by simple tests may well be most useful. The visitor has the great advantage of seeing the patient in the home, even though many homes are unsuitable for any form of test, and not all health visitors have the temperament for this type of examination.

The general practitioner and the welfare clinics come next in recognition of defects, and once again emphasis must be placed on the need not to forget the possibility of the existence of a hearing defect. Here one thinks only of observation of development and behaviour, and of simple tests. It is only after some or part of this filtration process that the otologist comes into the picture, and immediate difficulties occur. The otologist has a busy department, where work is only covered by maintenance of a quick tempo; his clinic may be noisy; his audiometry room insufficiently quiet; he is more than usually fortunate if he has in suitable premises an audiology department and a department for the supply of hearing aids and the training of those using them. Even more important, assessment of hearing and giving advice in these cases is a matter of team work, in which the otologist, nominally in charge, may play only a minor part – a team including audiologist, teacher of the deaf experienced in the special problems of the very young child, the school medical officer, and occasionally a psychologist (and psychologists accustomed to problems of the deaf are rare). All this means setting aside suitable accommodation, nowhere easy now, and, even more difficult, some degree of fusion between the hospital, welfare and educational services, run by different Ministries and by different authorities. That this should be a difficulty is absurd, but in practice it is a real one.

Two circulars issued recently by the Ministry of Health should lead to improvement in the position. Circular 25/61 deals with the welfare arrangements for the deaf of all ages; it contains a new classification, dividing deaf into three categories, those deaf without speech, those deaf with speech, and those who are hard of hearing. It contains an important new requirement, that Local Authorities shall keep a register of the deaf, recorded under the three categories and placing separately those under 16, those aged 16 to 64, and those aged 65 and over. The circular does not lay down any method of notification, much less any compulsory notification.

Circular 79/61, issued jointly with the Ministry of Education, deals with young children handicapped by deafness; it discusses ascertainment, and children specially 'at risk'; it deals with audiology clinics, and, most important, asks for full co-operation in the interests of the child between practitioner, welfare authority, school authority and hospital. It states that 'where a child is found by a hospital specialist to have any

material hearing loss, all relevant information should be supplied to the M.O.H. or P.S.M.O. concerned, as well as to the general practitioner'. No compulsion is implied, and no burden of notification is laid on the general practitioner. This is the English way, but one wonders whether, if results are really to be obtained, we shall not have to follow Denmark, where doctors and teachers are bound (Rojskjaer 1960) to report any child suspected of suffering from any hearing disease. Such a child should be under regular observation, with repeated critical review of therapeutic and educational needs; there is a case for compulsory notification of all but the most transient cases occurring in childhood, and I differ from Livingstone (1960), who advised that cases of perceptive deafness in childhood should be notifiable; he is right, but I feel that failure to keep track of conductive deafness may well result in even greater loss of opportunities.

Notification is only of value if there is efficient follow up; general practice is not organized for sustained follow up of this nature, and in the interest of the child the family doctor must surrender some of his sovereignty. In the hospital the otologist must maintain his clinical supervision at short or long intervals, but something more organized and of wider scope is necessary. The School Medical Officer and Medical Officer of Health have organization and are accustomed to records and follow-up problems. But it must be recognized that there are involved problems of a highly specialized nature, and much of the good that could come from the circular will be lost if Local Authorities and otologists do not co-operate most intimately in the exchange of records and the supplying of follow-up information. Moreover, if use is to be made of the information the Medical Officer must have otological guidance; it is not enough to-day that one member of a County Medical Officer's staff should be placed in charge of arrangements for handicapped children, the deaf being included. Advanced Local Authorities, such as the London County Council, have the advantage of advice from consultant otologists, and all should follow suit.

Hearing Aids

The term 'treatment' has been used having regard to surgical and medical measures. The provision of, and training in the use of, hearing aids is perhaps a method of alleviation rather than treatment, but in many cases it is at least as important. We all accept now that the earlier the provision is made the better; children a few months old have been supplied, and have accepted the aid.

The Medresco aid has been criticized for lack of automatic volume control and for power insufficient for some children, but there are three criticisms I would make: (1) The hard plastic insert is often unsatisfactory, and safer and better inserts of soft plastic should be more readily available. (2) In the infant and young child the cords connecting the microphone on the body to the receiver in the ear make for trouble; a head-level aid would be better. Bender & Wiig (1960) of Baltimore advise that the aid be carried on a light metal spring over the vertex; their insert is of pliable plastic, adjusting itself well to the meatus and giving a good seal; the aid so worn is comfortable and not disturbed by any normal activities. They go further, and advise a binaural aid, worn on the same metal spring, the microphone of each ear being on the side opposite to the receiver, thus preventing feed-back. This is an interesting point; one wonders what the effect will be on sound localization. (3) The third criticism applies to the older child, and the child with other handicaps such as the spastic child. In each case a head-level aid may be preferred, in the teenager because she wants to be in the fashion, and there are girls who refuse to wear the Medresco when they get to this sensitive age; in the spastic child the involuntary movements make cords unsuitable and the head-level aid is to be preferred – all the more so, as the deafness is often not gross and a simple head-level aid will suffice. I submit that it is wrong that in the infant, in the spastic and in the sensitive child we have to depend on charitable funds to meet their real needs. Those responsible for giving the Minister advice should certainly look at this problem.

Education

From hearing aids, to education; this may seem some distance from the clinician, but the burden of this paper is to the effect that we have to see the child as a whole, and his problems as a whole. There are educationalists who say that no decision should rest with medical men, but if we do understand the problems and possibilities, our advice will be the more acceptable.

What one has to write on this must relate to the profoundly deaf child, affected before speech habits are formed and fixed. There is really no substantial difference of opinion as to the partially deaf. Total deafness is a rare event; any assessment of hearing when first done is likely to be a considerable exaggeration of the hearing defect as ultimately determined – a strong argument for continued supervision, reassessment when necessary and avoidance of finality in educational decisions. Pure-tone audiometry, when it can be done, is a very incomplete guide, but the type of case one has in mind is that in which deafness is profound, the equivalent, say, of more than 85 db loss with a limited frequency

range; admittedly a minority of cases, they are not few in number, and there is some danger that modern methods for these children may be inappropriate.

What is the concept of education and training of the deaf child now presented to the otologist? It is not unreasonable to summarize it as follows: (1) After the earliest possible assessment, the exposure of the deaf child to speech, sufficiently loud (and this presumes the use of adequate hearing aids), and sufficiently often, and used in association with the meanings of speech, and sustained throughout the period of readiness to hear, i.e. in the first years of life (Whetnall 1960). (2) The encouragement of speech communication and the forbidding of the use of signs and manual expression. (3) The maintenance of contact with normal hearing persons in family and at school; i.e. the whole emphasis is on integration with the hearing community and not segregation.

A very eminent and rightly esteemed audiologist has said that if these conditions are observed (referring to those first mentioned above) 'the child born deaf can hold his own at an ordinary school and grow up in a hearing environment. The right training can enable him to overcome his disability and take his part in normal life'.

Otologists are very busy in what is largely a surgical specialty. Few can make more than an occasional visit to a special school; few can visit social centres and deaf institutes; only rarely does the established case of profound deafness, and perhaps least frequently of all the person profoundly deaf from infancy, visit his clinic, and then the emphasis is on medical problems or hearing rather than on social adaptation. The otologist reads the medical and surgical literature; only rarely and by special effort will he read the *School Government Chronicle and Educational Review*, the *Teacher of the Deaf*, and, for example, the *British Deaf News* – each of which from time to time will express the views of the administrator, the teacher, and if one may say so, the consumer, the deaf person and his parents. Lest the case go by default one might, therefore, quote from each of these. In 1959 the *British Deaf News* reports that R Howlett, a senior administrator in the Ministry of Education, while recognizing the valuable part to be played by special classes attached to schools, said 'One must not be dogmatic or make exaggerated claims. It is regrettable to hear it suggested that most deaf children, even if severely deaf, can be kept out of special training schools if they begin auditory training early enough – and indeed that special schools for the deaf would shortly no longer be necessary. This raised false hopes in parents, and depressed staff in schools which must remain for an indefinite period the main place for educating deaf children'. From many articles in the *Teacher of the Deaf* one might quote one of H.M. Inspectors of Special Schools; in 1960 Parnham wrote 'too rigid an interpretation of pure oralism could be cruel and unnatural'. And in the *School Government Chronicle* another of H.M. Inspectors of Special Schools, Lumsden (1955), wrote that it was suggested 'that children became abnormal by attending special schools. What rubbish! There is, on admission, often a transformation; for the first time the children become normal. Parents of handicapped children know from bitter experience that it is no use pretending that their children are normal'.

These contrary views do, of course, give us food for thought, and there is much to think about. For children up to 3 or 4 years of age we have no doubts – earliest possible preliminary assessment, home training and supervision, expert guidance and support from the audiology unit, visits to or by a teacher of the deaf attached to the unit – all is plain sailing, except for the difficulty in supplying these things, and except for the parents. They need all the patience and courage we can give them.

For the older child, the special class attached to an ordinary school has the advantage of retention of home life and mixing with normal hearing relatives and children. There are, of course, difficulties in any large scale expansion of these classes. Not every headmistress of a school is wholly sympathetic, least of all when it comes to giving up one or two of her better rooms for the use of 5 or 6 children. Teachers of the deaf are already in short supply, and this position will be aggravated when attachment to the greatly needed audiology centres becomes more general.

That the system permits integration is true, but how real is the integration, and how much is it desired by the deaf? How much hardship does insistence upon it inflict? The deaf person (and I refer still to the profoundly deaf person) is under never-ending strain with normal people. Would any one of us advise the sending of a backward boy to the rigours and competition of a public school? The deaf like to be with the deaf, to paraphrase Lumsden, already quoted, to be equals with equals. There is a significant and perhaps pathetic phrase in an article by Buchl (1960), describing the arrangements in Holland, where residence in special schools is not favoured. Since the children come from a wide area, foster parents have to be found, to give a hearing family background. Buchl states that 'care should be taken that the deaf children should not live too near one another; they are magnetically drawn to each other'. Writing of older subjects in Northern Ireland, Backett & Brown (1956) wrote that 'for

the majority the company of others equally deaf is the only sort of social life worth having and it is apparently full and satisfactory'.

The hardship of competition, the strain of contact with normal hearing children, these are certainly worth while with the partially deaf and the exceptionally able case of profound deafness, but it could be suggested that before submitting others to the ordeal the factual benefits should be carefully assessed.

As with the integration, so with pure oralism. The present policy is to rely on this, without use of signs, and only with the failures in the last few months at school, to encourage and teach the use of signs. By the great amount of time given to auditory and speech training, are we limiting the true education of the child? Language is necessary for intellectual development, but are we confusing speech and language? The child has other faculties and abilities; why concentrate on the defective one? Two-thirds of those leaving deaf schools in the North of England and with Grade III hearing had speech unintelligible (or to be understood only with the greatest difficulty) by those with normal hearing (Drewry 1960); are we sacrificing the many to the successes of the few and the theories of idealists?

I have posed these questions on integration and oralism, and I appreciate that the manner may indicate a bias. That is not my intention. There are great teachers; there are great successes. In each child an individual decision has to be taken. My hope is that every otologist will think the matter out; an interested and informed otologist can be a great help to the child and a strong support on occasion to the teacher of the deaf, speech therapist and all who work in the same cause. The Ewings, Miss Whetnall and her associates, and others have made great advances possible; by their methods, as yet, only some children have been dealt with and for a limited period. Within another two or three years a number of children, under care from infancy, will be available; then one hopes a survey will be made of results obtained in all grades of deafness. Then will the time be ripe for a complete new look at what is done for the deaf child; then should the question be answered 'Are we using the right methods in each case?' and indeed the fundamental question asked and answered 'Have we the right objectives?' Then should be heard the otologist and the audiologist, the psychologist, the administrator, the teacher of the deaf (in and out of special schools) the welfare officer and the youth employment officer. And this time the mistake of the Royal Commission of 1890 should not be repeated; that Commission reported without hearing evidence from a single deaf person.

This paper has been incomplete, in particular making little reference to the great work done in other countries.

In closing I pick out four points for emphasis: (1) The need for a register of children with deafness of any nature in pre-school and school years. (2) The need in hospital for a follow-up of children with perceptive or conductive deafness at least as efficient as that in use for malignant disease. (3) The necessity for every otologist to think beyond the medical and surgical treatment of his deaf patient to the educational and social problems. (4) The need for a full enquiry, within the next two or three years, into the successes and failures, the methods and the objectives, in our handling of the deaf child.

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Miss Edith Whetnall (*London*) said that deafness in children was an important topic about which far too little was known.

The right hearing aid was essential, it must give enough amplification and be worn without thought as though it were part of the clothes. The ear-level aid was the aid of choice; it was small and could not be seen, and obviously a child would like it. It had been suggested that there was little evidence yet of the benefit gained by two aids, but there was some evidence showing that two ears were better than one

and that the child would learn more quickly and more easily with two aids.

Miss Whetnall agreed that follow up was important. A survey of the work carried out in the Audiology Unit at Golden Square was now under way. Some of the first children treated were now nearly 14 and several were older, one was 17. The deafness of the 17-year-old girl was detected by the mother, who always spoke close to the young child's ear. Indeed it was this case and a few others similar which pointed the way to the method now used. Given the chance, the deaf infant would learn the meaning of sound at the age and in the same manner as the normally hearing child learnt. This was fact and anyone who had not treated a child under those conditions did not have the necessary information to form an opinion about it.

Diagnosis was surely the province of the otologist. Detection and assessment were part of the diagnosis, for both depended on tests of hearing. Detection depended on understanding the responses to sound of the infant during the first year of life. Assessment could only be carried out after the child had undergone a period of training – the length of time required being the time the normally hearing child required in learning to hear and to speak, that is three to five years. To assess hearing before this was analogous to testing a person's ability to understand and speak French before he had had the time to learn it. Why should the treatment of deafness be the one disability not under the care of the doctor? Was not an otologist trained to understand the problems of hearing and deafness?

The comments made by the educationalists implied that there were failures. Miss Whetnall had been looking into the question of so-called failures. The commonest cause was a lack of understanding of the principles involved, once the cases had ceased to be under the immediate care of the otologist. Magic results were expected and the deaf child was condemned for not learning speech more rapidly than the hearing child. Many children with normal hearing still had a speech defect when they went to school. The child could not be educated before he had acquired speech. It was the otologist's job to make the deaf child educable.

Dr David Morris (*London*) said he was not altogether in agreement with the President in what he had said regarding the prevention of deafness in children. Dr Morris was doubtful whether preventive measures were possible as yet with such conditions as prematurity and toxæmia, but with further knowledge it might be possible to help in the same way as in rhesus incompatibility.

As a pædiatrician Dr Morris welcomed the latest provisions of Local Authorities for the early diagnosis and management of deafness in children, because it was difficult to get children, especially the younger ones, seen quickly and effectively.

Dr Morris asked the President for his views on the use of daily prophylactic sulphonamides in children with recurrent upper respiratory tract infections. The work of Bonham Carter and Burke at the Hospital for Sick Children, Great Ormond Street, on the catarrhal child had been highly effective. This had been confirmed by the increasing number of pædiatricians who now used that method. He wondered if ear, nose and throat surgeons approved of it; pædiatricians found it very successful in the management of these children.

Mr Stuart R Mawson (*London*) said that Miss Whetnall had raised the question of detection of deaf children and Dr David Morris's remarks prompted him to suggest that otologists should try to persuade their pædiatric and obstetrical colleagues to send children 'at risk' of deafness, because of their prenatal, perinatal or immediate postnatal histories, to the audiology units for screening. This could be expected to result in fewer children escaping the early detection so necessary if they were to receive help at the optimum time.

Mr A Mackenzie Ross (*Bournemouth*) said that he agreed with Miss Whetnall. The detection and assessment of deafness in children should be made through the services of an otologist, otherwise some curable cases could be missed, e.g. those with serous middle-ear catarrh. He mentioned a child who was referred by the school authorities because an audiogram showed a marked degree of deafness. On examination the ears were found to be full of wax. His contention was that the child should be examined in the first instance by an otologist. However, in the Bournemouth and Poole area there was now an Assessment Clinic which included the otologist, the education officer, the teacher of the deaf, the psychologist and the school medical officer; when necessary other consultants, e.g. pædiatrician, psychiatrist, &c., were invited.

Mrs Florence Cavanagh (*Manchester*) wished to stress the importance of the ear moulds.

In severely deafened children who needed an aid more powerful than the Ministry's model, and for whom she had acquired commercial aids, she found it impossible to utilize this extra amplification because of ill-fitting moulds and feed-back. She thought that many of the technicians in hearing-aid clinics were unaccustomed to handling children and that the materials used for taking the impression were uncomfortable and rather frightening to youngsters.

She had also found that the commercial suppliers were afraid of making too long a process for the meatus. She thought that this was because much of their work involved elderly people who were often partially edentulous and had some derangement of the temporomandibular joint. No doubt in these cases a long meatal process could be a discomfort but she felt this did not apply in children. Mrs Cavanagh was now making some moulds in her own clinic – using one of the commercial preparations – and was concentrating on a longer meatal process. She wanted to emphasize the great reduction in feed-back when the soft plastic tip was used.

She pointed out the importance of having frequent new moulds since a young child grew rapidly and a well-fitting mould could quickly become too small.

Mr D H Craig (*Belfast*) said it was probable that upper respiratory infections varied somewhat in incidence and virulence in different parts of the British Isles, and consequently in the frequency and severity

of their complications, which might account for Mr Clarke not stressing the incidence of what, for lack of a better name, was called chronic adhesive otitis media. Certainly in Belfast in recent years Mr Craig had been impressed by the frequency of the condition and the severity of the deafness it could produce.

In infants it was most difficult to diagnose; even the most careful and repeated examination with the microscope might not show any fluid level and the tympanic membrane might be retracted.

When the drum was opened, thick gluey fluid could be sucked out. Repeated aspirations were required, and a cortical mastoid operation was often necessary. The mastoid air cells were frequently filled with unhealthy granulation tissue, and a wide exploration of the middle ear might be necessary to remove a mass of granulation tissue from the ossicles. In an established case it seemed impossible to prevent these granulations reforming.

Mr Craig had not reached the point of suggesting that every deaf infant's middle ear should be explored, but there was no doubt that if many more middle ears, and even apparently normal ones, were opened, many children would be spared severe and permanent deafness.

Dr J Fulton Christie (*Glasgow*) said he was pleased that Mr Clarke had referred to cases of acute otitis media which cleared up with adequate dosage of systemic penicillin although penicillin had been given without beneficial result before admission to hospital. He thought the broad-spectrum antibiotics such as chloramphenicol and tetracycline had a place in the treatment of cases due to penicillin-resistant organisms.

He fully agreed that certification of deafness was important. The Medical Officer of Health was the only person who had the necessary staff and authority to co-ordinate the services involved.

Unfortunately, rightly or wrongly, the teachers of the deaf were under the impression that otologists held the belief that all deaf children, if given auditory training from an early age, would be able to attend an ordinary school. While no doubt it was true of many children with a good social background or high I.Q. Dr Fulton Christie thought that there would always be others for whom a school for the deaf was the only solution.

So far as the question of oralism was concerned he had heard Dr Pierre Gorman, Librarian of the Royal National Institute for the Deaf, speaking two days before, and as a result, was in no doubt that the prime need of the deaf was language, and when necessary it was legitimate to use any method which would enable the deaf person to acquire it.

Mr H Zalin (*Liverpool*) said that whilst congenital and neonatal types of deafness were important and distressing in the individual case, they were numerically insignificant by comparison with otitis media as a cause of deafness in childhood. Otitis media in infancy was ubiquitous. Very few children escaped infection which was usually bilateral. Although the majority recovered without sequelæ and only a small percentage remained irretrievably damaged, this small percentage of a very high numerical incidence of infection meant a large absolute total of cases, and hence constituted a major problem.

The dangers of otitis media in infancy, in particular the suppression of mastoid pneumatization and collapse of the tympanic membrane, were well known. Diagnosis was by no means always automatic. Florid cases with acute distress, pyrexia and finally pouring otorrhœa, were self-evident, but all too often such symptoms as variable and intermittent fretfulness, head-rolling and anorexia were accepted as part of the process of teething and treated by sedation, which obscured the issue even further. These were examples of exudative otitis media and the signs were subtle and inconclusive. A dull, occasionally suffused or slightly full, tympanic membrane, should arouse suspicion, and in cases of doubt the tympanic membrane must be incised and the middle ear aspirated.

Given an awareness of the problem and devoted and intense therapy, why did results leave so much to be desired? He suggested the following reasons:

(1) The main weapon in the treatment of infection, antibiosis, was powerless against the viruses and these infections were mainly viral in origin. Siirala, Tarpila & Halonen (1961 *Acta otolaryng., Stockh.* **53**, 230) had recently shown that sterile middle-ear exudates, such as were repeatedly aspirated from Mr Zalin's cases, had an inhibitory effect on the cytopathogenicity of herpes simplex, poliomyelitis and adenoviruses in HeLa cells. These virus neutralizing antibodies were probably similar to interferon.

(2) It had been suggested that a severe infection in early childhood could selectively destroy individual capacity to produce antibody to that particular infection, leaving a susceptibility to repeated attacks of a similar nature by the original invader. This might explain the frequency of recurrent and relapsing otitis media in childhood.

(3) It had not yet been possible to solve the problem of the closed eustachian tube which persisted after the acute infection was over and caused havoc in the middle ear and mastoid.

The future therapeutic approach must lie in the field of antiviral agents and possibly the use of γ globulins to provide passive immunity in those patients where there was evidence that the immune response had been inhibited by overwhelming infection.

The President, replying, said that the very full discussion indicated the importance of the subject. He was aware of the work at the Hospital for Sick Children, Great Ormond Street, on the use of sulphonamides in long-continued prophylactic dosage; anything lessening the incidence of respiratory and aural infections was to be welcomed.

He hoped that enquiry into the successes and failures of educational methods would not be unduly delayed.