

# The Organisation of Comprehensive Audiological Services in the Cape Province

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## SUMMARY

There is an urgent need for comprehensive audiological services in South Africa to deal adequately with the problems of clinical, industrial and social medicine. The organisation built up in and around the Tygerberg Hospital is described, and may serve as a possible blueprint for what could be done in the rest of the country. In particular, the important role of the medical profession in the habilitation of hearing-impaired children is described, as well as the influence this has on the education of these children.

*S. Afr. Med. J.*, 49, 598 (1975).

Because we are of the opinion that there is a great need for improved audiological services in South Africa, and that the lack of a comprehensive audiological organisation on a national scale lies at the root of many problems related to the prophylaxis and care of hearing impairment, we devoted a good deal of attention to this aspect in the planning of the University Training Hospital at Tygerberg. Cognisance was taken of the problems of clinical medicine, which are the diagnosis and treatment of hearing defects, or neurological lesions, of industrial medicine with the problems of noise-induced deafness and of social medicine, with the problems of sound pollution. The correct issue and control of hearing aids was followed by a suitable rehabilitation programme, and by the habilitation and education of children who are born with hearing defects, or who become deaf early in life.

Thus, an audiological organisation was established, and is being developed to serve the Cape Province generally. We hope that it may eventually serve as an example which could be emulated on a national scale.

In order to plan and develop this organisation, during the course of 7 extended study tours, I spent about 12 months abroad visiting leading clinics and centres in Europe, Britain and the USA, absorbing from each what was regarded as suitable and best for our particular circumstances.

The co-operation of so many leading overseas authorities, also as regards training of our staff in their departments, has been of inestimable value, and naturally has had an important influence on our ideas and ultimate decisions. Particular mention must be made of the late Edith Whetnall of the Nuffield Speech and Hearing Centre, London, who made a lasting impression; Dr C.

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Rojskjaer, of the State Hearing Centre, Odense, Denmark; Professor Ian Taylor of the Department of Audiology and Education of the Deaf, Manchester University; Dr S. Silverman, Dr Hallowel Davis and Dr Audrey Simmons of the Central Institute for the Deaf, St Louis; Dr William Hardy and Dr Janet Hardy of Johns Hopkins Hospital, Baltimore; Dr A. Gloric, of Dallas; the Los Angeles Foundation of Otology; the John Tracey Clinic, Los Angeles, and others.

With the co-operation of the Department of Hospital Services of the Cape Provincial Administration and the University of Stellenbosch, it was possible to build up a central department, which is, by all international standards, large and fully-equipped. As far as the general planning is concerned, as well as the detailed completion of the intricate building construction involved in such an undertaking, it compares with the best anywhere.

The main audiology unit, or hearing and speech clinic, is located at the centre of the Otorhinolaryngology Outpatients Department, and functions as an integral part thereof. Owing to its particular situation and the efficient sound-treatment, the necessary quietness, privacy and relaxed atmosphere are achieved.

There are 4 sound-proof rooms with observation and control rooms, 2 large infants' and children's audiometry rooms, 10 office-therapy rooms, a seminar room, a departmental library, which is already well stocked with books and journals relevant to the specific activities, and a technical laboratory for the manufacture of hearing-aid ear-inserts.

Audiometric equipment is complete, and is the most modern available. Our 6 basic audiometers are of the Maico MA 24 type. Additional equipment includes simpler audiometers, Békésy audiometers, psychogalvanometers, acoustic impedance bridges, a third octave filter, speech trainers and sound level meters, as well as an evoked response audiometer, which will, in the near future, be housed with the equipment for electrocochleography in a specially constructed, electrically screened, sound-proof complex. Electronystagmography is performed in two electrically-screened rooms.

Outside the hospital is a therapy home for the early treatment of the hearing-defective baby and his mother, and a home where mothers from country districts and elsewhere, whose babies are deaf, can temporarily and periodically be housed while attending treatment sessions. There is also a separate pre-school complex, consisting of 6 sound-treated air-conditioned classrooms, as well as 4 individual therapy rooms with observation rooms and all extra facilities as required in a nursery school, for the early group treatment of slightly older hearing-defective children.



## HEARING AND SPEECH CLINIC

## Paedo-audiological Section

### Audiology Section

Here the usual audiological procedures for the diagnosis, prophylaxis and treatment, surgical or otherwise, of hearing defects are carried out, as well as the more sophisticated examinations that play an increasingly important role in neurology and neurosurgery, e.g. the localisation of lesions causing deafness and disturbance of balance, as well as other neurological conditions such as brain tumours. The evaluation and supply of hearing aids is the responsibility of this section, as well as the audiototherapy and speech therapy necessary for the rehabilitation of these patients.

### Speech Therapy Section

The study of speech pathology and the practice of speech therapy are closely related to audiology, and are best developed with audiology in a Faculty of Medicine, and, specifically, in a Department of Otorhinolaryngology. At the Tygerberg Hospital, they form part of the Hearing and Speech Clinic of our department, in contrast to arrangements at some other universities, where speech therapy often falls under a faculty other than that of medicine, with an obvious lack of essential clinical contact.

Speech therapy renders a service in the evaluation and therapy of children and adults with communication disorders, e.g. aphasia (motor or sensory), voice problems, delayed speech, language disorders, stuttering, split palate, laryngectomy etc., as well as being an important complementary service in the activities of the general audiology and paedo-audiology sections.

In our pre-school complex, we have two special classes for children with speech and language problems, as distinct from children whose hearing is impaired. A number of disciplines are involved in the evaluation and treatment of speech disorders, which necessitates the co-operation of all medical and paramedical specialities, and they are encouraged to discuss with us any special needs that may exist in their own fields.

### Electronic Acoustics Laboratory

To care for and keep in accurate functioning order all the advanced electronic apparatus in the department, to develop new apparatus and to assist in research, we have appointed an electronic acoustics engineer, who has at his disposal a fully-equipped electronic laboratory, and the co-operation of electrical and mechanical technicians.

In addition to the ordinary equipment necessary in such a laboratory, special facilities such as the following exist: laboratory calibration of audiometers; a mobile calibration system for the routine checking of the apparatus in daily use in the department; laboratory equipment for the checking of hearing aids for effective frequency and intensity response, and for distortion; and an artificial ear and an artificial mastoid, with the necessary calibration facilities.

This section is especially concerned with the habilitation of the hearing-impaired baby and the modern approach to the problems of deaf-mutism. It would be meaningless to describe the mere physical facilities and techniques used. Because we are initiating an essential service that will have a profound influence on the future prospects of the hearing-impaired child, and which should be made known to the medical profession and to the public in general, some details of the underlying philosophy, the comprehensive organisation and the aims of the department are outlined. Finally, the important influence of this approach on the ultimate school placement of the child with defective hearing is discussed.

During the first years of life, there can be no doubt that it is the medical profession that has the most intimate contact with, and thus the best understanding of, the problems of the young child, and the opportunity of being of assistance. However, it is unfortunately true that in the past we have neglected the deaf child, and in ignorance and impotence very often adopted the 'wait-and-see' attitude. Fortunately, this has changed. A tremendous amount of research into the problems of congenital deafness, done over the past decades, has led to a new interest and understanding on our part, and we now know that the medical profession has a very important, if not vital, role to play in the handling of the baby who is born deaf. Moreover, this has a decisive influence on the future possibilities of educating such a child, and on the pattern of education of the hearing-impaired, generally.

We now know that with early diagnosis and the development of the residual hearing that is present in the majority of congenitally deaf children, results can be obtained that open up new vistas of hope for these children as regards the possibility of integration into normal society as useful citizens.

Deafness in babies and very young children is a special problem. The child who is born with a severe degree of deafness, or who becomes deaf early in childhood, will not learn to talk, and is thus not only deaf, but dumb. These children, left to their own resources, are doomed to tragic isolation in a silent world, with no sound contact with their surroundings and fellow human beings, and no ability to share their emotions and thoughts, even with their mothers.

That they are deprived of inner speech, which forms the natural basis of thought is related to this, and is perhaps equally tragic. When we think, we formulate our thoughts and ideas in words and sentences. Without the development of inner speech, they lack a fundamental mechanism in their thinking processes. Their intellectual and emotional development is impaired, and they find it impossible to adapt themselves socially to a normal community life.

Traditionally, in South Africa (and elsewhere), churches and benevolent societies were the first to interest themselves in the welfare of the deaf. The result was the establishment of institutions where these children grew up and lived in protected surroundings, but, naturally, in isolated communities. At the same time, an attempt was made to give them some form of education which was, according to



the conceptions of the time, within the scope of their abilities. This usually amounted to the learning of a manual trade. Such communities were frequently established in country areas, where they could be self-supporting.

Later, educationalists started playing a role, and attempts were made to supply these children with a method of communication. The manual method, which depends on the use of signs, was the first to be developed, but had the disadvantage that only deaf people could converse with each other. It also accentuated the tendency towards isolated groups and intermarriage, which, because of hereditary and environmental factors, resulted in the birth of deaf, and possibly dumb, children.

This was succeeded by the oral method, which aimed at teaching the child to understand speech by lip-reading, and to develop speech by a study and imitation of lip, tongue and respiratory movements. Whereas they could learn to understand others reasonably well, the acquisition of speech by such completely unnatural and artificial methods was, and is, usually very poor.

Both these methods ignore the fact that practically all congenitally deaf babies have some degree of residual hearing that can be developed and used in the understanding and development of speech. Apparently, recognition of this fundamental principle developed independently among educationalists and the medical profession. In England, for example, the gradual development of understanding and application of this principle can be traced in a most interesting way when one studies the evolution of educational methods for the hearing-impaired, and the resultant changes in legislation that controlled their education. The same applies to other civilised countries.

Residual hearing must be regarded as usable hearing, and this brings us to the modern approach to the problem of the child who is born deaf, namely, the auditory approach. The tragedy of the deaf child is not that he cannot hear, but that the hearing that he possesses is neglected instead of being developed. An important reason for this is that it is not sufficiently realised that hearing in a normal child is an art that has to be acquired, and a difficult one at that.

To understand the use of residual hearing in the handling of the congenitally deaf child, one should have a thorough knowledge of the development of hearing and speech in a child who has normal hearing. The normal baby can hear sounds, but does not understand them. The meaning of sounds has to be learned. Usually, the ideal circumstances for this learning process exist in his normal surroundings at home, and gradually sounds begin to assume some significance for him. Then he starts imitating these sounds, and speech develops. This, however, does not happen spontaneously; it is a lengthy and difficult process, and an acquired art.

### **FACTORS INFLUENCING THE DEVELOPMENT OF HEARING AND SPEECH**

**The sounds should be heard early enough.** During the first year, the child has a special aptitude for learning to distinguish sounds. This is the so-called 'period of readiness to listen'. The importance of this period cannot be stressed enough, because it is of basic importance as far as the

understanding of the problems of deaf-mutism and its successful treatment are concerned. After the age of 3 years, this ability to distinguish new sounds diminishes. After 5 years, it becomes difficult to develop residual hearing, and after 7, impossible.

**The sounds should be heard frequently enough.** A baby learns to hear by listening to a continuous repetition of words and sentences. During her natural and spontaneous chatter to her baby, it has been found that a mother uses about 305 words in half an hour. This ensures an effortless and continuous source of sound stimulation for the baby, as well as practice in hearing. It is said that when a child says 'Mamma' for the first time, he has heard the word 20 000 times.

**Sounds must be heard loudly and clearly,** because until this stage, no reservoir of sounds has been stored in the cerebral cortex. Nature provides for this in that the child cannot get away from the mother, and hears the sounds close to his ear. Later, when he plays with other children of his own age, he hears sounds loudly, and at ear level. A great step forward occurs when the baby begins to associate certain sounds with pleasure, e.g. the sound of his feeding-bottle with milk, and the voice of his mother with encouragement and love. During this period of readiness to hear, the baby builds up an understanding of words and sentences **in an atmosphere of love and security that can only be supplied by his parents.**

The first year of life, the period of readiness to listen, is now followed by a period of readiness to speak, usually when he is 12-18 months old, and begins to realise that certain sounds that he makes can influence the activities of his mother. In the development of speech the same factors that influence hearing also play an important part. Speech develops naturally, through the imitation of sounds that are heard frequently. After the second half of the first year, this tendency to imitation becomes stronger, until it dominates all his activities. He is continually trying to repeat what he hears. At the same time, development of the intricate control over the muscles of the tongue, mouth and throat, which are used in the formation of words, takes place. Here, the control supplied by his own hearing so that the sounds are formed correctly (the so-called 'auditory feedback'), is very important.

This development of hearing and speech takes time. Although he is continually hearing the right pronunciation, his first attempts at speech are poor. The child who hears normally listens for two years before his attempts at speech begin to succeed. The next step in development takes place when he mixes with other children, at play, then at nursery school and at school, and later at university. During this long process of development he constantly improves his pronunciation, and eventually speaks the language in the accent of his surroundings. The most critical period of this long developmental process, however, is the first year of life.

A child who is born deaf may learn to hear and to speak in the same way and according to the same principles as a child who has normal hearing, provided that the circumstances important in the development of hearing and speech, as described above, are supplied. Conversely, children with normal hearing or moderate deafness, when



deprived of such circumstances owing to neglect, or to removal from the right environment (e.g. wrong placement in a school for the deaf), may fail to develop speech.

The modern auditory approach to the congenitally deaf baby is thus to discover the hearing defect as early as possible, preferably at the age of 6-7 months, to amplify the sounds by the use of a suitable hearing aid (or two aids), and to develop his hearing and speech by intensive audiototherapy. Neither the degree nor the type of deafness was found to be a decisive factor.

Distortion of sound is no obstacle to young children, as it would be to adults, as they have never had the opportunity to hear differently. Also, at this early age, their ability to discriminate between sounds is better than it is at a later stage. Audiototherapy cannot give them normal hearing, but it can develop their hearing and understanding so that what they hear becomes a language that they understand.

At this very early age of readiness to hear and to speak, the child must continually be exposed to sufficiently loud normal sounds, words and sentences, in his own home surroundings of security and love. He should receive more attention than the normal baby, and more encouragement. He must wear his hearing aid continuously, with ear-pieces in both ears, or possibly even two hearing aids, so that he can hear sounds of an intensity as close to normal as possible. The young baby immediately realises that he is deriving benefit from the aid, readily takes to it, and does not want to part with it. In older children it may be more difficult. They are past the stage of easy discrimination of sounds, and to them sounds remain a noise. At this stage they are probably already fixed lip-readers.

The auditory approach to the problem of deaf-mutism is not new. In the past, otologists repeatedly drew attention to the infrequent occurrence of total deafness in babies, and emphasised that the residual hearing present should be regarded as usable hearing, which should be developed so that they could learn to hear and speak. The realisation that this treatment should be applied at the vital early age, during the period when a child with normal hearing usually develops hearing and speech, is an important new development.

The important role of research and of new developments in electronics and acoustics should also be emphasised. Better audiometric techniques and equipment make earlier and more accurate diagnosis possible. Smaller and more efficient hearing aids, group hearing systems and auditory trainers are of great assistance in the early auditory training of the infant, as well as in his future school career.

### THE PAEDO-AUDIOLOGICAL DEPARTMENT AT TYGERBERG HOSPITAL

In South Africa, apart from isolated efforts, very little has been done at the right age for the young congenitally deaf baby. At the new University Training Hospital at Tygerberg we have planned a large and well-equipped paedo-audiological department, an organisation which we hope will go a long way towards improving this situation.

Selected people with suitable basic qualifications, with particular emphasis on psychology, education and logop-

paedics, were sent to leading clinics and institutions in Europe, Britain and the USA, where they received lengthy specialised training in their respective fields. They came back as highly-trained authorities, able to handle the different facets of the work in the department, to do research, and also to organise the training of others, so essential for further expansion of the organisation.

The paedo-audiological unit forms part of the Department of Otorhinolaryngology, where the otologist may co-ordinate the various examinations and services. This is an important, and sometimes controversial, concept, which is accepted in the audiological highly-developed Scandinavian countries, and also, to a great extent, in Germany and England, but which was originally neglected in the USA, to their present regret.

The well-known Marion Downs, Assistant Professor of Otolaryngology (Audiology), University of Colorado Medical Centre, (herself a non-medical person) in her paper 'Overview of the management of the congenitally deaf child' presented at a Symposium on Congenital Deafness, and published in *Otolaryngologic Clinics of North America*, vol. 4, No. 2, June 1971, started off the discussions as follows:

'There are several basic principles concerning the management of limited hearing children that I should like to present as a rationale for the contents of several of the papers. To some people these principles may sound heretical, but they are based on long and bitter experience. The most basic of the philosophies is that the physicians must take the responsibility for the management of the child with hearing impairment throughout the learning life of the individual child. This is to say that the otolaryngologist, or pediatrician, should be responsible not only for the diagnosis and treatment of the condition but for the choice of therapeutic and educational placement and for monitoring the physical and intellectual status of the child during his educational years. The physician should also be ready to intervene at any time if it becomes apparent that a change in educational direction is indicated.

'The otolaryngologist (or the otologically orientated pediatrician) possesses two attributes that make him the likely person to assume these responsibilities: he has the requisite knowledge, and he has the authority. He alone can put together from a myriad of sources all the information available in a given case, and come up with a working hypothesis on the degree of hearing function that exists. He alone has the authority to direct the parents to the appropriate therapy program; his 'prescription' for training is recognised as being as definitive as is medical treatment. The parents may hear conflicting ideologies from the audiologists, from educators and from therapists. But there is no confusion when the otolaryngologist prescribes a specific course of treatment, the course is consequently followed to the letter.'

On our staff we have paedo-audiotherapists who are responsible for examination and treatment programmes. Also available for specialised examinations and consultations are the personnel and facilities of the general audiology and speech therapy sections, all these facilities being integrated in our hearing and speech clinic.



Very often we have to deal with multiple handicaps, so that it is essential to have available the services of other medical specialists such as paediatricians, neurologists, psychologists, psychiatrists, ophthalmic surgeons, orthopaedic surgeons, physiotherapists, etc.

Psychological assessment is at present done by the head of our paedio-audiology section, who is a trained psychologist. We also have the co-operation of the clinical psychologists from the Child Guidance Clinic of the Department of Education, University of Stellenbosch. Although we intend appointing a full-time psychologist on our staff, continued close co-operation with the above department should prove to be of the greatest importance.

Social workers play an important role in the detection of cases, and in the determination of social backgrounds and follow-up home visits.

### Early Detection of the Hearing Impairment

An efficient organisation for the early detection of hearing defects, preferably at the age of 6-7 months, is very important. At the moment it is usually the parents or the family doctor who first discover that the child has a hearing defect, very often too late, and even then the exact diagnosis and treatment are delayed, due to ignorance. Both the public and the medical profession should be informed about the importance of early diagnosis, and the very much improved outlook for these babies if they receive treatment at this early stage.

For the early detection of hearing defects, we are making use of the existing health services. Public health officers, district surgeons, social workers and nursing sisters, with special training in simple screening tests, should examine the hearing of all babies at Child Welfare Clinics. When the tests suggest a possible hearing impairment, the child should be referred to the audiological clinic.

We offer a course in basic acoustics, anatomy and the physiology of hearing, the classification, causes and treatment of deafness, especially the causes of congenital deafness, and the modern approach to the problem, followed by practical instruction in screening for hearing defects in babies and young children. During 1973 this course was attended by the postgraduate students in medical social work at the University of Stellenbosch, the nursing sisters taking the National Diploma in Public Health at the Cape Technical College and at the College for Advanced Technical Training, and the personnel of the Child Welfare Department of the City of Cape Town, health visitors as well as doctors (approximately 150 students). This training has now been incorporated in the curriculum for the National Diploma in Public Health, so that in future all health visitors will be able to do screening tests.

We are fortunate in having the enthusiastic support of the Chief Medical Officer of Cape Town and his Department of Child Welfare, and now the hearing of all babies born in the municipal area of Cape Town will be tested at the age of  $\pm 7$  months ( $\pm 24\ 000$  yearly). We have been promised the same co-operation by the Chief Medical Officer of the Child Welfare Department of the Divisional Council. During 1974 a beginning was also made with

the training of their personnel, and within the foreseeable future we hope that similar screening tests will be done all over the Cape Province.

The concept of mobile audiometry units, to my mind of very limited use on their own, could be applied to great advantage within a comprehensive organisation, as described here.

Moreover, our organisation should also make provision for the testing of babies who, owing to a different social and economic background, may not attend the Welfare Clinics. By means of intensive propaganda, we could reach a situation where all parents, doctors, or whoever may be concerned, should know that, just as it is an accepted and normal practice for all babies to be inoculated against smallpox and other diseases, so the hearing of all babies should be tested at the age of 6-7 months. Any suspected cases should then be referred to the audiological unit.

### Examination at the Clinic

Here the baby is examined thoroughly, clinically as well as audiological. In doubtful cases, the hearing may be tested by means of modern sophisticated methods such as evoked response audiometry, or better still, with the aid of a more recent development, electrocochleography. In these tests acoustical stimuli are supplied, and the electrical responses are picked up at the various levels of the nervous system which are concerned with hearing, for processing by a computer, and thus the threshold of hearing is determined. Electrocochleography, where the responses are picked up in the auditory nerves, may be done under a general anaesthetic. This has the advantage of simplicity, and promises to be a most useful method for the objective testing of hearing in babies.

If a hearing defect is detected, a line of treatment is adopted. Active medical and surgical treatment is necessary in quite a proportion of cases; otherwise audiotape therapy is initiated.

The next very important step is examination by the psychologist to determine intellect, emotional make-up, developmental status etc. Then the child is referred to the Department of Paediatrics for total assessment, which includes physical, neurological, mental, emotional and developmental status. This department has the co-operation of the Departments of Clinical Psychology and Psychiatry. The social background is investigated by social workers attached to our department.

### Parent-Infant Programme

At this stage, the co-operation of the parents is obtained. It is explained to them how a normal baby learns to hear and to talk, and that their deaf baby could do so in the same way. The mother is the more important person in this approach, because she is responsible for ensuring that her baby will hear normal sounds and speech under all natural circumstances, and that he will learn their association with objects and actions. The use and the role of the hearing aid is explained to her. As soon as possible a hearing aid is supplied, preferably with connections to both ears — or perhaps two hearing aids. Special ear inserts are made and replaced every few months, to ensure that they fit properly.



From this time, the mother and her baby visit the otologist at regular intervals to discuss any problems, and to make sure that she fully understands and applies all the principles of the treatment programme in every respect, and under all circumstances. It is very important to encourage her, and to explain that, whereas a baby with normal hearing takes two years to start speaking, her deaf baby will take longer. Unlimited patience is required.

In the meantime, the mother and her baby are in the constant care of the paedo-audiotherapist, not in a hospital atmosphere, but in a separate therapy home, which, although somewhat altered for its special purpose, represents the ordinary, normal household. The paedo-audiotherapist takes the mother and child from room to room, even into the garden, explaining to her how she should fully exploit every possible domestic situation to convey to her baby the meaning of sounds and sentences, and their relation to objects and actions. In the first instance, emphasis is on the use of the child's residual hearing, but at the same time he is also taught to make use of lip-reading.

This treatment takes place several times per week. The privacy of these individual sessions gives the mother the opportunity to discuss all her problems with the therapist in a relaxed and intimate atmosphere. However, group meetings, where mothers can discuss their common problems and offer solutions, take place weekly. Once a month the fathers are also included in a parent meeting, when they attend lectures on topics of special interest to them.

Mothers and babies from country districts are housed in a special home while they take an intensive course of several weeks' duration, in the handling of their babies. At regular intervals they return there for refresher courses, and for more advanced courses.

### Pre-School Group Therapy

At about 2½ - 3 years of age, the next step is more systematic treatment, in small groups. For this purpose there is another separate complex, which consists basically of 6 specially constructed classrooms, and the necessary accessories such as observation rooms, individual therapy rooms, etc. Nursery school teachers and speech therapists specially trained for this stage, handle the children in small classes.

Since it is essential that in these classes one should also have children with normal speech and hearing to supply the necessary sound stimulation, our pre-school classrooms are attached to the crèche in the hospital grounds, which is attended by a large number of small children of varying ages. In the classrooms deaf patients mix with normal children on a planned basis, and mix freely on the playing grounds of the crèche. Not only does this supply the necessary sound stimulation, but it goes a long way to ensure the acceptance and integration of deaf children among hearing children and into general society. For the same purpose they are taken on excursions into the streets, shops, cafés, parks, the zoo, etc.

The time spent in pre-school classes serves as a period of diagnostic treatment of deaf children, where their

development can be watched carefully before a final decision regarding their future is taken. This stresses the extreme importance of avoiding too early or too rigid a classification of deaf children into definite categories.

In the pre-school classes the diagnosis of aphasia, in those with normal hearing, is confirmed, and special treatment is instituted.

Attached to the crèche is a modern nursery school for children with normal hearing. As far as our general organisation is concerned, this is a favourable factor, since, with their co-operation, it is possible to transfer some of our little patients there when this should be deemed timely and advantageous to their development.

The progress of each pupil is carefully watched and recorded by means of tape — or better still video-tape-recordings, and their speech and language development is checked at regular intervals by our speech therapists.

When the time comes, joint discussions must take place between the staff of the audiological department, the parents, and the education authorities, to decide on the best planning for the child's educational placing. The patient has now become a pupil, and the responsibility for his further habilitation and integration into society rests with the school authorities.

### Educational Placing

It should be stressed that an early medical approach to the child with impaired hearing and early pre-school treatment have a decisive influence on the future possibilities and pattern of education of such a child. For the first time we are able to supply comprehensive facilities for early detection and pre-school treatment on a provincial scale in the Cape Province. I feel sure that similar facilities are going to be organised in the other provinces in the near future. It should be reiterated that in school placement the deciding factor is not the degree of hearing loss as measured in decibels, but the extent to which the child has acquired natural speech and communication, and this depends to a great extent on whether the child has had early pre-school treatment. Thus patients with a hearing loss, who would previously certainly have been classified as being profoundly deaf, and suitable only for schools for the deaf, will, with the above approach, become educable within the normal school structure. Examples are patients who are progressing well even at university and in professional work, with hearing losses at speech frequencies of between 80 and 100 decibels. One has a loss of 90 - 100 decibels for the speech frequencies in one ear, and no hearing at all in the other.

It follows also that when, by early diagnosis and treatment, a child has been given the opportunity to learn to hear and to speak, his future educational programme should be based on the same principles as those for children with normal hearing. If special classes or schools are needed, these should be attached to a normal school. Under no circumstances should they be attached to a school for the deaf, where completely different educational principles apply. Moreover, these children should not be isolated into hard-of-hearing groups in special hostels.



Accommodation should be arranged in normal hostels, or with private families.

With the approach described above we believe that we shall be able to hand over to the educational authorities a high proportion of deaf children who will be able to receive their education within the normal school structure, in normal nursery schools and thereafter in ordinary schools, perhaps with the help of a visiting or residual teacher for the hard of hearing, or in special classes attached to normal schools, or, if necessary, possibly temporarily, in a special school for the hard of hearing, which should however be within the structure of normal education and which, to facilitate co-operation, should be under the same control as ordinary education.

We believe that with early diagnosis, and the utilisation of the vital early period of readiness to hear and to talk, only a small percentage of deaf children with normal intelligence will have to attend schools for the deaf. However, it will be necessary for patients with perhaps even a relatively slight hearing loss, who, as a result of other causes, e.g. low intelligence, brain damage, multiple handicaps, bad socio-economic background, late discovery and lack of adequate pre-school treatment etc. fail to develop sufficient communication through natural channels. They will have to receive their education in schools for the deaf according to the special principles and methods developed there.

There is no competition between the paedo-audiological clinic and our pre-school programme and the schools for the deaf. We handle the child with impaired hearing at an earlier stage than usual, and whenever it becomes apparent that a particular child would be best placed in a school for the deaf, we do not delay in referring him there. The closest co-operation with such schools is essential.

### **The Importance of Co-operation**

The importance of co-operation and teamwork cannot be sufficiently stressed. The solution does not lie in the hands of the otologists, audiologists, speech pathologists and therapists, or the teachers in normal or special schools, but in the co-ordinated efforts of all these facilities. Whereas emphasis in the handling of the early stages undoubtedly falls on the medical specialist and his bio-medical co-workers, they must have the co-operation of the educationalists, on whom the emphasis later falls, and who should at all times be assured of the continued assistance of the former, especially in the case of patients with multiple handicaps, like deaf blindness, minimal brain damage, etc.

The success of the modern philosophy in the habilitation and integration into normal society of the child with impaired hearing, depends on the meticulous application of the right principles by all specialities concerned. This does, however, necessitate re-examination and re-organisation of some of the traditional approaches to the problem. A positive approach should be adopted to make it possible for as many as possible of the children with impaired hearing to receive their education in the normal school structure. Educational authorities must see to it that normal schools are properly equipped with all the necessary

facilities and staff to do full justice to specific educational needs.

### **Present and Future Planning**

It is disillusioning that, apart from the two university training hospitals in Cape Town, the hospitals in the other regional centres, Port Elizabeth, East London and Kimberley, have no audiology departments, and practically no audiology services. Pre-school clinics and classes exist in East London and Port Elizabeth where they are run under the auspices of the local Societies for the Deaf. They do excellent work on a limited scale, but suffer acutely from the lack of funds and sufficient suitably-trained staff. We are in the process of extending the organisation for comprehensive audiological services to these regional hospitals.

The corner-stones of so comprehensive a service are the audiological departments in these hospitals, which supply adequate equipment and staff to do basic audiological examinations, essential for clinical medicine.

They should also control the supply of hearing aids and subsequent rehabilitation programmes.

With the newly-passed legislation for the control of industrial noise and compensation for noise-induced deafness, the demand for audiological services in the bigger centres is going to be significant.

In and around these departments, an organisation for the systematic early detection of hearing defects in children should be developed. Problem cases could be referred for consultation to the audiology department at the Tygerberg Hospital. Otherwise, these regional departments should be responsible for the early treatment of these children, for parent guidance programmes, and for pre-school classes in their own areas.

In the Eastern Province, special problems arise because of the large Black populations in the homelands, where socio-economic backgrounds are completely different. The approach described in this memorandum will not necessarily be suitable in the beginning. Excellent use could be made of mobile clinics in the rural areas.

### **Training of Personnel**

It must be obvious that urgent priority should be given to the training of sufficient staff. More attention should be given to the teaching of audiology in our medical schools, at undergraduate as well as at postgraduate levels. In the near future, we hope to establish a degree course in speech pathology, speech therapy and audiology but as a matter of urgency we should start an intensive one-year course for a Diploma in Audiology, adapted on the lines of the diploma given at the University of Manchester. Suitable basic qualifications for this course could be a teacher's diploma (secondary, primary, kindergarten or nursery school), or a degree in psychology or logopaedics, as well as a degree in medicine.

With the planning described in this article, we shall, in the near future, be in the position to supply an adequate comprehensive audiological service in the Cape Province, and the same could be done in all provinces.