

## **Paparella: Volume II: Otology and Neuro-Otology**

### **Section 2: Audiology**

#### **Chapter 9: Rehabilitative Audiology**

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The evolution of Western man's attitudes toward deafness is perhaps most significantly reflected by his creation of arrangements and systems for the education of deaf persons. The history of our culture is marked by man's slow, faltering and, at times, haphazard, frustrating, and irrational struggle toward enlightenment, and the history of the education of the deaf is no exception to this general rule.

The notion that deafness and muteness depend upon a common abnormality and that the deaf were poor if not impossible educational risks persisted through medieval times. The Justinian Code (sixth century) classified the deaf and dumb as mentally incompetent, and the Rabbis of the Talmud classified the deaf with fools and children (second century BC). Cardano of Padua in the sixteenth century asserted that the deaf could be taught to comprehend written symbols or combinations of symbols by associating these with the object, or picture of the object, they were intended to represent. Dalgarno, in 1680, suggested the possibility of preschool education, and de L'Épée of France and Heinicke of Germany argued the merits of the language of signs and speech for the intellectual development of the deaf. Thomas Hopkins Gallaudet brought the French (language of signs) system to the USA, and Alexander Graham Bell applied a science of speech to teaching the deaf. Itard in France, and later Urbantschitsch of the Vienna Polyclinic and his student Goldstein of the USA, both otolaryngologists, suggested the values and techniques in training every residuum of hearing. Universality of educational opportunity for deaf children in economic opportunity brought on by the changing technology, have, by and large, become economically and socially productive men and women. This is an absorbing story that has been set down in many contexts by many writers and need not be elaborated here.

In the past three decades many factors, not wholly unrelated, have stimulated interest in education and rehabilitation of persons with impaired hearing. As we have seen elsewhere in this publication, they include development of refined electroacoustic instruments, particularly audiometers, to measure hearing loss; improvement of hearing aids; evolution of surgery for otosclerosis, and of reconstructive surgical procedures for the middle ear and cochlear implants; development of promising investigative techniques in psychoacoustics, auditory biophysics, biochemistry, physiology, and microanatomy; recognition of the problem of noise-induced hearing loss in industry and the armed forces and the growing issue of noise as a pollutant; awareness of hazards to hearing, such as heredity, unfavorable prenatal conditions, and perinatal stress or injury; and a growing public appreciation of the rehabilitative needs and the economic and social potential of handicapped persons.

Forward-looking management of persons with impaired hearing requires (1) dissemination of information about hearing impairment and acoustic hygiene; (2) early identification through a "high risk register", screening programs in clinics for babies and in schools, and thorough audiologic examinations prior to employment; (3) complete diagnosis;

(4) appropriate medical and surgical treatment; (5) thorough assessment of hearing after completion of all indicated medical and surgical procedures, with particular attention to educational and rehabilitative needs; and (6) appropriate measures such as hearing aids, speech reading, speech correction and conservation, manual communication, special education, vocational planning, and psychological guidance.

This simple statement of the important facets of the management of deafness should not cause us to underestimate its complexity, particularly when normal hearing is medically or surgically unattainable. We realize this when we ask the question, "What really is deafness?" Is it a number on a decibel scale that describes the severity of hearing impairment? Is it a disease like mumps or measles or meningitis? Is it an ankylosed stapes? Is it a piece of tissue in the auditory system that would be judged to be abnormal if viewed under a microscope? Is it an affliction to be conquered by the ingenious scientist? Is it the burden of a child whose parents hope persistently and fervently that the scientist will be successful, and soon? Is it a special mode of communication? Is it something that is encountered occasionally in the man or woman whose fingers fly and whose utterances are arrhythmic and strident? Is it a cause to which diligent, skillful, and patient teachers have committed themselves for generations? Is it the agony of isolation from a piece of the real world? Is it the joy of accomplishment that mocks the handicap? Is it the bright mind and the potentially capable hands for which the economy has no use because they are uncultivated? Is it a crystallization of attitudes of a distinctive group whose deafness, modes of communication, and other associated attributes such as previous education that they have in common, cause them to band together to achieve social and economic self-realization? Of course, it is all of these and more, depending on who asks the question and why.

In seeking the answer to the question, all of us have our own motives, our own purposes, and our own responsibilities. The public official is concerned with the magnitude and severity of the problem, ways of organizing to solve it, legislative needs, and costs; the physician and the investigator study the causes and pathology of deafness, its "psychology" and its management; the educator considers the physical plant, personnel requirements, and methods of instruction and communication; the rehabilitator is sensitive to training and job opportunities; and the deaf person himself and those close to him seek the opportunity for him to be all he can and wants to be. As in the legend of the three blind men, it is difficult to perceive and comprehend the whole elephant. The focus of this chapter is on rehabilitative audiology, the management of irreversible deafness.

### **Classes of Hearing Handicap**

Many persons, both children and adults, suffer from impaired hearing. The handicaps that arise from this are economic, educational and, above all, social. These persons need help, both medical and educational.

In order to plan facilities for the medical treatment, rehabilitation, and special education required by those with impaired hearing, we must know how many persons with hearing problems there are in various age groups and in various communities. In addition, we must know the severity of their handicaps. Those who are profoundly deaf or have a severe handicap must be distinguished from those who are moderately hard of hearing, and these must all be distinguished from those who suffer only from the inconvenience of a minor

handicap.

The first step in making such distinctions is to divide hearing impairment into categories of handicap. The Committee on Hearing and Equilibrium of the American Academy of Ophthalmology and Otolaryngology recommends the division of the handicap of hearing into classes or grades, according to Table 1. The overall handicap of impaired hearing is best estimated in terms of ability to hear everyday speech well enough to understand it, but for statistical purposes the more precise measurements of pure-tone audiometry are preferable. This table defines each category in terms of pure-tone audiometric measurements such as are regularly made in surveys and tests of hearing, since it is possible to estimate a person's threshold of hearing for speech reasonably well from pure-tone measurements.

Specifically, each class in Table 1 is defined in terms of the average hearing threshold level for three audiometric frequencies that are important for the understanding of speech. The numbers represent the simple average of the hearing threshold levels in decibels (dB) at the frequencies 500, 1000, and 2000 Hz, obtained with an audiometer that is calibrated according to the recommendation of the American National Standards Institute (ANSI).

**Table 1. Classes of Hearing Handicap**

Hearing Threshold Level dB (ANSI)	Class	Degree of Handicap	Average Hearing Threshold Level for 500, 1000, and 2000 Hz in the Better Ear*		Ability to Understand Speech
			<i>More Than</i>	<i>Not More Than</i>	
25	A	Not significant	25 dB	25 dB	No significant difficulty with faint speech
40	B	Slight handicap	25 dB	40 dB	Difficulty only with faint speech
55	C	Mild handicap	40 dB	55 dB	Frequent difficulty with normal speech
70	D	Marked handicap	55 dB	70 dB	Frequent difficulty with loud speech
90	E	Severe handicap	70 dB	90 dB	Can understand only shouted or amplified speech
	F	Extreme handicap	90 dB		Usually cannot understand even amplified speech.

\* Whenever the average for the poorer ear is 25 dB greater than that of the better ear in this frequency range, 5 dB are added to the average for the better ear. This adjusted average determines the degree and class of handicap. For example, if a person's average hearing threshold level for 500, 1000, and 2000 Hz is 37 dB in one ear and 62 or more dB in the other, his adjusted average hearing threshold level is 42 dB and his handicap is Class C instead of Class B.

With a given audiometric hearing threshold level some persons will understand speech more easily and accurately, and others less easily and accurately, than is indicated in the table. Intelligence, quickness of perception, special training, general education, language background, motivation, ability to understand, and time of onset of hearing impairment all contribute to the degree of an actual handicap. Any impairment of the central nervous system

may greatly complicate the situation. Any one or several of these various factors may be vital in determining a person's overall economic or educational potentialities.

### Definitions of Hearing Disorders

It is important here to clarify the definitions of deaf and hard-of-hearing children as they are discussed in this chapter.

A great deal of unnecessary confusion among the laity and well-intentioned professional workers alike has surrounded the precise classification of hard-of-hearing and deaf children and, unfortunately, has frequently obfuscated discussions of their problems. The confusion seems to grow out of the differences in frameworks of reference to which classification and nomenclature are related. For example, some workers classify the child who develops speech and language prior to onset of deafness as "hard of hearing" even though he may not be able to hear pure tones of speech at any intensity. This child, it is argued, unlike the congenitally profoundly deaf child who has not acquired speech naturally, behaves as a hard-of-hearing child in that his speech is relatively natural or "normal" and, therefore, he should be classified as "hard of hearing". It is obvious that a not too precise educational standard has guided the labeling if not the definition of the child. If, however, we consider the same child from a purely physiologic standpoint, it is grossly misleading to term him "hard of hearing" when for all practical purposes he hears nothing at all.

The situation is complicated further by the use of terms that suggest not only physiologic, communication, and educational factors but also gradations of hearing level and time of onset. To this category belong such terms as *deaf and dumb*, *mute*, *deaf-mute*, *semideaf*, *semimute*, *deafened*, *partially deaf*, and others. These terms are of little value from the physiologic, communicative, or educational points of view, and it would be well to eliminate them from general usage.

Of course, the time of onset of deafness affects the psychological and educational developmental patterns and should be borne in mind in labeling and classifying a child. For purposes of this chapter we need to define the child in terms of his educational and psychological potential. A useful point of departure is a set of general definitions recommended by a special committee of the Conference of Executives of American School for the Deaf:

*Hearing impairment:* A generic term indicating disability that may range in severity from mild to profound; it includes the subsets of *deaf* and *hard of hearing*:

A *deaf* person is one whose hearing disability precludes successful processing of linguistic information through audition, with or without a hearing aid.

A *hard-of-hearing* person is one who, generally with the use of a hearing aid, has residual hearing sufficient to enable successful processing of linguistic information through audition.

The distinction between hard-of-hearing children and those whom we have termed deaf is not always entirely clear. The reason is that individual children may differ greatly in the

use that they are able to make of the remainder of their hearing. It is not simply a matter of hearing level for speech but also of such different factors as the age of onset, severity and type of hearing loss, intelligence of the child, amount of training that the child has had, age at which the training was begun, and the child's auditory and language environment. As we have learned from experience with "culturally disadvantaged" children who hear, an impoverished language environment retards development of skills of communication, a condition that is difficult to remedy when the optimum time for acquisition has been passed. It is a matter also of the attitude of parents and their degree of understanding of the significance of the hearing impairment.

Some objects vigorously to the restricting influence of the definitions and classifications of impaired hearing contained in these proposals of the Conference of Executives and others. They maintain that the continuing increase of fundamental clinical and therapeutic audiologic knowledge precludes any "static categorization". For example, study of the thresholds of tolerance for speech and for pure tones has suggested that there is a useful portion of the auditory area even beyond the range of conventional audiometry. Some individuals who have therefore been termed "totally deaf" as a result of audiometric tests may be reached by auditory stimulation using proper amplification. And it may prove to be more fruitful to classify the person with a physical disability on some psychological scale of behavior that expresses how he or she lives with his disability.

We are aware that delimiting definitions are hazardous, and we recognize that each child's capabilities must be assessed individually by the best methods available to us so that we are not constrained by the need to classify.

### **Prevalence of Hearing Disorders**

In general, disorders of hearing which are socially and economically handicapping are of three varieties: (1) loss of sensitivity so severe as to be classified as deafness; (2) loss of sensitivity which imposes only a partial handicap so that the patient is classified as hard of hearing; and (3) dysacusic disturbances in which garbled hearing is the primary symptom.

Analysis of numerous surveys, particularly those of the United States Public Health Service (1969), suggests the following main points:

1. There are approximately 236,000 deaf individuals of all ages and both sexes in the USA today.
2. Approximately 6,000,000 Americans have partial hearing impairments of handicapping degree that are bilateral.
3. An additional 2,500,000 or so have significant unilateral hearing loss.
4. Among school-aged children there are about 52,000 in schools or programs for the deaf, about 100,000 more requiring intensive special management, and about 250,000 more who are auditorily handicapped to an important degree in the school environment.

5. About 700.000 persons suffer a combination of at least some degree of handicapping hearing deficit and some degree of handicapping visual problem.

6. Handicapping hearing losses are particularly prevalent in the older age group, and here they are more frequently combined with visual disabilities.

7. No reliable general data are available on the prevalence of hearing losses by cause, on the distribution or the patterns of losses, or on the incidence of dysacusis. In the case of deaf children, however, the leading congenital causes are maternal rubella (18.9 per cent) and heredity (21.5 per cent). Meningitis (14.6 per cent) and otitis media (6.2 per cent) for acquired deafness.

## **Rehabilitation and Education**

The most helpful and generally acceptable measures for hard-of-hearing persons are hearing aids; auditory training, including instruction in speech reading and speech conservation and correction; and educational, vocational, and psychological guidance.

### **Hearing Aids**

The evolution, description, and selection of hearing aids are discussed in Chapter 6. It is important here to stress the need for training in the use of hearing aids. It is not likely that the hard-of-hearing adult or older child needs to be taught again to be aware of sound. On the other hand, gradual loss of hearing will be accompanied by a failure to attend to those aspects of sound that become more difficult to hear. Such patients, newly equipped with hearing aids, must not be sent out to unscramble for themselves the new buzzing confusion that is now with them. Attention to weak, not recently heard sounds must be focused, and gross discriminations must be carefully retrained. With higher frequencies again available, the telephone ring and the doorbell can be distinguished, but such discriminations may not be immediately obvious and therefore must be made part of a training program.

With respect to speech perception, several goals must be kept in view. Through audiometric and other testing, the clinician knows something of the character of the hearing loss. This information plus the results of ingenious analysis by master teachers will show which auditory cues are available to the listener, which can be made available through training, and which are not likely to be valuable at all. The emphasis here, of course, is on the individualization of the program.

Drills and exercises are particularly useful for adults, especially when the items contain contrasting elements based on cues that the patient is to learn. Recognition based on such cases must be carefully trained through several stages. At first the cue may be used in isolation and slowly enough that the listener can succeed. Then speed becomes important, especially as the cue is introduced into syllable and word contexts, such as *bed* and *red*. Finally, the availability of the cue must be demonstrated and trained as it occurs in the rapid exchanges of conversation. Teachers in many fields find that proceeding from easy, rewarded steps to the finer, more difficult ones will produce better learning with less frustration than when the most difficult and challenging aspects of auditory perception are introduced early.

All too frequently the promotional literature on hearing aids emphasizes the concealment of hearing loss. From the standpoint of rehabilitation, this may be one of the major abuses in the field of hearing impairment. A cardinal principle of good mental health is recognition of reality and adjustment to it. It is a disservice to handicapped persons to encourage them to evade reality. Audiologists are to be commended for emphasizing that the wearing of a hearing aid is a demonstration of courtesy, since it spares the wearer's associates and family from having to shout or repeat.

### Speech Reading

Speech reading, sometimes called lip reading, is the process through which a person understands speech by carefully watching the speaker. For hard-of-hearing persons it is an essential supporting skill. The eye and the ear together apparently are better than either one alone, and for this reason there has been emphasis in recent years on associating speech reading instruction with hearing and with auditory training. The need for post-surgical rehabilitative measures after cochlear implantation has focused much current attention on this kind of training.

The factors that contribute to speech reading ability have been suggested by experienced teachers, by investigators and by speech readers themselves. Jeffers and Barley (1971), in a thoughtful overview, have organized the factors and analyzed the research relating to them. They emphasized three primary factors. One is *perceptual efficiency*, which includes the ability to identify speech sounds or elements and to perceive them rapidly, and also the ability to gain information from the face when the focus is on the mouth. Associated with these processes are visual acuity and attention, speed of focusing, and peripheral vision. The second factor is *synthetic ability*, which includes the ability to identify parts and patterns (words and phrases) and the gist of a message. The third factor is *flexibility*, which fosters the ability to revise tentative identification of a message. Among major secondary factors are the amount and kind of training, language proficiency, motivation, and reaction to frustration and failure.

Associated with language proficiency is intelligence and also the extent and pattern of the person's impairment of hearing, its duration, and person's age at its onset. In general, investigations confirm the importance of visual perception, the ability to fill in missing words, and training. Language proficiency, as might be expected, is important for the speech reading skill of deaf children, but it seems not to be important for the adult population who already possessed language when their hearing failed. Duration of hearing impairment seems to be important, but the influence of hearing level is not clearly established.

Spoken language is a rapid succession of utterances that are composed of some forty-odd meaningful sounds of varying degrees of visibility. The speech reader must be able to recognize all the visible movements, and she must fill in those that are invisible. Fortunately, sounds like "f" and "th" that are relatively difficult to hear are easy to see on the lips. Likewise, the sounds that are more difficult to see (like the short vowels) are easier to hear because they have more energy in the low- and mid-frequency range where the majority of hard-of-hearing people have useful residual hearing. The forty-odd sounds are produced by changing the shape of the mouth and the relative position of the tongue, teeth, lips, and jaw. It is these rapidly changing movements that the speech reader must observe and interpret. To

help her to fill in the gaps in what hears and sees, since only about one-third of speech sounds are clearly visible, the speech reader can learn to use the sensations that she imagines or actually feels in her own speech muscles as she watches the speaker.

Note what even an expert speech reader does when puzzled. He silently imitates the movements he sees. This imitation helps him to translate a visual image into a motor speech image, and usually gives him a valuable clue. This use of the muscle-feeling sense is a valuable training device.

Spoken language is not entirely visible. Sounds like "f" and "th" are rather easy to see on the lips but sounds like "k" and "g" are not. Furthermore, some sounds look alike, such as "p" and "b", so that "pan" and "ban" can be confused. But just as we do in listening, we must make use of contextual clues. The speech reader needs to do more of it.

Perry and Silverman, in *Hearing and Deafness* (1978), make the following practical suggestions to the speech reader:

1. Only the person with a hearing handicap can overcome it. Teachers and friends cannot do it for you; instruction and guidance merely point the way for you own application to the task.

2. Your continual practice of speech reading in daily contacts will help you develop the skill to carry on a normal life comfortably.

3. Remember that hearing is the natural and normal way to understand speech. Thus the hearing-impaired should learn to make the best use of an appropriate hearing aid.

4. Combine looking and listening to provide better understanding of speech, with less strain, than with either used by itself.

5. Keep relaxed, but remain alert and tuned in.

6. Anticipate what may be said, but be ready to shift as the message develops.

7. Do not expect to get every word. Follow along with the speaker, and key words will enable you to put two and two together.

8. Develop a sense of humor so that inevitable mistakes are not regarded as set-backs.

9. Confront the fact of a hearing loss honestly, and do not attempt to hide it from others. They will know that some problem exists, and it's better to tell them the truth than to leave them bewildered or to let them arrive at their own mistaken conclusions.

10. Inform others that their best way to help is by quiet natural speech. When they shout, exaggerate lip movements, cover their mouth, or talk to you from the next room, it is your responsibility to educate them; in the first two instances they are only trying to help, and have no idea they're actually making it harder for you.



11. Stage-manage situations to facilitate speech reading whenever you can. A good light on the speaker's face is important, but avoid facing a bright light yourself. Keep about 6 feet between you and the speaker, so that you can observe the entire situation.

12. Consider the noise factor when choosing where you will carry on conversations. It is easier to hear in smaller rooms with upholstered furniture and sound-absorbing materials on the walls, ceiling, and floor. This is particularly true if you wear a hearing aid.

13. When joining a group, try to determine the topic of conversation immediately. Friends can be coached to give an unobtrusive lead, such as, "We are discussing the housing problem".

14. Keep abreast of national and local current events. You will be a more interesting conversationalist and will be better able to follow the comments of others.

15. Remember that conversation is a two-way affair. Do not monopolize it in an effort to direct and control it.

### **Speech Correction and Conservation**

The major speech problem with hard-of-hearing persons is correction and conservation of speech. They do not hear speech and speech patterns clearly and therefore have a poor model for imitation. Depending on its kind and severity and time of onset, hearing impairment can affect articulation, loudness, voice quality, and patterning.

Articulation is concerned with the production of phonetic elements and transitions between them. In the case of sensorineural deafness, for example, such sounds as "s" are difficult to perceive and, because there is little motor-kinesthetic feedback, the sound is frequently omitted or distorted. Loudness of speech is often affected in cases of conductive impairment. His own speech sounds abnormally loud to the talker and, hence, he drops his voice and can hardly be heard under conditions of listening stress. In cases of long-standing sensorineural impairment, voice is poorly modulated and is generally characterized by abnormal fluctuations in loudness and by harshness and stridency. Patterning, which refers to intonation, accent, and stress, can also be distorted. Even if these deviations in speech are not present when hearing impairment is first observed, it is helpful to begin speech work to conserve normal speech.

### **Educational, Vocational, and Psychological Guidance**

We need to know the interests, aspirations, aptitudes, abilities, and limitations of the individual. To provide guidance for hard-of-hearing children and adults, one should be aware of the possibilities of education and rehabilitation to reduce the limiting effects of the hearing handicap.

Two paradoxes soon become evident to the counselor working in guidance with congenitally hard-of-hearing persons. One is that as a group they often have much more in common with the deaf than one would have thought prior to having actual experience with them. This is particularly true in terms of educational achievement, language skills, general

knowledge, and certain behavioral patterns. Second, the hard of hearing seem to reflect more psychological disturbance than the deaf. They frequently share the problem of marginal people in any group, that of identification. The person born hard of hearing may not be able to find full acceptance among those with normal hearing or the deaf. Whereas association with the hearing ideally offers a wider range of friends and interests, it may be the price of frequent rejection or a subservient role. Association with the deaf is sometimes perceived as psychologically threatening in the sense that deafness is a magnification of their own real or perceived deficiencies. Furthermore, the small number of totally deaf people restricts the opportunities for identification with them.

The problems of vocational guidance of hard-of-hearing persons that are different from those encountered with those with normal hearing or with the deaf are most often manifestations of identity conflict. Effective guidance and counseling is, therefore, often a long-term process aimed at fundamental changes in the person's self-image. Rarely is such service provided hard-of-hearing persons. Consequently, it is common to see them go through life overcompensating for their hearing loss or magnifying its significance, both of which lead to vocational and personal dissatisfaction.

Educational guidance for hard-of-hearing children should recognize the particular needs listed in Table 2. With proper recognition of the difficulties and with appropriate auxiliary aid, children whose hearing impairment is from less than 40-dB loss to a 70-dB loss (groups 1, 2, and 3 in Table 2) and some in group 4 may be placed in a special class for hard-of-hearing children within a public school system or in a regular classroom. Where the child is placed depends on the amount and time of identification of hearing loss and the availability of special help. The latter includes special classes, itinerant teachers, and speech and hearing clinics in a university or hospital or provided by a community service for hard-of-hearing persons.

**Table 2. Oral Educational Needs of Children With Impaired Hearing**

<b>Group</b>	<b>Hearing Level</b>	<b>Educational Needs</b>
1	Less than 40 dB	Speech reading and favorable seating.
2	41 to 55 dB	Speech reading, hearing aid (if suitable) and auditory training, speech correction, and conservation, and favorable seating.
3	56 to 70 dB	Lip reading, hearing aid and auditory training, special language work, and favorable seating or special class.
4	71 to 90 dB	Probably special educational procedures for deaf children with special emphasis on speech, auditory training and language, with the possibility that the child may enter regular classes.
5	More than 90 dB	Special class or school for the deaf. Some of these children eventually enter regular high schools.

At all levels total communication, or emphasis on manual communication, may be the method of choice.

There is no agreement on the existence of a set personality structure for hard-of-hearing children; in general, as already stated, they need to be made aware of their handicaps, and as Ramsdell suggested in *Hearing and Deafness* (1978), "The most successful adjustment is the one that overrides and submerges the handicap in normal activities centering outside one's self".

## **Deaf Children and Adults**

### **Early Management of Deaf Children and Parental Guidance**

When we consider deaf children, we must realize that special techniques are necessary to build the skills of communication. The essential and primary channel for receiving the acoustic symbols we call speech is either absent or severely restricted. All the skills of communication that depend on learning over this channel are adversely affected. From infancy to early school age, the chief mode of communication for the normal-hearing child is auditory. The child hears and learns to talk from what he hears. Furthermore, he not only learns how to communicate, he also learns what to communicate.

The encouraging progress in the identification and assessment of young children with hearing impairment has emphasized the value of early management. The period from birth to the age of 5 is particularly critical for the learning and development of children, whether hearing or deaf. Since the young child with hearing impairment is denied many of the normal experiences that lead to adequate development of communication, it is essential that he be given help and opportunity to reach his potential as early as possible. This means not only a program for the development of the skills of communication, but also a regimen that removes, wherever possible, the barrier that isolates the child from the world about him. Formal and informal intercommunications (by whatever means) tend to lessen the child's feeling of apartness and to make him feel wanted and significant. The child is thus motivated to communicate, and it is the task of the parent and the teacher to show him the usefulness of speech and other means as tools of communication.

The increase in efforts for early identification and the growing confidence in its validity have resulted in the development of many programs of parent guidance, particularly those related to infants and young children. There appear to be no universally accepted specific aims or procedures in guiding parents; the emphasis vary. For some the primary aim is to create realistic "acceptance" of the child's condition, and the counseling is weighted in the direction of psychotherapy. For others the stress is on conveying information in order to create an understanding of sensory deprivation and its effect on the total development of the child in general and of the child's communicative deficit in particular.

When parents become aware that their child is deaf, their initial reaction is usually one of profound grief. It is not pleasant to learn that one's child is deaf and that it is hopeless to expect a restoration of the child's hearing. Unfortunately some parents refuse to face this fact and being a pilgrimage from one physician to another, always hoping for a miracle and not heeding advice about the necessity for special education.

Other parents surround the deaf child with an overwhelming, protective "love" to compensate for his deprivation; they dress him, feed him, amuse him, and shield him from

contacts with other children. The child is thereby deprived of opportunity for normal development and his education is delayed.

Sooner or later all parents realize that special education is necessary; but here they are bewildered: "My child is deaf, but what do I do next?" Pediatricians, otologists, educators, and audiologists can help them to make the educational arrangements best suited to the child's needs. Children, schools, and communities differ, and no single answer is correct for all deaf children in all places. The actual choice of a particular school is often difficult.

Perhaps the most significant fact about the education of the deaf in the USA is that it is universally available to all deaf children of school age. Of course, the quality of education may vary, but it is important that no child need be denied an opportunity for it. Where are these opportunities available?

About 30 per cent of 60,000 deaf children attend public residential schools for the deaf. These schools, open to qualified children without charge, are supported either directly or indirectly by state tax funds. Most of the public residential schools are supported by legislative appropriation and, hence, come under the control of the state authorities. The educational services of the remaining schools are purchased by the states on a per diem or per capita basis and are controlled by their own boards.

Other tax-supported institutions for the deaf are public day schools, classes and programs enrolling about 65 per cent of the children. The remaining children are educated in denominational or private schools. Such schools may be either day or residential. The number of children in each class ranges generally from five to ten. Some deaf children have been absorbed into classes for the hearing. Some deaf individuals attend high schools and colleges for the hearing. Most public residential schools provide education at the secondary level, and higher liberal arts education exclusively for the deaf is available at Gallaudet University, Washington, DC. Technical postsecondary education is provided at the National Technical Institute for the Deaf, which is an integral part of a larger technical institute for the hearing, the Rochester Institute of Technology, Rochester, New York. A number of other post-secondary school programs are also available.

Until we have more evidence to support the point of view of either the day or the residential school, we must study each child's situation thoroughly to determine what educational placement is likely to be most fruitful for him.

The figures given above have been changing due to the passage in 1975 of Public Law 94-142, which specifies rights and protection of handicapped children. It mandates free public education in a least restrictive environment and provides due process appeal by parents if placement of a child in a particular educational setting is at issue.

Once a school for the deaf child is selected, the "long pull" begins for the parents - the extended period of learning how to work most effectively with the school throughout the child's educational career. Parents are more apt to enter willingly into this important period if they feel that their earlier grief and bewilderment have been recognized, sympathetically understood, and met with kind and clear counsel. Here a heavy responsibility lies upon the school: first, to recognize the nature of the strong emotions that surround the relationship of

the parents with their deaf child; and second, to develop home cooperation through constructive and informative reports and by encouraging frequent visits to the classroom.

Parents must create every opportunity for the child to employ and practice at home the communication that he has learned at school. They can assist materially in developing the child's speech, in enriching his vocabulary, and in translating his experiences into meaningful language. If the child is at a residential school, contacts with home should be maintained by letters and photographs; news from home is very essential to the deaf child's happiness. Reports from the teachers must keep the parents informed concerning the child's progress.

As the deaf child reaches adolescence, his basic needs are the same as those of other children. He must soon be ready to earn money, to make decisions, to associate with the opposite sex, and to compete with the hearing. The schools and the home must prepare him for this broader environment.

Teachers, parents, and school executives must also cooperate in the selection of a school or program for further education or for vocational training. Many variables affect these decisions: the age of the child, her intelligence, her academic record, her interests and skills, the schools available, and the vocational opportunities in his community.

When the parents are able to observe the fruits of their long labors, they experience the comforting satisfaction that their efforts have played a tremendously significant role in the hoped-for adjustment of their child. Parents should not overlook their debt to the teachers, whose wisdom, patience, and understanding have made possible the deaf child's development and growth.

## **Education of Deaf Children**

### **Goals of Education of the Deaf**

Although there is little disagreement about the management and education of hard-of-hearing children, there is a controversy about the formal education of deaf children.

How one attempts to educate deaf children depends on the goals that are set for them; these goals are, in turn, determined by what is considered the overall potential of the deaf child - educational, psychological, and social. From views and practices of those concerned with education of deaf children, three schools of thought emerge.

One group stresses the limitations imposed by deafness, such as exclusion from certain types of employment, the implication of a minority status in education and social contexts, the difficulties of learning speech and speech reading, and the misunderstandings concerning the abilities and aspirations of deaf persons. The following statement best summarizes this group's viewpoint: "The aim of the education of the deaf child should be to make him a well-integrated, happy, deaf individual, and not a pale imitation of a hearing person; to produce happy, well-adjusted deaf individuals, each different from the other, each with his own personality".

A second school emphasizes the great potential for deaf persons for education and participation in a world of hearing people. This group stresses the importance of early education and of auditory training and emphasizes the objective of "normalization - deviating only insignificantly from persons with normal hearing". In essence there is "one world" in which the deaf person must function - a world of hearing and speaking people.

A third group points to the economic, academic, and social achievements of deaf persons among the deaf and the hearing as evidence that proper and early training enables the deaf child to realize his potentialities. It is apparent, however, that there are situations in which deaf people may always be marginal and that the approach to them should be influenced accordingly. Realism demands that parents, and the child himself, be spared the psychological distress that stems from failure to achieve an unattainable goal of "normalcy".

Until more facts are available, a rational attitude seems to point to a recognition that deafness imposes certain limitations that must be accepted, while at the same time proper education in its broadest sense strives to relate the deaf person to the world about him in a psychologically satisfying way.

Educators agree universally that every deaf child should have an opportunity to communicate by oral speech. Some educators advocate supplementing oral instruction with other forms of communication, such as the manual alphabet or the language of signs. The manual alphabet, or finger spelling, is a method of forming letters from A to Z by certain fixed positions of the fingers of one hand. This is a form of "writing" in the air and, obviously, requires knowledge of the language that is being communicated. The language of signs is another form of communication. This is a system of conventional gestures of the hands and arms that by and large are suggestive of the shape, form, or thought which they represent. The "total communication" method attempts to make available speech communication, the manual alphabet and, sometimes, the language of signs or one of its adaptations to English and is influenced by the aptitude of the child and the context of the communication.

The "oral-manual" controversy is not yet settled. It is encouraging, however, that numerous investigations are under way to study not only the linguistic, conceptual, and intellectual effects of modes of communication but also their influence on features of personality such as emotional maturity and self-identity.

### **Development of Speech in a Deaf Child**

Speech for the deaf child generally is learned by a multisensory approach that utilizes visual, tactile, and kinesthetic, as well as auditory, stimulation. The emphasis on the use of a particular sense modality or combination varies with the amount of residual hearing and the age of child at time of instruction. The following factors are important in the attempt to develop oral speech.

1. An environment must be created for the child in which speech is experienced as a vitally significant means of communication. Oralism is as much an atmosphere, and an attitude, as it is a "method" of teaching.

2. Spontaneity of speech is encouraged, but formal instruction is necessary at the appropriate stage in development. Good speech in deaf children does not come of itself.

3. The proper combination of visual, auditory, tactile, and kinesthetic pathways should be exploited rationally and vigorously.

4. Judicious correction of poor articulation, and of undesirable rhythm and voice quality, is necessary. The acceptance of poor speech encourages its use.

5. Periodic evaluations of the social effectiveness of the child's speech is necessary for long-range educational planning.

### **Auditory Training**

Auditory training, with hearing aids, supplements other sensory experiences to improve the child's speech and his perception of others' speech. Out of experience grow the following guides for auditory training.

1. Most deaf children have a small, but useful, portion of residual hearing, and many who have been termed "totally deaf" can respond to amplified sound. Audiograms may not tell the whole story of a child's ability to appreciate speech through hearing. Formal auditory training, in addition to the use of a hearing aid, is essential to teach the deaf child to make use of this remnant of hearing.

2. Auditory training, even with a hearing aid, should be instituted as soon as it is determined that the child is deaf, and the training should be geared to his auditory capabilities. Deaf children can be taught to discriminate various environmental sounds, even though grossly; within limits, they can be made aware of speech sounds. The combination of auditory training and amplification creates experiences with sound that are meaningful and that make the hearing aid more acceptable.

3. Children should be taught as early as possible the use and management of their own hearing aids.

### **Speech Reading**

In the oral method of instruction, speech reading supplemented by amplified sound becomes the chief means of understanding spoken words. The following are aids to development of this skill in deaf children.

1. An atmosphere of oral communication must be created, and speech reading must be shown to serve a purpose.

2. Even if the child is not expected to understand every word of a spoken message, he or she should be talked to and should be encouraged to take advantage of situational clues. Some educators suggest combining speech reading with finger spelling.

3. Speech reading should be reinforced by other sensory clues whenever practical.

## **Manual Communication**

Following are suggestions for acquisition and improvement of manual communication:

1. Diligent practice is essential, especially for acquisition of receptive skills.
2. Observation of fluent spellers and signers is important.
3. In finger spelling, practice should emphasize words, not individual letters.
4. Signs should be practiced in sentences.
5. Sentences should be composed, not imitated.

## **Development of Language**

One of the most formidable tasks in the education of deaf persons is development of the understanding and expression of language. By ingenious techniques, teachers have been able to develop language in deaf children. Instruction recognizes the problems presented by vocabulary needs, multiple meanings, verbalization of abstract ideas, and syntactical complexity. The subtle relation between the acquisition of concepts and the language used to express them is undergoing intensive study by psychologists interested in the education of deaf children. The following guides are helpful in efforts to develop language ability in deaf children.

1. Language teaching should be related to significant and meaningful experiences of children. Teachers and parents must be alert to the ideas that are developing in the children so that they may provide the children with language with which to express them.
2. Language must constantly be made to serve a purpose for the child.
3. All sensory channels should be used to teach language.
4. Deaf children need formal, systematic aids to the acquisition of language. Many shun language when they feel insecure in its use.
5. Schools and homes should create an atmosphere where language is used and where books are read regularly.

In summary, the fundamental task of the teacher of children with hearing impairment is to analyze the information that he or she wishes to convey, be it speech, a word, or an idea, and to select the sensory channels and modes best suited to transmit the information to the child.

## **Vocational Rehabilitation Services**

Each of the 50 states, as well as the District of Columbia, Guam, Puerto Rico, and the Virgin Islands, have vocational rehabilitation programs that serve eligible deaf children.



The determination of eligibility and the actual extension of services are functions of the state vocational rehabilitation agencies. Eligibility rests upon the presence of a physical or mental impairment, the existence of a substantial handicap to employment as a result of the impairment, and reasonable expectation that vocational rehabilitation services will render the individual able to engage in a remunerative occupation or in an occupation more in keeping with his total characteristics. Eligibility also is ordinarily limited to disabled persons of working age, or nearly so.

Rehabilitation services are provided in accordance with a plan worked out by the client and his or her counselor, assisted by the vocational guidance team that is available. They may include, in any appropriate combination, the following services.

1. Thorough physical, mental, and aural examinations.
2. Extended evaluation, up to 18 months for a severely handicapped deaf person, to determine employment potential.
3. Communication development, including hearing aids, speech reading, speech correction and conservation, auditory training, reading, writing, the manual alphabet, and the language of signs.
4. Individual counseling and guidance, including attention to problems of personal adjustment as they influence employment.
5. Training for jobs - in school, on the job, by correspondence, or by tutor.
6. Maintenance and transportation during rehabilitation.
7. Necessary tools, licenses, and equipment.
8. Placement in the right job.
9. Follow-up to make sure that the rehabilitated worker and the job are properly matched.

This writer cannot improve on a previous contribution as an appropriate conclusion to this discussion.

*Although man has traveled a long tortuous road from pre-Christian era in evolving an enlightened understanding of the social problems of deafness, a large portion of society still looks upon the deaf and hard of hearing as queer, dependent, and, sometimes, ridiculous. We are all familiar with the cheap humor of which they are often the target. Since their handicap is not as visible as that of the blind and crippled, the deaf often find themselves in embarrassing and humiliating situations because others do not understand their special problems.*

*The answer of the deaf to such misunderstanding is to continue their social and economic achievements as self-respecting and productive individuals. Our social action for*

*the deaf, therefore, should not aim for special privileges for them, but should constantly strive to provide opportunity without discrimination for the deaf to help themselves.*

*The achievements of the deaf in the USA since the founding of the first school for the deaf in Hartford in 1817 have been good, but the record can be improved. This is the conjoint task of the teacher, the parent, the scientist, the physician, and of course, the deaf person himself".*