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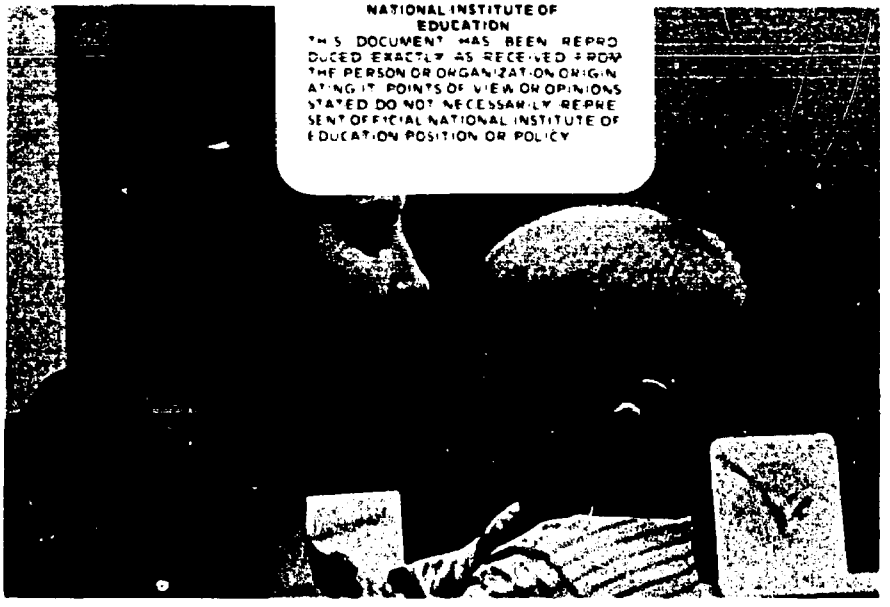
ABSTRACT

Included in the proceedings of a 1973 workshop on the education of deaf blind children are four papers on aspects of diagnosis and remediation. Roger Seelye discusses vision, visual anomalies, and the implications of low vision conditions such as cataracts, glaucoma, retrolental fibroplasia, and optic atrophy. The low vision aids workshop is summarized by George Gore who reported the demonstration of assessment and simulation role playing techniques. Mary Clare Boroughs considers issues of testing and provides a list of tests appropriate for multiply-handicapped children. Mary Gray reviews growth and development in terms of biogenetic, psychodynamic, behaviorist, sociological, ecological, and developmental organismic theories. Discussed in the paper by Janis Forbord are the nature of hearing disorders, how hearing is tested, the anatomy and physiology of the hearing mechanism, and amplification for the deaf and hard of hearing. Also provided are a developmental inventory suitable for children from 3 months to 9 years of age, a listing of gross motor skills of infancy and childhood with usual achievement ages, a listing of workshop participants, the workshop agenda, and the questionnaire and tabulated results used in a workshop evaluation. (DB)

WORKSHOP IN THE EDUCATION OF DEAF-BLIND CHILDREN



WORKSHOP PROCEEDINGS
JUNE 18 - JULY 20, 1973

MICHIGAN DEPARTMENT OF EDUCATION
MICHIGAN SCHOOL FOR THE BLIND

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WORKSHOP IN THE EDUCATION OF DEAF-BLIND CHILDREN

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LANSING, MICHIGAN

EDITED BY

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LANSING, MICHIGAN

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CONTENTS

Because of the large quantity of printed material presented to workshop participants during their daily lecture periods, only the papers of workshop presenters are included in the proceedings.

VISION, VISUAL ANOMALIES, AND THE IMPLICATION OF LOW VISION

By
Roger R. Seelye, O.D., Consultant
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For nearly all animals, vision is an instrument of survival, but for most of them, from those who stalk the jungle to those who flee, it is little more than that. For man, however, vision is not only an aid to survival but also an instrument of thought and a means to the enrichment of life. Because man is able to see in a certain way, he has been able to create a written language that carries his message to large audiences and survives after the spoken word has gone.

Among all the living species, man has the most intricate visual system; a system that includes the eye and related parts of the brain, which permits him to organize and understand the increasingly complex elements of his environment. Because of his eye and his brain, man is able to ask certain questions and devise ways of answering them.

While there are many similarities among all eyes, man's visual system is closest to those of tree-climbing animals or the hunters. No doubt, this is because man's immediate ancestors came down from the trees where their eyes had become adapted for rapid focusing while swinging from limb to limb. The eyes of most tree creatures and ground stalkers face forward in their heads, so that their owners can look at a point with both eyes at once. These eyes also are equipped with aiming and focusing mechanisms for bringing the images of the two eyes together and integrating them in the occipital cortex of the brain, so that the picture we perceive is three-dimensional and in sharp outline.

Man's eyes have traded certain advantages for others. They are highly versatile and accurate, but certainly much less acute in vision than a hawk and have a much less wide sweeping range than that of a deer. They are not ideally suited for seeing underwater, or are they very efficient at night. Yet, with all t promises, they retain a staggering degree of adaptability and precision.

They are capable of extremely rapid movement, of instantaneous shifts in focus, of adapting to bright or dim light, of distinguishing colors, and of estimating distances, size, and direction of movement.

In order to understand the process of human vision and the imperfections that exist within that visual system, we first must understand basic ocular anatomy and physiology. The eye is an image-catching device. No matter how greatly the apparatus for seeing may vary from one kind of animal to another, vision is always the same in one fundamental respect: The process begins with light entering the eye and bringing with it the information it has picked up in touching or passing through the objects in its path. These light patterns travel through the various parts of the eye until the image is cast upon the retina in the back of the globe of the eye.

Getting a clear, intact image to the retina is no simple matter. First, the amount of light entering the eye must be controlled. If there is too much light, the image will be uncomfortably glaring; if there is too little light, the image will be indistinct. Next, the image must be focused sharply on the retina.

In the human eye, the tasks of controlling and focusing light are performed by a delicately engineered system of devices, whose coordination and ability to adapt to various conditions make the most sophisticated optical systems relatively simple in comparison. At the very front of the eye is the cornea, a transparent tissue rising from the outermost layer of the globe of the eye, the opaque, white, and elastic sclera. The cornea bends the light and is, therefore, part of the focusing mechanism. About 70% of the total bending of focusing of the light entering the eye is done by the cornea. Imperfections in the shape of the cornea caused by disease, injury, or developmental anomalies can sharply reduce a person's vision both in quantity and quality.

Behind the cornea is a clear fluid called the aqueous humor, which is

constantly being replenished as a part of an intricate circulation system within the anterior chamber of the eye. The pressure of the aqueous humor from behind helps maintain the shape of the cornea and also plays a part in focusing the light rays entering the eye.

Making up the posterior wall of the anterior chamber is the colored iris with its hole, the pupil, lying almost directly in line with the center of the cornea. The iris governs the amount of light entering the eye by increasing or decreasing the size of the pupillary opening.

After the light has passed through the cornea, aqueous humor, and pupil, it goes through the lens, which does the fine focusing for near or far viewing.

Finally, the light proceeds through a jelly like substance in the posterior chamber of the eye, known as the vitreous humor, which helps maintain the shape of the globe of the eye and bends or focuses the light rays a small degree, and then finally the light reaches the retina.

The globe of the eye is made up of three distinct layers. The outermost layer is called the sclera. It is characterized by its elasticity, opaqueness, and fibrous tough consistency. It serves to maintain the shape of the eye and helps hold the eye's structures in their proper relationship with each other.

The choroid, the middle layer of tissue, is made up of nearly all the vessels which supply the eye with its blood flow. The choriodal layer is continuous with the ciliary body which houses the muscular apparatus which controls the focusing of the crystalline lens by increasing or decreasing the tension on the zonular fibers which connects the lens to the surrounding ciliary body and holds the lens in its proper position. It is also continuous with the iris which controls the amount of light entering the eye.

The innermost layer is the retina, which is actually two separate layers. The retinal pigment epithelium lies firmly attached to the choroid and reflects

light into the retinal visual receptor layer which has its receptor cells facing outward instead of inward as logic might predict. There are three different types of receptor cells: 1. Cones, which are used for our most acute visual needs and color perception. 2. Rods, which are used for our night vision and peripheral vision. 3. Pupillary receptors, which control the dilation and constriction of the pupil by the amount of light falling on their sensitive heads. The light rays, which have mechanically been focused on the retina by the cornea and lens, are transformed into electrical signals and sent to the occipital cortex of the brain. The retinal surface is marred by veins and arteries laying on top of the retinal fibers and receptors. It also is marked with areas of greater or lesser sensitivity. Acute vision takes place only for objects seen straight on; their images falling on the fovea, a tiny pit in the center of a slight depression called the macula. Another spot on the retina is blind because it has no light-responsive cells. This is the point where the optic nerve fibers leave the eye. These are the fibers that carry the signals collected from the receptors of the retina to the brain for translation into what we know as sight.

Now that the structure and basic physiology of the healthy eye is known, we can better understand and appreciate some of the anomalies and defects of the eye caused by injury and disease. The signs, symptoms, and problems arising from these visual anomalies, as well as the means of providing these afflicted persons with improved vision, must be understood by educators of the visually handicapped. This will insure that these visually impaired persons can be provided with the maximum of educational opportunities with consideration of the severity and type of his or her specific visual impairment.

Cataract formation, both congenital and developmental, and the condition of aphakia created by the removal of the cataracts are major contributors to the area of low vision. A cataract is an opacification of the lens or its surrounding

capsule, a loss of transparency of the lens, developing as a result of altered physical and chemical processes in its colloids. A lens opacity is usually termed a cataract as soon as it produces some visual disturbance. Visual disturbance can be a blockage physically by the opacity or a refractive change induced by cellular edema, or swelling, producing interference with clarity of visual images. Cataracts may be produced by mechanical injury, osmotic influences, heat and cold, chemical damages, radiation, and diet deficiencies which are all developmental or induced changes.

The most common cause of cataracts to the educator of the visually handicapped is congenital in nature; the formation of cataracts by the toxic affects of Rubella or German measles. In 1940 there was a severe epidemic of rubella in Australia. It was found that babies born of mothers who had contracted rubella suffered from a number of congenital defects, chief of which were bilateral cataracts. Most of these babies were small, ill-nourished, and difficult to feed. A congenital heart lesion was present in the majority, and there was a high incidence of early deaths from broncopneumonia. It was discovered that the majority of affected babies were born of mothers who had had rubella during the first or second months of pregnancy. It is believed that if a woman contracts rubella within these first two months, the chances of her giving birth to a congenitally defective child are 100%. If she contracts rubella in the third month of pregnancy, the chances are reduced to about 50%, and the chances of defects are less and less each following month thereafter.

There are two forms of cataracts caused by rubella. The first is a pearly white central opacity surrounding by a small, clear, peripheral zone. The second form is a cataract that is uniformly dense throughout.

Bilateral surgical removal of the cataracts is the only treatment available, but in many cases other congenital factors previously named prevent surgery.

The incidence of low vision following surgical treatment is very high.

The two most common surgical procedures used on children are extracapsular extraction and needling. Extracapsular extraction involves cutting or tearing the anterior lens capsule and expressing the cataractous lens material, leaving the capsular remains inside the eye. Needling involves rupturing the lens capsule and letting the cataractous contents re-absorb in the aqueous humor drainage system. This type of procedure is not always the most successful, because along the remains of the lens capsule, epithelial cells proliferate and form grape-like clusters. These remains and cellular formations become dense and form a secondary cataract requiring a second operation.

Visual problems are created by the aphakic condition of the eye after cataract removal and the absence of the crystalline lens of the eye must be replaced by a very powerful spectacle or contact lens. Aphakic corrective spectacle lenses are of the bifocal type and correct the person's vision for two distances only: 1. Extreme distance (10-15 feet and beyond). 2. Near reading distance (12-16 inches).

Low vision care of the aphakic patient consists of correcting their extreme farsighted refractive error with a lens of a power to correspond to the degree of farsightedness created by the surgical removal of the opaque lens. A bifocal segment is used in the lens to focus for a reading distance. The power of the bifocal depends on the severity of the patients low vision and their specific visual requirements and needs. Telescopic systems may be used for distance viewing with or without their aphakic correction. Due to the fact that an aphakic eye acts as an eyepiece of a telescope, a telescopic system can be produced by using a weak convex lens at approximately ten to twelve inches from the uncorrected aphakic eye. Microscopic systems may also be used when the severity of low vision prevents adequate correction at near with a bifocal segment in a spectacle lens.

Another ocular disease causing a great deal of visual loss is Glaucoma. A very high intraocular pressure is manifest in glaucoma which retards the vascular supply to the retinal tissues and suffocates the retinal receptor cells, destroying their ability to function normally.

There are three types of glaucoma. One type is known as congenital or infantile glaucoma, (sometimes called buphthalmos). The infant is usually born with this condition, but it may be contracted at any time within the first year of life. This is generally a rare defect usually affecting male children. It is almost always bilateral with the drainage angle of the anterior chamber of the eye remaining open, but the aqueous still failing to drain away. Some of the signs and symptoms of the disease are: 1. An abnormal enlargement of the eyeball and especially the cornea, the corneal diameter almost doubling in some cases. The enlargement of the globe of the eye and cornea is due to the readiness with which the tissues of the infant's eye stretch under pressure. Adult eyes are extremely resistant to stretching. 2. The cornea becomes hazy due to the increased internal pressure and the child is very photophobic, or light sensitive. Treatment by medication is usually not effective and the pressure has to be lowered surgically.

The second type is Secondary Glaucoma. Secondary glaucoma exists when there is an elevated intraocular pressure caused by and secondary to another ocular defect. This anomaly can be caused by such ocular defects such as iritis and iridocyclitis, occlusion of the central retinal vein, intraocular tumors, change in position or size of the lens, and trauma, or injury. The person with secondary glaucoma may manifest an acute attack in which there is much pain and discomfort, haziness of the cornea, irregular dilation of the pupil, extreme photophobia, and angry injection of the conjunctival and ciliary vessels of the eye. On the other hand, the person may, conversely, experience no discomfort or visual disturbance whatsoever and the intraocular pressure makes a gradual rise to the danger level. The treatment of secondary glaucoma is by medication, in order to both constrict the pupil and open the anterior drainage angle,

and to retard formation of the aqeuous humor.

The third type of glaucoma is primary glaucoma. Primary glaucoma is an elevated intraocular pressure for no particular or apparent reason. It is diagnosed by the same ocular signs as stated for secondary glaucoma; a high intraocular pressure as measured by a tonometer, by a loss of portions of the visual fields and by characterized changes in the appearance of the optic nerve head as viewed by an ophthalmoscope. The treatment is the same as for secondary glaucoma.

The visual field defects in the glaucomas are characterized by a gradual loss of the periperal visual field finally producing "tunnel vision." The central visual field and the central visual acuity remain good until the macular area becomes affected in the later stages of the disease. Even though the macular vision remains clear the person has a difficult time traveling around, frequently bumping into objects, has night blindness, and is usually declared legally blind because of the extensive visual field loss.

The need for low vision care in the strictly pure glaucoma cases is rare because of the good central vision remaining, but the ocular defects causing secondary glaucoma usually require low vision aids of some type.

Retrolental Fribroplasia affecting premature infants was first reported in 1942. Of those premature infants weighing less than three pounds at birth, approximately 22% were affected. The incidence tends to increase with a decreasing birth weight under three pounds. Immediately after birth the eyes seem to be normal and indistinguishable from those of other premature infants who never developed retrolental fibroplasia. The earliest changes occur at about the end of the third to the fifth week and consist of a dilation of the arteries and veins. Later, elevated gray masses appear in the retina, usually in the periphery, accompanied by retinal hemorrhages. A generalized retinal edema develops and vascular buds arise from the retinal vessels and push their way into the vitreous chamber in a proliferating way. Detachment of the retina then occurs and the newly formed connective tissue in the anterior vitreous chamber obscures all fundus details. The growth of the eye is usually arrested at this stage producing

a microphthalmus condition. Retrolental fibroplasia is a bilateral condition and in some children the disease reaches a certain stage and then stops by itself, but about 20% go on to the final stages and are permanently blinded.

The cause of retrolental fibroplasia is believed to be excessive oxygen used on these premature infants while in the nursery. The use of oxygen predisposes the eye to a growth of new blood vessels and to detachment of the retina. It is thought that there may be other agents besides oxygen involved in the production of retrolental fibroplasia, since the disease has occurred in infants not given oxygen and one of twins may develop the disease while the other is spared when both were given the same amount of oxygen. However, retrolental fibroplasia has been on the decline since pediatricians have been witholding and controlling oxygen on premature infants.

Retrolental fibroplasia usually destroys the person's central vision, as the macular area is usually severly affected. The visual fields are usually very limited and the afflicted person will use any patch of retina for fixation of objects that has been spared destruction. The visual acuity decreases as the useable portion of the retina is displaced from the macular area.

Low vision care for the retrolental fibroplasia patient consists of providing a great amount of illumination to give contrast to the objects being viewed. Microscopic lens systems are usually very valuable in these cases. The microscopic lens magnifies the image of the fixated object and spreads it over a greater number of retinal receptor cells. This usually makes the object easier to view and distinguish.

Primary optic atrophy or simple optic atrophy, causes a loss of central peripheral visual actuity. It, many times, also causes changes in the visual fields with a reduction of sensitivity in the areas of the retina supplied by the atrophied nerve fibers. In primary optic atrophy the optic nerve head, as seen in a fundus view of the retina, appears very pale, due to the loss of its normal capillarity. The very fine vessels that lie on its surface merely close off the blood supply in the atrophy

The second type of optic atrophy, secondary optic atrophy, has the same appearance and characteristics as primary optic atrophy. This type of atrophy, however, is secondary to the presence of another ocular defect. Secondary optic atrophy can follow such anomalies as:

1. Papillitis and/or papilledema.
2. Retinochoroiditis and certain retinal degenerations, (retinitis pigmentosa).
3. Glaucoma.
4. Toxins.
   A. exogenous poisons: methyl alcohol, quinine, and arsenic.
   B. endogenous toxins: botulin.

Vision, and especially central vision slowly degenerates in optic atrophy to a given level specific only to each individual case. Individuals afflicted with optic atrophy, generally, are good travelers and well aware of all objects within their field of vision, unless very near total blindness.

Both microscopic and telescopic lens systems are useful in improving the near and distance visual acuity respectively, of the optic atrophy patient. An abundance of illumination should, also, be afforded this type of low vision patient.

Retinitis pigmentosa, a hereditary pigmentary degeneration of the retina, sometimes appearing in a number of members of one family. It is primary deterioration of the rod and cone cell layer of the retina with clumping of the retinal pigment in the periphery of the fundus. The earliest sign is a slight loss of central vision, with a central scotoma occurring before clumping of the pigmentation of the retina takes place. The chief symptom is "night blindness." This is because the more peripheral area of the retina in which the degeneration of the visual cells first occurs is the portion where dark adaption chiefly takes place. The disease usually starts in children and advances at a rate particular to each individual case.

The clinical picture shows the optic nerve head pale and waxy in color. The retinal vessels show severe attenuation and some of the smaller vessels even disappear. The retinal pigment clumps into spidery shaped structures as the degenerative process progresses from the periphery of the retina inward to the

macula. In the later stages of the disease, a posterior polar complicated cataract develops.

The visual limitations created by retinitis pigmentosa are an inability to see at night, a loss of macular visual acuity with a central scotoma, and contracted visual fields similar to those of advanced glaucoma making it difficult for the person to get around without tripping or falling over everything. All reading tasks will be very difficult, even with magnification, due to the limited width of the visual field. A nystagmus usually begins in the later stages of the disease when the central vision is affected.

This type of retinal degeneration is associated, in many cases with the Laurence-Moon-Biedl Syndrome which is characterized by:

1. Pigmentary degeneration.
2. Abesity.
3. Polydactylism.
4. Hypogenitalism.
5. Mental retardation.

Low vision care is, generally, not too successful in this visual anomaly because of its progressive nature and its severe restriction of the field of vision. The other degeneration characteristics of the Laurence-Moon-Biedl Syndrome also curtail motivation and desire to use low vision aids or to learn for that matter.

Detachment or separation of the retina is not only a problem in itself, but a resultant condition manifested in the final stages of many visual defects. In order to understand retinal separation, you must first understand, to some extent, the embryologic development of the eye.

In a four week old embryo, an outgrowth develops from each side of the ventral-lateral wall of the forebrain, shaped like a hollow sac and called the primary optic vesicle. Each vesicle becomes invaginated so that the sides lie in opposition. Forward extension of the invaginated sides closes in so that a new hollow space is formed and called the secondary optic vesicle. The space

forming the primary optic vesicle disappears, leaving only a potential space, a weak spot, which represents the site of opposition of the pigment epithelium of the retina to the layer of rods and cones, only attached at the ora serrata at the base of the ciliary body and the optic nerve head. The two layers remain in contact with each other due to the pressure of the contents of the eyeball against the rod and cone layer, pushing it against the retinal pigment epithelium. Therefore, when a retinal detachment occurs it separates at the potentially weak spot between the two layers of the retina, the pigment epithelium and the rod and cone receptor cell layer.

Separation of the retina occurs when the retina is raised up from the pigment epithelium by abnormal contents of the sub-retinal space, such as tumors and inflammatory exudates from the choroid. The retina is sometimes pulled forward from the pigment epithelium by shrinkage of the vitreous body or by fibrous tissue formation in the vitreous secondary to perforation wounds or hemorrhages. Breaks or tears in the retina allow fluid to pass underneath it into the potential sub-retinal space and float it up. Breaks and tears are commonly caused by sudden traumatic distention of the globe of the eye and formation of weak spots in the retina produced by cystic degeneration in the periphery of the fundus. Highly myopic eyes produce stretching of the scleral coats without similar stretching of the retina creating a retinal separation.

When a retinal detachment occurs, the person first notices a loss of vision in one part of the visual field and it appears as a "floating curtain." The retinal area separated appears elevated, grayish in color, and folded in appearance to the observer with an ophthalmoscope. The overlying vessels appear black instead of red. A hole or tear may also be visible.

The treatment for retinal separation is to eliminate the cause and reattach the retina by use of an Argon Laser or cryo-surgical techniques.

No low vision care is possible or necessary until the retina is repaired and the damage is assessed.

This paper has attempted to describe the mechanism of vision and some, but not all of the defects affecting the proper functioning of the visual system. An attempt has also been made to acquaint you with what to expect, as far as visual performance is concerned, with each anomaly described and some of the possible improvements that can be attained by the use of various kinds of low vision aids. Certainly a detailed description of the low vision procedures involved with each visual anomaly mentioned and the low vision training needed with these cases is much too complex and extensive to be discussed in a paper of this type.

LOW VISION AIDS WORKSHOP

By
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Associate Professor
Michigan State University

Prior to the official evening workshop of Low Vision Aids, the participants in the workshop were sent the film, "The Low Vision Patient" to preview before the session opened. The film is available through the New York Association for the Blind and gives an excellent portrayal of team work in a low vision context.

The workshop began with two handouts for the participants. One is an unpublished article called the "Visually Handicapped and Visual Training" authored by George Gore and John Bock, 1971, and the other is "Cumulative Record of Visual Functioning of Children and Youth with Severe Visual Impairment" developed at Portland State University in 1967. It was suggested that the participants could adapt the format of the Accumulative Record Form to be used with their multicapped children.

Other materials which were circulated for identification were Catalogue of Optical Aids and "A Worker's Guide to Characteristics of Partial Sight." In addition, several low vision testing cards were distributed with a description for proper usage. After preliminary discussions of low vision and its implication for "normal" partially sighted children, there was a discussion of how to assess visual perception through non-verbal strategies. Four types of materials were used; two of these materials, simulation and role-playing through the use of low vision lenses, 8X, 12X, and 14X were utilized. The first strategy was the simple use of chalk or a magic marker to draw circles and X's approximately two inches high and wide to below what would be considered average print size. When the patient could replicate the task and drawing of the circles and X's through imitation, it was concluded that he could perceive the print well enough to read. However, when this method led to negative results, it would not necessarily mean that the patient could not perceive the print visually but might indicate other factors than loss of vision acuity that might be operating. Another strategy demonstrated was that of using two sets

of "Flash Card Vision Tests for Children," New York Association for the Blind. With these cards which are in pictorial form, it is possible to have the patient match the one you present from his own set and by paying attention to the distance and stated numbers on the flash card to draw fairly accurate measurement of acuity. Once again, the positive results can be the only ones which should be used to form conclusions concerning visual perception. Another possibility of using material in a non-verbal fashion was demonstrated through the use of the Barraga Low Vision Efficiency material which was adapted by the MSU/RIMC. Each participant was given a booklet containing 48 items. Each stub in the booklet has a master object on the left hand side with the four related items to the right. Bock in 1971 suggested an additional adaptation to the procedure of having extremely low vision patients use this material by having the master item separate from the others so that it can be compared separately with each of the other items on the stub. It was his feeling that when a patient had to retain several items in his memory bank, there was too much cognitive involvement, and more true pictures of visual perception functioning would be possible through the procedure he suggested. During the low vision aids workshop, Dr. Gore demonstrated this by simply tearing the master form from the remainder of the stub and showing the ease brought about by using the one-to-one relationship when a severe visual loss is present. This procedure may likewise reduce or eliminate other contaminating factors such as extreme hypertension and the like.

Bernita Sims, a student taking a low vision practicum in conjunction with a course in Low Vision Facilitation at Michigan State University, worked with deaf-blind children using a strategy of separating not only the master item from the stub but also separating the individual comparison items. In addition, she adapted the non-imitation items to ones of imitation, and with those deaf-blind children who had reached the ability to match stages, she felt she had a great deal of success in diagnosing visual perception.

Time did not allow for the full procedure of having one participant under low vision simulation role playing and his partner administer the visual efficiency scale in total and then have them reverse their roles. However, there was enough time to have each go through the procedure covering 1/2 the distance.

Another simulation role-playing procedure was used with the participants being supplied with chipper's goggles which had been adapted to represent a few eye conditions such as central field loss (macula-degeneration) and peripheral field loss, as well as reducing visual acuity for distance to 20/200, 20/400, 20/800. The initial reason for providing this experience was to have those participants who were so that they could see under even simulation many of the so called blindisms immediately coming into play. Observational techniques were stressed at this time so that participants might learn to identify the strategy used by the participants under simulation to function well enough to accomplish a stated goal. In one case six simulators had to walk in a figure eight around two islands of chairs, three rotating clock-wise and the other three rotating counter clock-wise. There were three with extreme field loss and three with acuity loss from 20/200 to 20/800.

Another simulation role playing part of the workshop was some of the strategies identified in "A Study of Ball Utilization and Its Effect on Young Deaf-Blind Children," by Patricia A. Hodges, Phillis Ann Thompson, Louis M. Tutt, and George V. Gore in 1971. Under simulation, the participants rolled and threw balls which were soundless or made sounds while rolling. While other participants observed the functioning of the simulators when confronted with the objective of reaching for or catching the balls. The workshop lasted longer than scheduled, and one of the teachers present asked that she be allowed to retain the goggles for further use during the institute. This request was granted, and I appreciated the opportunity to start thinking seriously about structuring presentations which deal with the multicapped visually impaired population who have residual vision.

TESTING THE DEAF-BLIND CHILD: ISSUES AND METHODS

By
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This evening's talk will be divided into three parts. First, I want to make some comments on testing in general--advantages and problems. Then, I have assembled a list of tests that are used with children with a summary on each one. Finally, I will show you the video tapes we made in which I am testing three rather different children in the deaf-blind diagnostic classroom here.

What is a Test?

A test is a way of measuring a sample of behavior in an objective, standardized manner.

The sample of behavior is the response of the child to the items on the test. It is important that the test be made so that the sample is wide enough and important enough that the score has value. It should also be noted that most test items are not just bits of behavior but a sequence of behaviors in the process of development.

For example, let us look at the child's response to paper and pencil. First, in one infant test, you give the child a pencil and paper just to see what he will do. Has he used one before; will he explore? One child eats the pencil; another child tries it upside down and is satisfied; a third child scribbles; a fourth child makes circles round and round. The test may ask: will he scribble spontaneously? will be scribble if you demonstrate? will he draw a line vertically? horizontally? will he make circles? The answers to each one of these questions will tell you a level of development.

That relates to the fact that a test is "standardized." Standardization refers to two aspects of testing: 1. The test is administered in a uniform way.

e test is scored by standardized norms.

Considering administration, these are specific directions for each item. With younger children there is usually more freedom, but there are always some regulations. For example, in the paper and pencil illustration, you let him try on his own first. If you demonstrate first, then you cannot score whether he would scribble spontaneously. Similarly, you move in progression--vertical, to horizontal, to circles, in the usual order of development.

Recently, a parent objected to my report that her child was functioning at the level of an average two year old. She pointed out that it is not fair to pick out some nice, attractive, average child and measure all other children against him. That parent is right. Tests have been tried out on hundreds and sometimes thousands of children--usually so-called average children, occasionally special groups--at many age levels. For example, an infant test might be given to 25 children, age one month, another 25, age two months, etc. up through 2 1/2 years. Or a test for three to 12 years old might be given to groups of 100 children at six months age intervals. Usually an effort is made to test a range of children--rich and poor, north and south, black and white, etc.

The third point is that a test is objective. This refers to the fact that another examiner should get the same result. Of course, this is never perfectly true, but a trained psychologist is alert to administer carefully and is fresh on the score. Let me illustrate. I have observed children being trained to respond to the drumbeat. When you have worked with a child for many weeks on a task like that, he learns to respond to many other cues besides the drum--and you may even learn to give cues you don't know you are giving because somehow they obtain results. In a testing situation I can be more objective in two ways--I am alert to this danger and use standardized directions, but more than that, I haven't had time to develop the additional cues with that particular child.

Let's shift to the use of tests. Occasionally tests are given every so often [illegible] reason at all and placed in a file. In my opinion, a test should be

administered to answer a question that involves a decision. For example:

> Johnny is performing better. Is he ready to move up to a more advanced group?
> Mary is regressing. Is it because she changed dorms or is there a physical change? (example)
> Tom is reading, but he refuses to use a pencil. Why?

If you are going to try to use a test to help make a decision, you need to be aware of several pitfalls.

1. A test may not fit a child. This is particularly true of multiply handicapped children. If a child is totally deaf, he will fail any item in which he must understand directions. If he is partially sighted, visual items may or may not be useful for him. This is also related to experience. If a child has had extensive training with formboards (illustrate), then he will do much better than a child who has never seen one before. I remember some years ago, testing a four year old girl who had little speech and a very limited background, in a second floor apartment with her depressed mother. She was very adept with formboards which I doubt she had ever seen before. That give me important information about her visual-motor development.

2. The next pitfall is the child who falls apart with strangers or in strange situations. Last year, I tested a child who tests every new person he meets by uncontrolled tantrum behavior. Quite clearly I had to rely on parent information at first and test later.

3. The third pitfall is the child who is sick or upset or even hungry. This may be hard to checkout--we all have ups and downs, and some handicapped children have a wide range of good and bad days--or even time of day.

4. The fourth pitfall relates to tests that rely on information from parents or other adults. Depending on attitude such persons may consistantly over or under-rate a child.

To offset these pitfalls with multiply handicapped children, I usually checkout my results with the teacher and even parents. The teacher may be present on the

sidelines during the test (or even parents) or I can check back by observing the child in class or at home and pressing for answers about his common behavior.

When the test has been administered and scored, you have a measure of current functioning. This can also spell out some more detailed information on strengths and weaknesses. As such, it can be used for planning specialized curriculum and grouping.

Usually, there is another question that plagues us--what is his potential? Could he do more if we did this or that? That question is much more difficult to answer.

If a child by a number of behaviors shows that he would rather fail than succeed, then the test is probably a poor measure of what he could be.

If a series of tests show more progress in one situation than another, or an astounding breakthrough, under certain circumstances, then there is probably greater ability being hidden. In either case, there is no way to answer the question of how much more!

In questioning the future development of a child, there is some evidence that in order to learn language in oral, written or signed form, a child must show prior evidence in early years of what is called proto-symbolic behavior. Many deaf-blind children show primitive emotions of crying and smiling, will demand help for immediate needs such as leading, or will learn a few gestures for immediate needs. These are not enough. Proto-symbolic behavior includes a range of differentiated emotions communicated non-verbally, the use of pointing and other spontaneous gestures for communication and representational play in which real life situations are played out spontaneously with toys. You will see illustrations of proto-symbolic behavior, and lack of it, in the video-tapes. A number of test items gets at these areas--other information can be obtained from more spontaneous behaviors.

Some of the Most Frequently Used Tests: (Most of these are for use by certified psychologists. The scales of social maturity are more generally available.)

Scales of Social Maturity

Vineland Social Maturity Scale
Doll, E.A. Vineland Social Maturity Scale:
Manual of Directions, Minneapolis: Educ. Test Bur., 1947.
Birth to 25 years. Social Competence: General self-help; self-help in eating; self-help in dressing; occupation, communication, locomotion, socialization, self-direction.

A Social Maturity Scale for Blind Preschool Children
Maxfield, Kathryn E. and Buchholz, Sandra
American Foundation for the Blind, Inc., 1957
Birth thru 6 years. Extension from an adaptation of the Vineland.
Same as above but omits self-direction.

Scales of Mental Development

Cattell Infant Intelligence Scale
Cattell, Psyche, The Measurement of Intelligence of Infants and Young Children.
New York: Psychol. Corp., 1947.
2 - 30 months. Intelligence: range of items using communication, visual-motor competence, simple problem solving.

Bayley Scales of Infant Development: Mental Scale
The Psychological Corporation, 1969.
Birth to 30 months. Measures a varied range of skills verbal and non-verbal. Similar to Cattell, but modernized.

Stanford Binet Intelligence Scale Form L-M
Houghton Mifflin Co., 1960
Two years through adult - highly verbal after five years, but also stresses memory and some visual-motor performance.

Interim Hayes-Binet, 1942 - Perkins School for the Blind
Three years through adult.
Uses verbal items from the 1937 - Stanford Binet-memory, comprehension, numerical concepts, vocabulary.

Wechsler Intelligence Scale for Children (WISC)
Psychological Corp., 1949
Five to 15 years.
12 Subtests grouped into verbal and performance scales.

Non-Language Tests

Columbia Mental Maturity Scale
Harcourt, Brace and World, 1954, 1959 and new revision
Two years to adult.
Designed for CPs, only requires pointing response. 100 large cards.

Leiter International Performance Scale
Stoelting Co., Chicago, 1969
Two years to 18 years.
Non-verbal placement response.
Items are small; all use a plywood frame.

Also used:

Gesell Forms
Circle, cross, square, triangle, diamond.
Copied and scored at 3, 4, 5, 6 and 7 years approximately.

Goodenough Draw-A-Man
Goodenough, Florence L., World Book Co., 1926
Now revised as Goodenough Harris.

A Method of Scoring Drawings of the Human Figure
Ages 3 1/2 to 13 1/2 years.

Video Tapes

Introduction: These tapes illustrate several points I have made. You will see three tests administered--the Bayley Scale at two different levels, the Columbia Mental Maturity Scale and Gesell Forms. The first child is three years old--he does not chew, walk or gesture, degree of vision and hearing unsure. The items are from four months to about 16 months. The second child is 7 1/2 years old. He walked at six years, can make immediate wants known. He has considerable vision, is probably deaf. Items are from 1 1/2 to 2 1/2 years. The third child is almost 10. She has peripheral vision; she is able to hear with an aid which she has had for only two years and she has mild hemiplegia (right side). Her milestones were only slightly delayed except toilet training. She is learning to talk. She shows much proto-symbolic behavior - varied responsiveness, gesturing and pointing.

GROWTH AND DEVELOPMENT OF CHILDREN

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I must say at the outset that my fields of competence are early childhood education, child development and family life, and the young disturbed, retarded, or learning disabled child. I come from an eclectic stance to the field of special education and I have been recently concentrating in the area of ecosystem theory as a way of integrating our tremendous "explosion of facts" into some useful order. I say this by way of clarifying my particular interests and my expectations that you--as specialized educators will need to translate my remarks into the framework most useful with your children. What I have to say will need to be interpreted for any special child as a delay in his acquisition of skills or a unique calendar that is his own. Obviously the emotionally disturbed child will be delayed in social relatedness and emotional expression and control. The blind or deaf child will find the acquisition of most skills difficult or at least requiring the support of special teaching techniques and communication tools.

I want to have each of you think of a child you know and quickly write down words which describe him. Let's look at some of them from a standpoint of whether anyone else who knew that child would describe those same things. Predictably there would be physical traits and certain personality "escences" that others would also see--but no one would have exactly the same perception as you. The consideration of growth and development leads us to ponder both similarities and differences in children. The term growth implies an increase in size, while the term development supposes a progression toward something--a going through stages. The consideration of growth and development is often deemed simple or boring by the new student as witness the number of child development students I have seen leaving observation booths convinced "nothing much was going on" versus the experienced teacher who for the opportunity to have some precious uninterrrupted time to retreat and

observe her/his class. While part of the differences in their responses rests on commitment and goals, another rests on their differential knowledge of growth and development. I once heard a consulting psychologist say, "If you are trying to decide whether a child is retarded or disturbed, watch his behavior. Is he doing something most children never do or is he doing something most children do, but at a different age?" Several principles were involved in her comment. One was the tendency--to be elaborated later---that we have of using knowledge of growth and development to DESCRIBE a child. I feel, in the educational setting, a knowledge of growth and development is only useful if it can help PRESCRIBE for a student. This skill involves a knowledge of normal behavior and of age norms for behavior--but only inasmuch as they give you relative information about a child.

One practice of teachers of the emotionally disturbed, which I feel should be encouraged even more, is to return to the regular classroom for a year periodically to reassess their understanding of the "normal" behavior required in schools. I say "normal" with great caution and I want it to be understood that I see behavior as dynamic which should indicate the need for certain supportive processes from us. But if one is going to be giving service to special children, somehow you have to understand how the culture, the community, and his family views normal growth and development.

Any attempt to study growth and behavior leads to a question of cause or etiology of behavior. For a specific child doing a specific action at one point in time, I believe there is at least five contributors--and note I do not say causes--of behavior:

1. Biogenetic
2. Developmental
3. Socialization Process
4. Situational
5. Accidental or Experimental

Theories which attempt to explain behavior--and, therefore, intervention techniques--

tend to concentrate on one or two of these contributors or speak of them so unequally that it is difficult to apply them for a comprehensive look at a child. Some of the theories by nature represent a bias because they were largely developed from one particular profession's view. For example, we know that the teacher's view of disturbed behavior and the need for intervention is often quite different from a mental health clinician's view. We often adopt techniques of dealing with certain behavior--unaware of the implications, the approach conveys about a view of man--his pattern of growth and his ultimate goals. I believe that all service professions--especially those in sensitive educating positions should have a more comprehensive understanding of the major theories of behavior and the particular contribution they make to education. I will list the major categories of behavior theories and discuss them one by one.

1. Biogenetic Theories
2. Psychodynamic Theories
3. Behaviorist Theories
4. Socialogical Theories
5. Ecological Theories
6. Developmental Organismic Theories

Biogenetic Theories may be called "disease theories" in that they suggest that the major concern of contribution to behavior lies within the person's physiological self. Essentially, they suggest that something within the person is abnormal due to an inherited defect or an injury to the bodily system in the prenatal environment, the birth process, the immediate post-natal environment or subsequent development. Researchers in this theoretical framework suggest that we will eventually have evidence that much behavior we popularly view as having a psychological cause will be seen as caused by biogenetic factors.

There are some obvious examples in deaf-blind children and other special education pupils, but I would agree with the feelings that research in this area is greatly needed and helpful answers will be forthcoming. I have seen a number of examples in families where I felt a very active, easily aroused and creative child

(certainly indicating a combination of psychological and physiological traits) happened to have parents who were deliberate, slow, calm, and categorical. The basic differences--some of them biogenetic--between the parents and child may contribute to stress and frustration that leads to disturbed behavior. Of a more serious level are the claims of researchers such as Rimland that very seriously disturbed children may actually be the victims of biogenetic occurances which have seriously injured their physical selves. As an example, Rimland has done extensive research with megavitamin therapy and with study of allergies to study the unique chemical processes of autistic children. He has had significant behavioral changes with the administration of different combinations of vitamins and he has isolated allergies in some disturbed children (particularly milk and wheat allergies) which led to dramatic behavior changes when the offending stimuli were removed. Another example of such research efforts is that being done on schizophrenia--partly at Lafayette Clinic in Detroit--that is studying a protein which activates large levels of a hallucinogenic in the bodies of schizophrenic patients. Demographic research has discovered that schizophrenia is genetically influenced to the point where both monozygotic twins have the probability of becoming schizophrenic as high as 70 to 89% if one twin becomes schizophrenic. Dr. Ruetter's study of normal, mongoloid, and autistic infants' babbling suggested that damage to the central nervous system's process might explain the bizarre behavior of autistic children when he found that autistic babies babbled in a language uniquely their own and unlike either the mongoloid or normal infants. Only the parents of an autistic child could decode his infant's language attempts--even though all of the parents could decode all the babbling from either normal or mongoloid infants.

Des Lauriers' work with autism brought him to the conclusion that in autistic children, the two separate arousal systems did not work in harmony and the one was therefore repressing the efforts of the other to a state of absolute immobility. I predict that further biogenetic research--particularly regarding drugs and nutrition will yield other small bits of information about the relationship between behavior

and the physical self.

Psychodynamic theories began with the work of Freud and the contributions of individuals like Jung, Maslow, Horney, and Erickson. Essentially the psychodynamic theories are conflict theories. They always represent man's growth as a struggle between opposing forces which may move toward wholeness and health if won by one force, or toward regression and disability if won by the debilitating force. For Freud, the major struggle was between the id (or impulsive primeval energies) and the ego (the rational, reality connection) in their control of the pleasure drive--which he tended to reduce to the sexual drive. While later workers altered the exclusive emphasis on sexuality, the thrust of the theory is psychological and win/lose. While much of Freudian terminology has become adult cocktail circuit talk, its influential view of children can still be seen in the naive attitude some educators express about "controlling" the child's impulses, or the paramount fear that deep feelings and intensity should not be a part of any formal learning setting.

The work of Erik Erickson was built on psychoanalytic theory but placed a strong emphasis on environment and life experiences--while still relating to a conflict base. Erickson's work has been very influential in many child development or growth and development approaches in our universities. Erickson spoke of the "eight ages of man" as being a hierarchical series of stages--each of which represented a basic conflict needing resolution--whose successful culmination was reached in maturity. He felt that a conflict resolved in one stage away from the healthy force made it very difficult for successful conflict resolution of future stages. He viewed the stages and their approximate ages as follows:

1. Trust vs. Mistrust (birth to 2)
2. Autonomy vs. Shame and Doubt (2 to 4)
3. Initiative vs. Guilt (4 to 7)
4. Industry vs. Inferiority (7 to 11)
5. Identity vs. Role Confusion (11 to 18)
6. Intimacy vs. Isolation (Early Adulthood)
7. Generativity vs. Stagnation (Young Adult to Middle Age)
8. Ego Integrity vs. Despair (Middle to Old Age)

Each of the struggles is seen as themes of particular life stages and thus significant to the educator. Another theorist whose work came out of a psychodynamic approach is that of Carl Rogers, who is known as the originator of "non-directive therapy" and author of the popular book, On Becoming a Person. Also influenced by the work of Abraham Maslow, Rogers sees life as a series of struggles, but he sees the person as containing the seeds of health or the basic urge to always resolve those conflicts toward health and self-fulfillment. Rogers feels that the therapist's main job is to clarify the client's goals and feelings as a supportive move toward health. He speaks of the self-actualizing urge, the organismic valuing process, and the experience of life as being the major contributions toward behavior. Rogers taught Virginia Axline, author of the popular book, Dibs; and Virginia Axline taught Clark Moustakas of Merrill Palmer Institute and author of many books on therapy and education including the popular Authentic Teacher. These later workers illustrate a tremendous belief in positive will and significantly inspires many people to value the human potential in everyone.

The Behaviorist theories have their roots in the work of Pavlov, B.F. Skinner, Watson, Bandura, and Bijou--to name a few of many workers in the field. The basic view of behavior propounded by this group is that behavior continues because it is valuable or positively reinforced by the environment (or the actor himself) and will be changed only when it is not thusly reinforced. There is a stated emphasis on pragmatism in this approach in that psychological states, moods, qualities of interaction, and other such "subjective" happenings which are hard to measure are usually deemed unimportant because they cannot be easily measured and changed in ways that are useful to teachers. Instead there is a concentration on pupil behaviors that contribute or do not contribute to the learning process by someone's standard, and they suggest ways to help students achieve more successful learning behavior. The work of Carl Huett in the Santa Monica school system is exactly of this theory.

Huett demonstrated that special education students get into trouble in the school system because they persist in behaviors that interfere with optimal learning. He created "engineered classrooms" which made use of the "conditions for learning" which he lists in the following hierarchy:

1. Attention
2. Response
3. Order
4. Exploratory
5. Social Mastery
6. Skill Mastery

Huett then ascertains where a student is operating on this hierarchy and begins rewarding him for appropriate behavior at that level. He allows the student to regress when he needs to and simply then positively reinforces him on the lower level until he can again, proceed toward skills for learning. Two of the significant contributions made by behavioral psychologists are their emphasis on obtaining detailed accurate reports of student behavior and their belief in record keeping and readjustment of goals and processes.

Sociological views of behavior begin with the premise that all behavior is social and can thus be explained by such broad demographic understandings as culture or social class, or by the study of specific interaction in a social group such as a family or a classroom. In an extreme example of the contribution of this theory is the work by Durkheim, Ssaz and others who viewed mental illness as social responses which the particular society did not happen to approve. Much of the work on schizophrenia has revealed that its presence in the low socioeconomic groups is 3 to 4 times its presence in the upper levels of society so either prejudiced professionals react to lower class clients in ways that result in their being labeled schizophrenic, or the lower classes appropriately react to the stress in their environment by becoming schizophrenic. Much of family research has looked at family as a primary social group and used the concepts of role and power to define its structure. Likewise classrooms have been viewed as social settings in which

the particular combination of people and events explain specific behavior patterns.

The ecological view of behavior is that of the early cultural anthropologists like Margaret Mead and Ruth Benedict; Clyde Kluckhohn and Rene Dubos who look at behavior in terms of its meaning in a particular cultural environment. The mesh between individual action and the environmental is seen as interactive in a dynamic flow. Out of this approach and its popular thrust in the environment, can move quite readily to discussing some emerging views which are more developmentally organismic in nature.

The developmental organismic view sees the mesh of organism and environment with a continuum of time--represented by the developmental emphasis. This approach allows the integration of several keys concepts which seem to me essential in considering the child and his behavior. One concept is that of hierarchical growth coupled with an ecological view of organism and environment. It also provides the background for a discussion of dynamic growth and the idea of critical stages. The idea of critical stages has arisen out of research with growing children and animals and represents the view that there seem to be optimum periods in the development of organisms that the mastery of a particular skill is relatively easy or at least appropriate due to the organism's system at that point. However, if the skill is not acquired at that time, it is difficult and/or requires much more deliberate teaching and practice to acquire it at a later date. Research with ducklings and their following instinct is an illustration of this effect. It appears that whatever is available to follow from 12 to 18 hours after hatching is the organism the ducklings will follow. Likewise there appears to be a critical period in human infants for an establishment of a healthy trusting relationship with a male paternal figure around 12 months of age. Probably there are other such periods especially for social skills that we have not yet pinpointed.

One example of a developmental organismic view is that of Jean Piaget-the French psychologist who has brilliantly and intently studied children's cognitive development, starting from a sensitive position as a highly trained biologist. Piaget has theorized that children learn and develop through a series of hierarchical stages with the principles of accomodation and assimilation providing a reintegration of his learning at each stage. His theory is sensitive to the environment and life experiences of a child as well as to his maturational level which makes some learning tasks relevent and others quite inappropriate at any given time. In particular his works represents a great sensitivity to the child and a need for educators to understand the child's stage of development. Piaget's stages are as follows:

1. Sensory-Motor (Birth to 2 years)
2. Preoperational (2 to 6 years)
3. Concrete Operations (7 to 11 years)
4. Formal Operations (11 to adulthood)

In Piaget's theory, the ages are by no means absolute, depending on the child's experience and potential. He views the stage of concrete operations as highly significant to the usual school environment because it reflects the child's ability to conserve or maintain a concept of quantity, no matter how its shape or form changes.

The work of Lawrence Kohlberg on moral development grew out of his knowledge of Piaget and Dewey and reflects a developmental view of the acquisition of moral values. Kohlberg has identified stages in a hierarchy which can be used to determine or describe the value judgments a child makes. Kohlberg believes that educators need a greater understanding of moral values and must be sensitive to the fact that many people do not seem to reach a very high level of moral development. He believes moral values move through the following hierarchy:

1. Punishment and obedience--where the child feels that what is right is that which is not punished.
2. Instrumental Relativism--where the child believes what is satisfying to him is good.

3. Interpersonal Concordance--where two people agree to confirm each other's values.
4. Law and Order--where rules are absolute and must be obeyed.
5. Social Contract--where a particular group can reach a consensus on what is moral in that setting.
6. Universal Ethical Principles--where there are standards of ethics which represent values about humanity and rights of all people.

If we view the family as the primary socializing group which teaches values, we recognize how important it is for educators to know something about a child's family experiences. However, if the child is in a residential setting or if it appears that the family values he has learned are dysfunctional for life in our culture, then the school, it would appear has an even greater responsibility to be sensitive to the values our actions demonstrate.

If we can return to my original mention of the things that I feel contribute to behavior--biogenetic factors, socializing processes, developmental levels, situational conditions, and accidental or experimental learning, I submit that an approach which can accommodate all of those factors must be a developmental organismic one. The family, the peer group, the classroom composition are all mediators in the learning process for a child, but we cannot ignore his biogenetic reality or the active part he plays in effecting his environment. Just as a parent acts out a parenting role based on his/her own experience and knowledge--the particular uniqueness of any child teaches the parent how to act in that setting. Roles are learned interactively--the teacher--pupil interaction is thus affected. You teach in a particular way, partly because of the kind of students you have if you are a sensitive professional. For any particular child, some part of his potential or experience may be dominant at a particular time of that situation. We can talk about normative data in the sense of the usual time that certain behaviors are accomplished, but it is really only useful as a measure of a child's need for experience and support at a particular point in time. Physically, children follow objects with their eyes first--then reach with their . They sit up and then stand and then walk in a progression of skills

that each builds on the previous one. And all along the history, the child is an open system giving messages and receiving them--forming concepts of the desirable and images of the world. If our goal is to support the maximum growth for every child, we need accurate information about the usual progression of learning as well as knowledge about this particular child's unique experiences--socially, physically, and psychological--with which he enters any educational setting.

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HEARING DISORDERS
TESTING - DIAGNOSIS - TREATMENT

by

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This paper will attempt to give the reader a basic understanding of hearing disorders, how hearing is tested, general anatomy and physiology, and amplification for the deaf and hard of hearing. Each of these topics could be a book in itself. However, this paper will touch on these subjects in a manner that will hopefully be useful to the classroom teacher.

Anatomy and Physiology

Some understanding of both the structure and the function of the various parts of the ear is needed to understand the different types of deafness and means of preventing or circumventing them. As you know, the ear consists of three main parts: the external ear, the middle ear, and the inner ear.

The external ear consists of the auricle or the visible part of the ear that protrudes from the side of the head, and the external auditory meatus or the ear canal. The auricle is essentially non functional in man. It provides limited help in collecting high-frequency sounds. The external ear canal is used to convey sound waves to the tympanic membrane and to protect the inner ear from noxious agents in the environment. It also serves to hold the temperature and humidity constant so that the tension and elasticity of the tympanic membrane remains fairly constant.

The middle ear consists of the tympanic membrane or ear drum, the tympanic cavity, the ossicles, and two small muscles. The eardrum is the entrance to the middle ear. It is a thin, flexible, fibrous membrane which is conical in shape like a loudspeaker. It acts as a sympathetic vibrator because it reflects with considerable accuracy the sound that is imposed upon it. This sound is then transmitted to three small bones in the middle ear called the ossicles. These three bones, the malleus, the incus,

and the stapes, serve to increase the sensitivity of hearing for air-borne sounds by transmitting these sounds very effectively to the inner ear. The tympanic cavity is like an air-filled room with four walls that holds the middle ear structures. The two middle ear muscles, the tensor tympani and the stapedius, retract to aid in protecting the inner ear from injury by loud sounds. The structures of the middle ear add approximately 50 decibels (dB) to hearing sensitivity.

The inner ear is a series of channels and chambers in the temporal bone that are so complicated in shape that they are known as the labyrinth. The inner ear contains the semicircular canals which contain the end organs for equilibrium or balance, and the cochlea which contains the end organs for hearing. The cochlea is coiled like a snail in a flat spiral of two and a half turns. Within the cochlea lies the sensory cells and their supporting structures, know as the organ of Corti. The organ of Corti contains tiny hair cells which must be intact for a person to be able to hear normally. When the fluid contained in the inner ear is set into motion by the movement of the ossicles, these hair cells are stimulated and send the auditory message to the auditory cortex in the brain.

In review, a sound enters the ear through the ear canal and is directed towards the tympanic membrane. The tympanic membrane transmits the sound to the ossicles. The ossicles, in turn, set the fluid in the inner ear into motion. This motion stimulates the hair cells on the organ of Corti. The hair cells send electrical impulses containing the auditory message to the brain.

Testing

Accurate measurement of hearing attempts to answer three basic questions: 1) Is there a hearing loss? 2) What is the nature of the hearing loss (unilateral or bilateral, symmetrical or asymmetrical, low or high frequency loss, etc.)? and 3) How much hearing loss is there at each frequency? This paper will discuss three audiometric tests that are commonly used to arrive at the answers to these questions. tests are pure-tone audiometry, speech audiometry, and impedance audiometry.

If possible, each patient that is seen at a hearing clinic will be given each of these tests.

Pure tone audiometry consists of presenting pure tone signals to the ear both by air conduction and by bone conduction. A pure tone audiometer will generate pure tones from 125Hz (low pitch) to 8000 Hz (high pitch, at octave intervals. A person's threshold (point where the sound is just barely audible) is determined throughout these frequencies both by air conduction and bone conduction and recorded on a graph called an audiogram. The frequency limits are depicted along the x-axis of the audiogram in octave intervals from 125 Hz to 8000 Hz. The intensity limits are depicted on the y-axis of the audiogram. The intensities on the audiogram range from -10 dB Hearing Level (HL) to 110 dB HL. The threshold of sensitivity for the average normal ear is 0 dB HL.

Air conduction testing measures the sensitivity of the entire peripheral auditory system. Because the sound is sent to the ear through earphones, it must pass from the external ear to the middle ear, and finally to the inner ear. Therefore, if pathology is present in any one part of the system, it will be reflected in the air conduction threshold. For instance, if the ossicles became disconnected so that they could not transmit sound effectively, even though the inner ear hair cells may be intact, a hearing loss by air conduction would be present due to the middle ear pathology. Routinely, air conduction thresholds are obtained for each ear separately at each frequency from 250 Hz to 8000 Hz.

Bone conduction testing evaluates the function of the cochlea or inner ear directly. The outer and middle ears are by-passed when the tone is sent through the bone vibrator which is placed on the mastoid process. The purpose of bone conduction testing is to aid in determining the site of lesion in the ear. For example, if thresholds for air conduction are reduced below normal limits, but bone conduction scores are within normal limits, the pathology must be either in the external or ear. That is, the sound is not able to reach the inner ear as effectively as

as it normally should. On the other hand, if both air conduction and bone conduction scores are reduced by the same amount, the pathology must be located in the inner. Even though the sound reaches the inner as effectively as possible, damage to the inner ear hair cells produces a reduction in hearing sensitivity. The middle ear cannot be measured directly with conventional pure tone audiometry. Thus, the air-bone gap tells us how well the middle ear is functioning. The air-bone gap is the difference in dB between the air conduction and bone conduction thresholds.

Both air conduction and bone conduction thresholds are obtained by presenting a tone at a given frequency at a loud enough intensity that the patient is sure to hear it. Then the intensity of the tone is decreased in gradual steps until the point is reached where the patient only hears the tone 50% of the time. That is, the tone at this is only barely audible. This point, measured in decibels, is then recorded on the audiogram for each ear; at each frequency, for both air and bone conduction.

Interpreting the audiometric results properly is very important. There are four basic categories into which hearing acuity can fall. The first is normal hearing. This is when both air conduction and bone conduction thresholds are 20 dB HL or better, and the air conduction and bone conduction thresholds are interweaving, that is, there is no air-bone gap. A conductive loss occurs when the bone conduction thresholds are within normal limits while the air conduction thresholds are poorer by more than 10 dB. Conductive losses tend to show an air-bone gap at all frequencies. Sensorineural hearing losses are found when the air conduction and bone conduction thresholds are both reduced below 20 dB HL and are interweaving. The reduction in sensitivity does not necessarily affect all frequencies. For example, in a noise-induced hearing loss, the sensorineural loss tends only to occur in the high frequencies while the low frequencies show normal hearing. The fourth category is a mixed hearing loss. This is a type of loss where a conductive component is present in addition to a sensorineural hearing loss.

Hearing losses can also be categorized into degrees of severity. The severity of the hearing loss is determined by finding the average of the pure tone thresholds at 500, 1000, and 2000 Hz. since these are the frequencies that are most important for understanding speech. If the average is 20 dB or better hearing is within normal limits. An average between 20 dB HL and 50 dB HL constitutes a mild hearing loss. A moderate hearing loss occurs between 50 dB HL and 70 dB HL. A severe hearing loss occurs between 70 dB HL and 90 dB HL and a profound loss is found if the average is anywhere below 90 dB HL. Therefore, it is possible to describe a person's hearing loss in detail. For example, if a report gave the following findings, it would give the reader a fairly good picture of the hearing loss: "The results of conventional pure-tone audiometry revealed a mild sensorineural hearing loss for the right ear and a moderate mixed hearing loss for the left ear."

By making use of all of this information, the audiologist can then answer the questions posed at the beginning of this section. He can determine if there is a hearing loss, the nature of the loss for each ear, and the degree of the loss at each frequency.

If these questions are answered, why do we need speech audiometry if we have pure tone audiometry? The reason is because a hearing loss may affect the ability to discriminate speech more than it reduces threshold sensitivity for pure tones. In other words, hearing is a complex function which involves more than listening to pure tones. For this reason a complete audiological evaluation includes both kinds of stimuli. There are two basic measurements obtained with speech audiometry, the speech reception threshold, and auditory discrimination for speech.

The speech reception threshold is defined as the lowest intensity at which the patient repeats 50% of the two-syllable words correctly. Because speech is contained in the frequency range from 500 Hz to 2000 Hz, the reception threshold should correlate well with the air-conduction pure-tone thresholds at 500, 1000, and 2000 Hz. This measurement is used primarily to confirm the pure-tone thresholds for these three

frequencies. If these two measurements do not correlate well, it tells the audiologist that one or both of these measurements may be inaccurate. He may then need to reinstruct the patient and repeat the test.

Auditory discrimination for speech measures in terms of percentage, the patient's maximum ability to discriminate speech. A lesion of the middle ear will not reduce this ability if the words are presented with sufficient intensity. Lesions of the cochlea may show reduced ability even when the words are presented at optimum intensity. That is, even if the words are plenty loud enough, the patient's ability to understand the words correctly has been affected. The test material for discrimination testing, that is used with adults and older children, is one-syllable words. The patient is asked to repeat these one-syllable words. However, with younger children, a child may be asked to point to one of six pictures rather than repeating the words. Auditory discrimination for speech is also given in a sound field at normal conversational intensity. This condition represents daily listening and gives some measure of the patient's need for amplification or how the patient performs in an everyday situation when he is wearing his own hearing aid.

Impedance audiometry is a fairly new test that is of extreme value in obtaining more precise information on the functioning of the middle ear. Part of its value lies in the fact that it does not require ccoperation from the patient. It is an objective rather than a subjective test. Therefore, it is especially helpful in testing children who for some reason are not able to cooperate in the pure tone and speech tests. Briefly, this test measures the compliance of the eardum, or how freely it moves back and forth. This is done by sealing off the ear canal with a small ear cuff and introducing varying degrees of pressure into the ear canal. Both positive and negative pressures are introduced. A normal eardrum will move fairly freely when this pressure is applied. However, if there is some sort of blockage in the middle ear behind the eardrum such as fluid, its movement will be impeded. This reluctance to move, or ess, tells the audiologist that there is some type of middle ear pathology.

Excessive movement of the eardrum can also be an indication of a problem. If the ossicles have become disconnected, the eardrum moves more freely than normal when the pressure is applicd. In any case, impedance audiometry is very sensitive to picking up various types of middle ear pathology. Medical referrals are then made to determine if the middle ear problem can be eleviated.

These three audiological tests can provide the essential information that is needed to accurately assess the hearing loss and to determine what steps need to be taken in medical management and rehabilitation. If all of the information obtained from these three tests are viewed concurrently, a fairly complete audiological picture is seen.

Hearing Disorders

There are innumerable types of hearing disorders, both in children and adults. This paper will cover only the more common hearing disorders that are found in children.

The conductive type of hearing loss that is most often found among children is otitis media. This condition arises as a result of a middle ear inflammation, an allergic reaction, or a response to changes in the pressure within the middle ear following high altitude flying or deep sea diving. The eustachian tube fails to give proper ventilation to the middle ear cavity. With closure of the eustachian tube, the pressure in the middle ear becomes negative with respect to the atmospheric pressure outside the eardrum. The eardrum retracts, and the negative pressure stimulates the exudation of fluid from the mucous membrane lining the walls of the middle ear cavity. The fluid fills the cavity since the inflammed tube prevents drainage. The fluid prevents the ossicles from functioning in a normal manner, and thus, causes a conductive hearing loss. This type of hearing loss may also occur in children who already have sensorineural hearing losses, therefore, adding even more of a handicap. It is important that these middle ear problems be detected as soon as possible to prevent [illegible]ent damage. Otitis media can usually be medically treated with antibiotics,

or in more severe cases by ventilation procedures such as inserting tubes into the eardrums.

Sensorineural hearing losses in children result either from viral infections or from hereditary factors. The degree of severity of these hearing losses may range from mild to profound, and may also be compounded by other disabilities.

Two common hearing disorders resulting from viral infections are those hearing losses resulting from maternal rubella and those resulting from mumps. A congenital hearing loss is a sequela to maternal rubella. The damage to the embryo is greatest if the virus invades during the first trimester of pregnancy. The virus prevents normal development of the cochlea. In a few instances the virus remains in the infant for 2-3 years after birth to further damage the cochlea producing a progressive hearing loss. The majority of the children with verified diagnoses have moderate to profound, sensorineural hearing losses. These children usually have other associated handicaps and require special education programs. A severe case of mumps can also produce a sensorineural hearing loss, only in this case the loss is usually unilateral and therefore not as handicapping as the loss caused from maternal rubella. Mumps generally result in a profound sensorineural hearing loss for one ear. Since these children usually do have one ear with normal hearing, they often get along well in the normal classroom with only preferential seating.

Hereditary deafness expresses the tendency of the deafness to appear rather frequently in a family as an obvious trait. This type of hearing loss is related to genetic factors rather than viral invasion of the ear. Any type of hereditary deafness can vary in severity in decibels or in its range on the frequency scale. Educational and habilitation management would vary greatly depending upon the severity of the loss.

There are many more types of hearing disorders that often occur in the adult population, however, the above disorders cover most of those that are commonly found among children.

Hearing Aids

A hearing aid is any instrument that brings sound more effectively to the listener's ear. The simplest hearing aid, used since man became civilized enough to grow old and become hard of hearing, is the hand cupped behind the ear. However, today's advancements have allowed the advent of tiny electric hearing aids. The electric hearing aid is quite like a telephone or public address system. The basic components of each system are a microphone which transforms the acoustic signal from the talker into an equivalent electrical signal, an amplifier that increases the power level of that signal, and an output transducer or receiver that transforms the electrical signal back into the acoustical domain. The basic electro-acoustic characteristics of a typical hearing aid that are important for the classroom teacher to understand are that of gain, frequency response, and maximum power output. The term gain simply means the average number of decibels that the aid is amplifying at the frequencies of 500, 1000, and 2000 Hz. If a hearing aid has an average gain of 60 dB, then a signal of 50 dB coming into the hearing aid would be amplified by 60 dB and signal coming out of the receiver would be a signal of 110 dB. The frequency response shows the ability of the hearing aid to reproduce the signal at each frequency. A hearing aid, because of its size, cannot perfectly reproduce the incoming signal. Most aids start amplifying at approximately 250 Hz and no longer amplify beyond 4500 Hz. Even throughout this frequency range, the amplification is not equal at each frequency. The frequency response curve will depict the amount of amplification at each specific frequency. The maximum power output of a hearing aid is inherently limited by the power of its battery and the power-handling capacities of its component parts. No matter how loud the signal coming into the hearing aid, it will only be amplified to a certain point within the capabilities of the hearing aid. Maximum power output should also be limited to a point that the power will not be damaging to the hearing mechanism.

No hearing aid can ever compensate completely for a hearing loss. Some limitations are imposed by the ear and others by the nature of the sounds that we wish to hear.

For example, an ear with a sensorineural deafness may be unable to hear high tones no matter how much they are amplified. Also, if a person has poor discrimination ability when tested under earphones, this ability will still be poor when he is wearing a hearing aid. The sounds coming in may be louder, but they will still be unclear. So, although hearing aids have come a long way since the cupped hand, they are still far from a perfect solution for the hard of hearing person.

The type of hearing aid to be selected for an individual greatly depends upon the type of hearing loss that this person has. If a person has an average hearing loss of 45 dB, then an aid with about 45 dB of gain should be selected to compensate for the degree of hearing loss. A person with a mild to moderate hearing loss such as this can usually be fitted with a small, behind-the-ear hearing aid. Due to the miniature size of the components these aids can only provide up to 60 dB of gain. Those individuals who have severe to profound hearing losses require a hearing aid that can provide more gain to achieve this, it is necessary to use a body type hearing aid. These aids are worn on the body with a cord and receiver that extend up to the ear. These hearing aids can provide up to 85 dB of gain. Most children placed in deaf education programs are fitted with these powerful body aids.

But again, remember that a child who has a hearing aid, is not hearing normally. However, it is to be hoped that he hears and understands better with the aid than without it. Much time spent in auditory training is necessary to aid the child in sorting out the incoming auditory signal.

Conclusion

This paper has at best only touched upon the area hearing disorders, hearing testing, and hearing aids. However, it is hoped that at least a general understanding of these areas has been gained, and that the information will be useful to the reader. For additional information on all of these subjects two excellent resource books are Hearing and Deafness by Hallowell Davis and S.R. Silverman, and Audiological Assessment by Darrell Rose. Both of these books may be found in the Science Library at Michigan State University.

DEVELOPMENTAL INVENTORY*

Material Needed	Age and Performance
Pencil	3 Months Holds head erect on shoulders Smiles to social approach Eyes follow pencil Opens mouth expectantly for feeding
Ring	4 Months Lifts head and shoulders in dorsal position in effort to sit Laughs aloud Uses both hands to grasp ring Inspects own hands in play
Bell Toy	5 Months Rolls from back to stomach Turns head to voice or bell In dorsal position, recovers fallen toy within reach Looks at toy in hand as he plays
Two cubes Spoon	6 Months Can hold cube in each hand Crows and coos actively Picks up cube from table on sight Bangs spoon on table
Toy Cup with handle Bottle Mirror	8 Months Sits momentarily without support Vocal expression to recognition Looks for fallen toy (definite) Restores bottle to mouth Smiles at image in mirror
Pellet Three cubes Cup with handle Ring in a string	10 Months Pulls self to standing position Picks up pellet with pincer prehension Makes adjustment to certain words Accepts third cube and retains two Lifts cup by handle and secures hidden cube Dangles ring by string in play

*Modified from Gesell and Stanford-Binet by Ruth M. Bakwin, Ped. (May) 1959.

Material Needed	Age and Performance
Crayon Cube Cup Rod and Holde (pegboard)	12 Months Stands with support Scribbles imitatively with crayon Can wave bye bye Places cube in cup on command Puts rod in a 1/2-inch hole Holds cup to drink
Ball Box Four Cubes	18 Months Walks alone Throws ball in box Points to nose, eyes, hair Says hello or thank you Accepts fourth cube, retains three Builds block tower imitatively
Pencil Key, penny, watch Picture book Six cubes Scissors Wrapped candy	24 Months Draws a circle with help Uses simple phrases or sentences Names key, penny, watch Points to 7 of 10 pictures Distinguishes in and under Repeats two digits Builds block tower of three or more Cuts with scissors Removes wrapping from candy Bladder control established Can clap hands, put palms on head-- on command
Pencil Picture Book Six cubes Buttons and button holes	3 Years Draws a circle from copy Uses pronouns, past and plural Names three objects in a picture Repeats six syllables I have a little dog. In summer the sun is hot. Repeats three digits in correct order (1 in 3 trials) 6-4-1 3-5-2 8-3-7 Builds bridge imitatively Gives sex Are you a boy or a girl? (own sex first) Gives last name What is your name? Can do two buttons (less than 3 minute Action agent (4 of 9 correct; any appropriate answer) What runs — What cries — What sleeps What scratches — What flies — What bites What swims — What burns — What cuts What blows — What shoots — What melts What sails — What boils — What floats Can put on shoes

Material Needed	Age and Performance
Card with two lines of unequal length Pencil Four pennies Two-piece puzzle Three-piece puzzle Picture book	4 Years Draws square from copy Counts 4 pennies Uses descriptive words of pictures Buttons clothes Comprehension: (Any appropriate answer) What must you do if you are sleepy? What must you do if you are hungry? What must you do if you are cold? Two piece puzzle in 4 seconds or less Repeats 10 words (1 of 3 absolutely correct) We will have a good time at the big picnic. When the train passes you will hear the whistle blow. Compares lines--which is longer? (3 times correct) Draws cross from copy Repeats 4 digits in correct order 4-7-3-0 2-8-5-4 7-2-6-1 Three piece puzzle (in 45 seconds or less)
Pencil Box Four colors	5 Years Draws triangle from copy Perform three commissions: Put the pencil on the chair. Close the door. Bring me the box. Laces shoes Knows age, How old are you? Names four colors (no errors) Definitions use or better (4 of 5) fork horse table pencil doll chair
13 pennies Nickel Dime Quarter	6 Years Right hand, left ear, right eye (no errors) Knows coins: Nickel, penny, quarter, dime (3 of 4) Is it morning or afternoon (correct one first)
	7 Years How many fingers on one hand, on other hand, on both hands (no error) Ties bow knot (less than 1 minute) Copies diamond Names days of week 3 digits backwards (1 of 3 correct) 2-8-3 4-2-7 9-5-8

Materials Needed

Pen

Age and Performance

8 Years
Counts 20 to 0 (less than 40 seconds only 1 error)
Definition superior to use (2 of 4)
balloon tiger football soldier
What's the thing for you to do (any appropriate answer)
If you've broken something that belongs to someone else?
If a playmate hits you without meaning to do so?
When you are on your way to school and you notice you are in danger of being late.
Writes with a pen (must be easily legible -- 1 minute only)
"See the little boy."

9 Years
Date (allow a 3-day error only)
Repeats 4 digits backward (1 of 3)
6-5-2-8 4-9-3-7 8-6-2-9
Names months (15 seconds, 1 error)
Makes a sentence with these words in it: (2 of 3)
work - - - money - - - men
boy - - - river - - - ball
desert - - rivers - - lakes

GROSS MOTOR SKILLS OF INFANCY AND CHILDHOOD

Item	25 percent	50 percent	75 percent	90 percent
Gross Motor				
Prone, lifts head				0.7 mo.
Prone, head up 45 degrees			1.9 mo.	2.6 mo.
Prone, head up 90 degrees	1.3 mo.	2.2 mo.	2.6 mo.	3.2 mo.
Prone, chest up, arm support	2.0 mo.	3.0 mo.	3.5 mo.	4.3 mo.
Sits - head steady	1.5 mo.	2.9 mo.	3.6 mo.	4.2 mo.
Rolls over	2.3 mo.	2.8 mo.	3.8 mo.	4.7 mo.
Bears some weight on legs	3.4 mo.	4.2 mo.	5.0 mo.	6.3 mo.
Pulls to sit, no head lag	3.0 mo.	4.2 mo.	5.2 mo.	7.7 mo.
Sits without support	4.8 mo.	5.5 mo.	6.5 mo.	7.8 mo.
Stands holding on	5.0 mo.	5.8 mo.	8.5 mo.	10.0 mo.
Pulls self to stand	6.0 mo.	7.6 mo.	9.5 mo.	10.0 mo.
Gets to sitting	6.1 mo.	7.6 mo.	9.3 mo.	11.0 mo.
Stands momentarily	9.1 mo.	9.8 mo.	12.1 mo.	13.0 mo.
Walks holding on furniture	7.3 mo.	9.2 mo.	10.2 mo.	12.7 mo.
Stands alone well	9.8 mo.	11.5 mo.	13.2 mo.	13.9 mo.
Stoops and recovers	10.4 mo.	11.6 mo.	13.2 mo.	14.3 mo.
Walks well	11.3 mo.	12.1 mo.	13.5 mo.	14.3 mo.
Walks backwards	12.4 mo.	14.3 mo.	18.2 mo.	21.5 mo.
Walks up steps	14.0 mo.	17.0 mo.	21.0 mo.	22.0 mo.
Kicks ball forward	15.0 mo.	20.0 mo.	22.3 mo.	2.0 yr.
Throws ball overhand	14.9 mo.	19.8 mo.	22.8 mo.	2.6 yr.
Balances on 1 foot 1 second	21.7 mo.	2.5 yr.	3.0 yr.	3.2 yr.
Jumps in place	20.5 mo.	22.3 mo.	2.5 yr.	3.0 yr.
Pedals trike	21.0 mo.	23.9 mo.	2.8 mo.	3.0 mo.
Broad Jump	2.0 yr.	2.8 yr.	3.0 yr.	3.2 yr.
Balances on 1 foot 5 seconds	2.6 yr.	3.2 yr.	3.9 yr.	4.3 yr.
Balances on 1 foot 10 seconds	3.0 yr.	4.5 yr.	5.0 yr.	5.9 yr.
Hops on 1 foot	3.0 yr.	3.4 yr.	4.0 yr.	4.9 yr.
Catches bounced ball	3.5 yr.	3.9 yr.	4.9 yr.	5.5 yr.
Heel-to-toe walk	3.3 yr.	3.6 yr.	4.2 yr.	5.0 yr.
Backward heel-toe	3.9 yr.	4.7 yr.	5.6 yr.	6.3 yr.

Taken from Frankenburg, W. and Dodds, J. "The Denver Developmental Screening Test." Journal of Pediatrics 71:181-191, August 1967.

Fundamental Motor Skills

Locomotor

walk
run
leap
jump
gallop
slide
hop
skip
rolling
stop
start
bounce
fall
dodge

Non-Locomotor

swing
sway
rock
stretch
curl
twist
turn
bend
push
lift
pull

Projection and Reception of Objects

catch
throw
kick
punt
strike
trap
dribble

Concepts to Be Learned and Experienced Through Movement

Spatial

up-down
right-left
over-under
front-back-behind
side - right - left
in - out
on - off
around - through
long - short
above - below
upper - lower
near - far
away from - close to
alike - different
between
large - small
big - little
wide - narrow
high - low
straight - crooked
curved - circular
round - square - triangle - diamond
forward - backward - sideward

Time and Force

fast - slow
speed up - slow down
strong - weak
heavy - light
soft - hard

Body Parts

head and neck
trunk: chest, pelvis
legs: hips
knees
foot - ankles
toes
arms: shoulders
elbows
hand - wrist
fingers

Body Actions

alone - together
alternating
turning - twisting
stretching - curling
rocking - rolling
collapsing - relaxing
freezing - tensing

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MIDWEST REGIONAL CENTER FOR SERVICES TO DEAF-BLIND CHILDREN
WORKSHOP IN THE EDUCATION OF DEAF-BLIND CHILDREN
JUNE 18 - JULY 20, 1973

DAILY SCHEDULE

Monday, June 18	8:30AM - 11:30AM	Welcome and Instructions Charles Weir & Virginia Wiehn Library Lecture Room Campus Tour
	1:00PM - 4:00PM	Class - Library Lecture Room Philosophy Definition Agencies Mr. Monk
	4:00PM - 5:30PM	Show & Tell, Library Lecture Room Picnic - Wigwam
Tuesday, June 19	8:30AM - 11:30AM	Class - Library Lecture Room Psychology of Deafness
	1:00PM - 4:00PM	Registration - MSU
Wednesday, June 20	8:30AM - 11:30AM	Observations in Deaf-Blind Classes
	1:00PM - 4:00PM	Class - Library Lecture Room Psychology of Blindness The Nonverbal Child
	7:30PM - 9:30PM	Speaker - Dr. Roger Seelye Optometrist Pediatric Low Vision Clinic Michigan School f/t Blind Lansing, Michigan
Thursday, June 21	8:30AM - 11:30AM	Observations in Deaf-Blind Classes
	1:00PM - 4:00PM	Class - North Library Classroom: The Rubella Child
Friday, June 22	8:30AM - 11:30AM	Observations in Deaf-Blind Classes
	1:00PM - 4:00PM	Class - North Library Classroom: Developmental Stages in Deaf-Blind Education
Monday, June 25	8:00AM - 11:30AM	Meet with Miss Wiehn in Elementary Building - Teacher's Lounge
	1:00PM - 4:00PM	Class - Library Lecture Room Coactive Movements Imitation Natural Gestures

Tuesday, June 26	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Principles of Language Acquisition
	7:30PM - 9:30PM	Speaker: George Gore, Ph.D. Michigan State University Low Vision Aids
Wednesday, June 27	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Suggestions for Auditory Training and Music Program for Deaf-Blind Children
Thursday, June 28	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Perceptual Motor Development
Friday, June 29	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Perceptual Motor Development Panel Discussion with Teaching Staff of Deaf-Blind Department
Monday, July 2	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Diagnostic Classroom
	7:30PM - 9:30PM	Speaker: Mary C. Boroughs, Ph.D. School Psychologist - MSB
Tuesday, July 3	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Exam Library Lecture Room
Wednesday, July 4	To be determined.	
Thursday, July 5	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Normal Child Growth & Development
	7:30PM - 9:30PM	Speaker: Mary Gray, M.A. Lincoln Center Child Growth & Development
Friday, July 6	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Readiness Progression in Gestural Communication
Monday, July 9	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Self-Care - Daily Living Skills
Tuesday, July 10	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Hearing Losses, Aids & Equipment Communication Task Analysis
	7:30PM - 9:30PM	Speaker: May Chin, Ph.D. Assistant Professor of Audiology, MSU Hearing and Testing

Wednesday, July 11	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Play Activities
Thursday, July 12	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Development of Awareness
Friday, July 13	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Auditory Training Panel Discussion with Teachers
Monday, July 16	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Problems in Language Development Take Home Exam
Tuesday, July 17	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Speech Development Language Beginnings
	7:30PM - 9:30PM	Speaker: Mrs. Lenore Kroman Social Worker Working with Parents of Handicapped Children
Wednesday, July 18	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Teaching Language
Thursday, July 19	8:00AM - 11:30AM	Classroom Assignments
	1:00PM - 4:00PM	Class - Library Lecture Room Mobility Parent Counseling Discussion of Exam
	5:30PM -	Picnic - Wigwam
Friday, July 20	8:00AM -	Library Lecture Room Summary & Evaluation

HOME SWEET HOME

WORKSHOP FOR TEACHERS OF DEAF-BLIND CHILDREN
JUNE 18 - JULY 20, 1973

WORKSHOP EVALUATION

With one (1) being the highest rating, please place a circle around the number that indicates your rating.

WORKSHOP IN GENERAL

Extremely Worthwhile	1	2	3	4	5	6	7	8	9	10	Worthless

RELEVANCE OF WORKSHOP MATERIAL AND EXPERIENCES

Very Informative	1	2	3	4	5	6	7	8	9	10	Provided No Information

WORKSHOP CONTENT

Content Clear	1	2	3	4	5	6	7	8	9	10	Content Unclear

LENGTH OF WORKSHOP

Too Long	1	2	3	4	5	6	7	8	9	10	Too Short

RECOMMENDATION TO OTHER TEACHERS AND AGENCIES

Would Recommend To Others	1	2	3	4	5	6	7	8	9	10	Would Not Recommend To Worst Enemy

1. What workshop content was most relevant to your needs?

2. What content was least useful?

3. In the formal presentation of the subject matter, which areas seemed most important to your understanding of teaching/training deaf-blind children?

   a.
   b.
   c.
   d.

4. Which areas of the formal course could be eliminated?

   a.
   b.
   c.

5. Which areas of the formal course could be given less emphasis?

   a.
   b.
   c.

6. In general, was sufficient information given as to methods and materials used in working with deaf-blind children? Yes _____ No _____
   Comments:

7. Was the division of time between direct experiences with children and the formal presentation adequate? What would you change?

8. Were the topices of the guest speakers appropriate? Yes _____ No _____

9. Is it desirable to have guest speakers? Yes _____ No _____

10. If yes, list topic areas:

    a.
    b.
    c.

11. Was the staff available for enough time to discuss your individual questions and concerns? Yes _____ No _____

12. What Instructional methods of the workshop did you like best? Why?

13. What instructional methods of the workshop did you like least? Why?

14. Would a follow-up workshop be helpful to you next summer? Yes _____ No _____

15. If yes above, what workshop content would be helpful to you in a follow-up?

16. Additional remarks.

Thanks for your help.

NAME _____
(Optional)

TABULATION OF WORKSHOP EVALUATIONS

WORKSHOP IN GENERAL

Extremely Worthwhile	1	2	3	4	5	6	7	8	9	10	Worthless
	(54%)	(33%)	(13%)								

RELEVANCE OF WORKSHOP MATERIAL AND EXPERIENCES

Very Informative	1	2	3	4	5	6	7	8	9	10	Provided No Information
	(47%)	(33%)	(20%)								

WORKSHOP CONTENT

Content Clear	1	2	3	4	5	6	7	8	9	10	Content Unclear
	(40%)	(33%)	(14%)	(13%)							

LENGTH OF WORKSHOP

Too Long	1	2	3	4	5	6	7	8	9	10	Too Short
	(14%)	(20%)	(6%)	(14%)	(40%)				(6%)		

RECOMMENDATION TO OTHER TEACHERS AND AGENCIES

Would Recommend To Others	1	2	3	4	5	6	7	8	9	10	Would Not Recommend To Worst Enemy
	(67%)	(27%)	(6%)								