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Education of

visually handicapped children

The Blind • The Partially Seeing

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foreword

FOR MORE THAN one hundred years, some attention has been given to the needs of visually handicapped children in the United States. This attention was first directed toward the blind, who, because of the extreme nature of their handicap, were more easily identified. It was, however, not until the early part of the twentieth century that consideration was given to children classified as the partially seeing, who outnumber the blind several times. While most blind children are enrolled today in either residential schools or Braille day-school classes, only a relatively small proportion of partially seeing children needing special school adjustments are enrolled in classes for the partially seeing.

As early as 1829, the Perkins Institution and Massachusetts School for the Blind was incorporated. About the same time, the New York Institution for the Blind (now the New York Institute for the Education of the Blind) was incorporated, and it opened in 1832. One year later, a similar school, now known as the Overbrook School for the Blind, was established in Pennsylvania. In the years that followed, many schools for the blind were organized, and now every State makes some provision for the education of blind children either within its own State or by arrangements with another State.

The first two public day-school classes for partially seeing children in the United States were opened in Boston, Mass., and in Cleveland, Ohio. Each of these cities reports such a class in the year 1913. Since that date, many school systems have included sight-saving classes as a part of their special educational programs, but the program is still far from adequate.

It is evident that, although progress has been made in providing for blind and partially seeing children, educators are still faced with the challenge of extending and improving services. Much of this challenge must be met by especially trained teachers who are prepared to give children the technical assistance they need. Some of the work will, however, be done by regular classroom teachers. This bulletin has been written in the hope that it will help to meet the need for information on the broader aspects of an

all-round program for visually handicapped children in school. Some of the material was prepared with the special school or class in mind, but teachers of regular classes in which one or more visually handicapped children are enrolled will be able to adapt the information given and the procedures described to meet the needs of their own pupils. It is hoped that teachers everywhere who have any responsibility for blind or partially seeing children will find in these pages practical information to meet problems of the day, as well as an incentive to seek further information through continued study.

GALEN JONES, *Director*
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Parts of two sections of the bulletin were contributed by Dr. Berthold Lowenfeld, Superintendent, California School for the Blind, C. Edith Kerby, Associate for Statistics and Analysis, National Society for the Prevention of Blindness, and Edith Cohoe, Supervisor, Braille and Sightsaving classes, City Public Schools, Detroit. Photographs were contributed by: Dr. Merle E. Frampton, Principal, New York Institute for the Education of the Blind, New York City; Dr. Gabriel Farrell, Director, Perkins Institution and Massachusetts School for the Blind, Watertown, Mass.; Dr. Francis E. Lord, Director, Horace H. Rackham School of Special Education, Ypsilanti, Mich.; Edith Cohoe, Supervisor, Braille and Sight-Saving Classes, Department of Special Education, City Public Schools, Detroit, Mich.; Lillie Mae Rickman, Assistant Professor of Education and Supervising Teacher, Partially Sighted, Illinois State Normal University; Dr. Lester N. Myer, Chief, Special Education, Pennsylvania State Department of Public Instruction, Harrisburg, Pa.; and Ruth Hargitt, Director, Special Education, City Public Schools, Cincinnati, Ohio. Dora Crouter, formerly Supervisor, Education of the Visually Handicapped, State Department of Public Instruction, Salem, Oreg., has also assisted in the preparation of this manuscript.

Visually Handicapped Children:

who they are and what they need

EVERY CHILD has characteristics, interests, abilities, and desires of his own. This is true of a child with a visual handicap whether the handicap is a mild one, correctable with glasses or treatment, or one as severe as blindness. A physical limitation, however, may adversely affect an individual's development, especially if proper help is not given him. It is for this reason that special consideration must be extended to children with such handicaps as low vision or blindness. If suitable educational facilities, proper medical care and good environment are provided while these children are still in the formative years, much can be done for them.

In this bulletin, the term "visually handicapped" will refer to both the partially seeing and the blind. The bulletin is *not* concerned with children whose vision can be brought to normal either through medical care or by properly fitted glasses. Instead it is concerned with children who have severe vision defects even after all possible correction has been made. From the standpoint of treatment, education, and general care, the needs of partially seeing and blind children are quite different. A brief consideration of some children will perhaps show the differences.

Some Children

Jane is partially seeing; John is blind; Mary has an eye defect, but it is correctable with eyeglasses. Jane and John have real visual handicaps, but the handicaps of partial vision and blindness affect them differently. Their life adjustments in various situations will also differ accordingly.

Jane, a partially seeing child, lives in a small town on the outskirts of a large city. When she entered school, she did not get along well: She was shy and retiring; she seemed to occupy herself well with most types of desk work, but she did not follow directions written on the chalkboard. Both her parents and the teacher were baffled. They thought Jane was intelligent, and yet her behavior was "peculiar," so the teacher and the mother had a conference with the school principal and the school nurse. The nurse suggested that the parents take Jane to a pediatrician for a thorough physical examination. The parents followed this advice. Through medical examination, it

was discovered that Jane was extremely nearsighted. The pediatrician referred her to an eye physician (ophthalmologist) for a thorough eye examination. Glasses were prescribed, but even with these Jane's vision was found to be considerably below normal. The eye specialist, the school principal, and the teacher conferred, and they recommended that Jane attend a sight-saving class in a nearby city. Within a few months after entering this special public-school class, Jane became well adjusted and at present takes more interest in other children and has developed as an individual in her own right. (For further information concerning sightsaving classes, see pages 20–30.)

Courtesy, Detroit, Mich., Public Schools

Large-type textbooks aid the partially seeing child

John, on the other hand, has a more severe handicap. He is blind—and has been so since birth. His training and schooling are of necessity quite different from Jane's. Life for John must be planned so that he will learn through the senses of touch, hearing, smell, and taste.

Because of his blindness, John had many problems in early childhood. He was in danger of being left out of child activities at a time when it is important for any child to be accepted by his peers. He was accustomed to sharing in family matters but also wanted to be included in the play of boys

and girls. His eyes, however, could not show him what the children were doing. This limitation in vision threatened to become a barrier between him and his seeing companions. He was not able, for example, to learn to "skip a rope" by watching other children. Someone had to teach him what was meant by skipping a rope and then how to do it. To learn this, as well as countless other activities, it was necessary for him to depend upon his senses of touch and hearing. John was fortunate, for his parents and little friends showed him how to skip a rope, how to roll a ball, how to play with toy trains and toy animals, and how to move about safely.

When John was small, he lived in a community where there were no day-school facilities for the education of blind children. He therefore attended a State residential school for the blind and secured his elementary education there. If John had lived in a large city such as Los Angeles, Cleveland, Chicago, or Detroit, he could have attended a special day-school class in a regular public school. (Such classes are usually referred to as Braille classes.) By the time John reached high-school age, the State school had given him so much help that he had mastered both Braille reading and Braille writing and typing. He had developed reasonable independence in getting about and learned grade by grade what other children learn in day-school classes. With the help of a reader he was then able to attend a regular high school in his own home town and live at home with his family. John is now in college in one of the Western States. The local newspaper recently commented as follows concerning him: "His fellow students believe he has what it takes * * * courage, determination, a wholesome outlook, and a will to succeed * * *." The present adjustment of this young man to college is possible because of special training given to him as a young child in the home, continued and supplemented by the work of the school and other public and private agencies.

Then there is Mary, a little 8-year-old girl, whose disposition was happy and cheerful until she started to school and had trouble with reading. At first, she appeared to be a "handicapped" child. Fortunately, however, it was found by testing her vision that all Mary needed was a pair of glasses. As soon as these were supplied, she began to read and to perform the usual activities of children. With glasses, she was no longer handicapped. Children like Mary, if correctly fitted with eyeglasses, can function as normal people. They are not, for one moment, to be thought of as handicapped. This bulletin will be concerned with boys and girls like Jane and John, and not with children like Mary.

The Child in the Family

The first needs of the visually handicapped child, whether he is partially seeing like Jane or blind like John, should be met by his family. A child with a vision defect requires the love and care of his parents just as his

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brothers and sisters do. He may have an even greater need for evidence of their affection and understanding because his visual defect creates special problems for him.

If teachers, social workers, and medical specialists are to give adequate help to mothers and fathers of such children, they need to recognize and consider both the parents' feelings and emotions, and the practical aspects of problems which these parents face. In looking forward to the arrival of a baby, parents think of a normal child and not of one who may be blind or partially seeing. When they discover that their baby has a severe handicap, they often cannot help being disappointed, bewildered, or even resentful. Frequently they do not know what to do for the child. Many times they cannot even see the possibilities for normal development.

These emotions may be expressed in various ways. Fear of doing the wrong thing, for example, often complicates the thinking of the parents; it may even overshadow their ability to plan for the child. Some parents not only are plagued by their fears, but also blame themselves or their families for the condition of the child. They may even try to hide the child from their relatives and neighbors. These attitudes profoundly influence the child. Even though the parents' anxiety or despair is not verbally expressed, the child can sense it and is negatively affected by it. The handicapped child's chances for adjustment in the community are not good unless he can achieve a normal and satisfactory place for himself within the home circle.

THE YOUNG CHILD

Some parents, because of their own attitudes, do not give the young handicapped child opportunity to develop normally. They may overprotect him or reject him, perhaps without realizing it. They sometimes do things for him which he could do for himself, such as continuing to dress him or feed him when he is old enough to learn such skills. In other cases, the parents and grandparents shower material things on a child who is blind or partially seeing, but fail to give him the normal affection or the opportunity to develop responsibility—because they reject him as a personality.

In contrast are the fathers and mothers who, almost from the birth of the child or the onset of the handicap, are mature and realistic in their attitudes toward life and toward the child. When the ophthalmologist tells these parents that the child's eye condition cannot be improved, they begin to gather reliable facts concerning his condition. They study possibilities for care and education of the child. Such parents are able to make constructive plans for him.

The adjustments to be made in the home for the blind child are different from the adjustments to be made in the home of a partially seeing child. If he is blind, he will need to be taught many things which partially seeing

children can learn independently by visual imitation. A blind child will have to learn what a spoon is by feeling and handling it. Then he will have to be shown how to hold it and how to put food on it. Lacking sight, he cannot learn by watching others. If, on the other hand, a child is partially seeing, different types of adjustments will have to be made for him. His storybooks must have large pictures with a minimum of detail. He should have better lighting conditions than the average when he is looking at these books. His eyes should be protected from glare. When he takes part in children's games, he will probably need extra instruction. After he enters school, there will be other adjustments needed which will involve both the school and the home.

THE OLDER CHILD

As the child approaches adolescence, his parents and teachers need to give him intensified help. In order to do so, they may require assistance from agencies prepared to advise him and render special service to him. While the principles of child development are the same for all, each age group does have its own particular needs and interests. As the young person grows up, many of the interests of earlier years will persist and expand, and new ones will develop. The adolescent, however, will be more immediately concerned with those interests and activities which are related to his future vocation and to social participation with his young friends.

During adolescence and youth, fear of vocational or social failure sometimes appears in a handicapped person who has previously seemed to be well adjusted. As he thinks of the choice of a life occupation, this fear may express itself in worry over the effect of his physical limitation. When he thinks, for example, of applying for a job, he may ask himself, "What will my visual handicap prevent me from doing? Will it close the door of opportunity against me?" When this is true, parents and teachers should work closely with visiting teachers, counselors, vocational rehabilitation agents, and appropriate agencies to help the young persons avoid these fears.

Classification According to Visual Handicaps

Children with visual defects are classified for purposes of education on the basis of several factors. One of these is acuteness of central vision. The visual acuity findings alone, however, are not considered to be an adequate basis for educational classification, especially if such classification is used to determine the child's placement in school. The findings of the visual acuity must be studied along with other factors. They serve as a guide in planning for the child when supplemented by medical diagnosis and prognosis and other information about the individual, such as his ability to adjust to his handicap and to compensate for it. The environment of the child, both past

and present, should also be taken into consideration if the classification is to be used as a basis for educational adjustments or placement in school. When these factors are kept in mind, the following general classifications are useful:

Children with slight but correctable eye difficulties that can be remedied through treatment or compensated for by properly fitted eye glasses are *not* considered visually handicapped. Such children may be included educationally and vocationally with the normally seeing.

Partially seeing children for whom special school adjustments are needed are those who, even after all necessary medical or necessary optical aid is given, cannot see well enough to use material and equipment provided for the normally seeing or whose eye difficulty might be increased by such use. On the basis of visual acuity alone, the vision in one eye, the better eye, after correction is between 20/70 and 20/200. Children with progressive eye disabilities or those with diseases that seriously affect vision are included in this group. Children in this classification are partially seeing; they do not need and should not use the materials required by the blind.

The blind are those who even after medical and optical aid have no vision or only a small amount of vision. In ophthalmological terms the definition most widely accepted considers children as "blind" who have a visual acuity of 20/200 or less in the better eye with correcting glasses; or "central visual acuity of more than 20/200 if there is a field defect in which the peripheral field has contracted to such an extent that the widest diameter of visual field subtends an angular distance no greater than 20 degrees." Those with the latter handicap have only a limited area of central vision. In addition there are those who have a central defect and can only see out of the corners of their eyes. Even a slight amount of vision may make a great deal of difference, particularly so far as mobility is concerned.

It is sometimes difficult to decide whether a child with a vision defect requires the services of a special class for the partially seeing or whether he should remain with the regular grade group. It may also be difficult to decide whether he should be educated as a partially seeing or a blind child. The recommendation of an ophthalmologist, together with the observations of parents and teachers and other specialists, forms a basis for making decisions.

Extent of the Problem

In the population of school-age children, approximately 1 in 5,000 is blind and 1 in 500 is partially seeing. There are reported to be between five and six thousand blind children in the United States who receive education in special schools or classes. Since all States make provisions for the education of their blind children either in their own schools or in schools of neighboring States, most of the blind children are eventually enrolled in residential schools or day-school classes. This is not true of the partially seeing. On the basis of the estimate that 1 child in 500 is partially seeing, there are approximately 50,000 partially seeing children of school age in the United States. Of these only about 8,000 are reported to be receiving special

education. This condition exists because suitable educational facilities are not yet available everywhere.

Almost every schoolroom has at least one boy or girl whose eyes need attention. According to estimates, 12 percent of the elementary school pupils have some vision defect. Fortunately, only a small proportion of the 12 percent have conditions serious enough to require placement in special schools or classes.

Causes and Frequency of Visual Handicaps [1]

The visual defects of blind and partially seeing children may be similar in type and cause, but they differ in degree and frequency. More is known concerning the causes of blindness than concerning the causes of partial vision. It is, therefore, desirable to discuss them separately. A series of studies on blindness was initiated in 1933 by the Committee on Statistics of the Blind.[2] In these reports, data are compiled in a cross classification showing both the types of eye affections and their underlying causes.

Courtesy, Allentown, Pa., Public Schools

Boy with partial vision copying from large-type book. His typewriter also has large type

[1] This section on "Causes and Frequency of Visual Handicaps" (pp. 7–10 and appendix 2, pp. 41–45) was prepared by C. Edith Kerby, Associate for Statistics and Analysis, National Society for the Prevention of Blindness, Inc.

[2] Kerby, C. Edith, *Causes and Prevention of Blindness in Children.* A report for the Committee on Statistics of the Blind. National Society for the Prevention of Blindness, Inc., 1790 Broadway, New York 19, N. Y. (Publication No. 110.)

CAUSES OF BLINDNESS

More than 60 percent of the blindness among school-age children is of prenatal origin. In about one-fourth of these cases, the cause is probably due to a hereditary condition. The cause of blindness in the other three-fourths of the cases is unknown. Of the known causes of blindness 1947–48), infectious diseases are responsible for the largest proportion of cases. Other causes are trauma (accidents), neoplasms, general diseases, and poisoning. (For further information on the medico-statistical aspects of visual handicaps, turn to appendix 2, pp. 41–45.)

Trend figures computed from data compiled by the Committee on Statistics of the Blind show an actual increase in blindness of prenatal origin. These same figures reflect a marked decrease in the number of cases which are due to known causes, such as infectious diseases and trauma. The reason is obvious: When a cause has been identified, it is usually possible to find a means of controlling its occurrence. The large group of unknown causes indicates the need for medical and social research; the resulting knowledge would form a basis of appropriate prevention and treatment programs.

Much needed medical research is now going on, especially in the field of hereditary conditions. There is at present much interest in the relationship between German measles (and other infectious diseases) in pregnancy and the presence of congenital eye defects in infants. Efforts are likewise being made to find the cause of retrolental fibroplasia, a condition in which there is a fibrous membrane behind the lens of the eye. This occurs chiefly in premature infants. The urgency of the need for continuous intensive research on this condition is illustrated by recent reporting of many more cases

Courtesy, American Foundation for the Blind

Blind children get concept of Independence Hall by feeling model of it

of retrolental fibroplasia than in former years. This defect has probably occurred in the past but only within the last few years has it been recognized as a specific entity. Today, as never before, attention is being given to the care of infants. As a result, a relatively large proportion of premature infants survive the hazards of early life. The current annual incidence of retrolental fibroplasia is not definitely known, but it may run into the hundreds.

Causes of blindness among pupils in residential schools for the blind and in Braille day-school classes, 1947–48 [1]

Causes	Percent of Pupils	Total Enrolled
Infectious diseases		16.8
Ophthalmia neonatorum	7.5	
Syphilis	3.2	
Meningitis	1.3	
Measles	.7	
Tuberculosis	.5	
Septicemia	.5	
Other and not specified	3.1	
Trauma		7.6
Play or sport	4.8	
Birth injuries	1.1	
Traffic and transportation	.5	
Other and not specified	1.2	
Poisoning		0.2
Neoplasms		3.8
General diseases		1.2
Prenatal origin		61.0
Hereditary, established or presumed	15.7	
Cause not specified	45.3	
Etiology undetermined or not specified		9.4
Total, all causes		100.0

CAUSES OF CONDITIONS RESULTING IN PARTIAL VISION

Less is known about the causes of partial vision than about the causes of blindness. Studies on causes of partial vision have not been as extensive as those on the causes of blindness. According to present records, the major causes of partial vision are prenatal conditions and developmental factors. The proportion of such cases among the partially seeing is probably much higher than among the blind. Other causes, in the order of their importance, are infectious disease, trauma, and general systemic conditions.

[1] Based on a sample group of 3,905 cases, constituting 71 percent of the total number of Braille students enrolled in 1947–48.

The types of cases which appear in largest numbers in sight-saving classes are those associated with refractive errors, especially myopia. Many children in sight-saving classes have myopia, which is progressive. The child who has this condition may become blind in early or middle adult life, but usually has sufficient vision during his school years to be educated in a sight-saving rather than in a Braille class.

Structural anomalies are probably second in order of importance among the partially seeing (although first among the blind). Some affections of the eye cause much more serious visual handicaps than others. For example, a child with anophthalmos (a condition in which there are no eyeballs) is, of course, totally blind; one with buphthalmos (enlarged eyeballs) is probably severely handicapped; a child with albinism (lack of pigment) is handicapped, but usually has useful vision; a child with a cataract, especially if it has been operated on, might function very well in a sight-saving class or under some circumstances even in a regular class.

The proportion of cases due to injury seems to be relatively small among the partially seeing. This is probably due to the fact that accident cases involving only one eye are most common and that, even if vision of one eye is lost completely, the child would not be enrolled in a sight-saving class, except possibly for a short period of adjustment. General diseases account for only a small percentage of the partially seeing cases, as is true for the blind.

Defects in the ability to control the movement of the eyes are also noted as causes of visual handicaps quite frequently among the partially seeing. Squint, or strabismus, usually involves serious loss of vision (amblyopia) in one eye only, and this visual handicap affects binocular vision. In nystagmus (a more or less constant involuntary motion of the eyes, usually from side to side), the associated amblyopia generally affects both eyes. It may be severe enough to place the child in the blind group or may be more moderate, in which case he belongs in the partially seeing group. Both of these muscle defects may appear in association with other defects: Usually some structural anomaly in the case of nystagmus and refractive error in the case of strabismus. (For further information on causes, see appendix 2, pp. 41–45.)

Elements in a Well-Rounded Community Program

Many visual handicaps could be prevented if more effective programs were in operation. Much could be accomplished if every child could have a thorough eye examination by an ophthalmologist before he enters school. In such a process, the children with *remediable* defects could be discovered and the condition remedied. On the other hand, when children have *non-remediable* defects, the parents and teachers could be notified, and adequate home and school plans could be initiated.

An all-round plan is usually a complicated one and may require the services of several agencies, both public and private. In many instances, the visually handicapped child will need long and intensive help from a number of sources. His ultimate adjustment will be largely dependent upon the extent and integration of these services. There are essential elements in such a program, and every community should make certain that its program includes: (1) Finding the child; (2) medical care; (3) education to fit the child's needs; (4) broad personal and vocational guidance leading to the best possible life adjustment; and (5) cooperation in institutes and workshops for parents.

FINDING THE CHILD WITH A VISUAL DEFECT

The first step in the program is to find the child with a handicap. The main responsibility for discovering eye defects in children is borne by the family physician, the pediatrician, and by other specialists and private physicians. In large cities, many people are seen in clinics and hospitals, which afford a splendid opportunity for finding eye deficiencies, even though the patient may be in the hospital or clinic for other tyes of examinations. Agencies in some communities have a designated responsibility for aiding in the identification of visually handicapped children, such as the commissions for the blind. (Most of the States have commissions for the blind.) Still other agencies conduct services which provide them the opportunity to discover eye defects in children who come to them for other types of treatment. The Crippled Children's agencies,[1] for example, through their widespread clinics and other services, offer a means for finding eye defects in children who are brought to their clinics usually because of other conditions.

Any agency known to have facilities and resources to help handicapped children will have cases referred to it and will, to some extent, become a case-finding agency. The more services an agency offers, the more complete will be the register in any kind of case-finding program. In addition to the work of physicians and agencies, persons such as the public health nurse, the classroom teacher, the social worker, and other representatives from child-serving agencies are likely to discover eye defects in children. The classroom teacher, because of close association with children, may be the first to suspect that a child has partial vision. If she is alert, she will make full use of available community resources in helping the child secure proper examinations.

It is important that the schools have a close working relationship with agencies and individuals serving handicapped children. Blind and par-

[1] Under the provisions of the Social Security Act, every State now has a public program for crippled children assisted by Federal grants-in-aid administered by the Children's Bureau, Social Security Administration, Federal Security Agency. (See p. 18.)

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tially seeing children may be known to departments of health even before they enter school. On the other hand, the school may suspect the presence of a vision defect in a child before one has been found by a private physician, a health agency, a clinic, or a social worker. The school as a case-finding agency will increase its effectiveness by cooperating with private physicians, health departments, and other agencies concerned with children.

MEDICAL CARE

Basic to any sound plan for physically handicapped children is a thorough medical examination and follow-up by a competent physician. As suggested in preceding paragraphs, the visual defect in a child may be discovered by his parents, by his teacher, by the family physician, by a hospital or clinic, or by a welfare agency. Regardless of who discovers the condition, the child should be referred to a specialist for accurate diagnosis. The terms "ophthalmologist," "oculist," "optometrist," and "optician," are sometimes confused. The ophthalmologist, also called oculist, is a physician who specializes in the study and treatment of defects and diseases of the eye. He uses the initials M. D. after his name. The optometrist is a nonmedical practitioner who is skilled in the measurement of vision. He uses the the initials O. D. after his name. The optician is one who is trained to make and supply eye glasses and optical instruments.

EDUCATION TO FIT THE CHILD'S NEEDS

One of the major worries of the parent of a blind or partially seeing child centers on the concern for the child's education. This is not surprising since so much of the educational program involves the use of the eyes. The parent naturally wonders how this problem is to be overcome. He wonders how knowledge is to be acquired, how social participation is to take place; he may even wonder if it is possible for his child to get an adequate education.

The child's total adjustment to life will depend to a large extent upon the kind of educational opportunity he has. The public school is an agency to which the parents of a visually handicapped child should turn as soon as they know that their child has an eye defect. Fathers and mothers, especially of partially seeing children, could often be saved unnecessary worry and hours of fruitless searching for help if they would explore the services their schools provide.

Many communities provide day classes for partially seeing children; others through supervision help these children in regular classes. In some of the larger population centers, there are day-school classes for the blind. A few communities provide special classes for children under the age of 6. In some communities, advisers, supervisors, or consultants work on State or local levels and give the help that enables visually handicapped children to

get all or a part of their schooling in the local school systems. It may be that the local school system can make all the necessary adjustments for the child so that he can continue to live with his family and still get his education. When this is not possible the local school systems working within the State department of education may be able to help plan the child's education elsewhere. All States make provisions—either by maintaining a school or by making arrangements with a school in a neighboring State—for residential school care for their blind children and admit them as resident or as day students.

Several States and some school systems provide counseling services for parents of visually handicapped children. Under such a plan, parents receive help in the specialized training of their child so that the child will be ready to enter school at the normal age. Such service helps to put parents in touch with other parents who have similarly handicapped children and to aid them as a group as well as individuals. All of this leads to the

Courtesy, Perkins Institute for the Blind, Watertown, Mass.

Young blind child learns what a pan is like by feeling it

consideration of personal and vocational guidance as a necessary element in a well-rounded program for the visually handicapped.

PERSONAL AND VOCATIONAL GUIDANCE

All those who come in contact with the child have a share in his guidance—the parents, the teacher, the social worker, the physician, and fellow classmates. A good guidance program should be in effect throughout a child's life and should permeate the efforts of the home, the school, the clinic, and agencies and individuals working with the child. However, as the child with a visual handicap approaches adolescence he may need special help. He may need help from the guidance counselors in planning further education, in meeting personal or social problems, in finding desirable recreation, or in developing hobbies. Special encouragement may be essential. Most people with serious handicaps need assistance in planning for a lifetime occupation. Fortunately State and local governments have made provisions to help these young persons through the services of the "vocational rehabilitation" agencies. (See p. 18.)

COOPERATION IN INSTITUTES AND WORKSHOPS FOR PARENTS

Much attention has recently been given to the problems which mothers and fathers face when they discover they have a blind or partially seeing child. This new focus of attention has come about partly because of the rise in incidence of blind babies. Parents of visually handicapped children need information and instruction to help them make plans for their children. To meet this need at least to some extent, a number of workshops have been conducted for mothers and their young blind children. Many of these have been sponsored by and held in residential schools for the blind. They may, however, be fostered by several agencies and housed wherever a convenient place can be found. Such institutes supplement the services rendered to blind preschool children in many States by visiting teachers.

The pattern of such institutes or workshops is usually something like this: A series of lectures and discussion groups is arranged for the parents, and a nursery school situation is provided for the children. Mothers and children usually live in dormitory fashion with the children sharing quarters with their mothers. During the day the children engage in good child-developmental activities while the mothers are free to attend lectures and participate in discussion groups. Lectures may include such topics as causes and treatment of visual defects and theory of child development. More and more the fathers, as well as the mothers, are being brought into these programs. Fathers who cannot participate in the entire program sometimes come for evening or Sunday lectures and discussions.

There are many values to be gained from such institutes or workshops.

Through participation in such activities, parents may be helped to see that their children have many possibilities for normal development and begin to provide an environment for the child based on good principles of child growth and development. By sharing in the experiences of an institute, the parents may be freed from their frustration; they get better factual understanding of the conditions; they see hope for their child; they find that other fathers and mothers are bearing burdens similar to their own.

To promote a greater cooperation between teachers and parents, some residential schools for the blind have organized parent-teacher groups. The meetings of these organizations offer opportunities for the exchange of experiences and observations which result in improved treatment of the children both at home and at school.

Sources of Aid to Visually Handicapped Children

At present not every community will have the elements essential to an adequate program for children who are blind or partially seeing. When such children live in communities affording little or no specialized help, the parents and teachers will still be able to find assistance. This will come most often from agencies and organizations at the national or State level. Individual help, or printed materials at little or no cost, can usually be obtained through correspondence.

WHAT SOME NONGOVERNMENTAL AGENCIES DO

Private agencies have played a very important role in getting better services for various types of children who have physical handicaps. In many instances they have put the problem before the public in a dramatic and effective way. They have disseminated facts, sponsored demonstrations, rendered individual and group services, and stimulated public agencies to action. In the field of the blind and partially seeing, private agencies have been especially active on the national level. Such agencies as the National Society for the Prevention of Blindness,[4] the American Foundation for the Blind,[5] and the American Printing House for the Blind,[6] have done much toward bringing opportunities to the visually handicapped.

The National Society for the Prevention of Blindness, Inc., was founded in 1908. It works closely with official and unofficial agencies (such as education, health, welfare, industry, and safety organizations) in developing and promoting activities for the prevention of blindness and the preservation of eye health. The Society carries on original research to determine

[4] 1790 Broadway, New York 19, N. Y.
[5] 15 West Sixteenth Street, New York, 11, N. Y.
[6] 1839 Frankfort Avenue, Louisville, Ky.

the causes and extent of blindness and impaired vision. Through a consultant staff, help is given in advancing the early detection and treatment of eye defects and diseases and in disseminating knowledge about eye health and protection, both among professional groups and the general public.

In the field of education, the Society evaluates and furnishes information about vision-testing methods for the preschool and school-age groups; assists educational authorities in improving environmental conditions affecting eye health and efficiency; promotes the establishment of classes for the education of children with serious eye defects; and aids in the preparation of teachers and supervisors for this branch of special education.

The Society publishes vision-testing charts, posters, films, and a wide variety of pamphlets. These materials are furnished at nominal cost. The Society also publishes a quarterly journal, the *Sight-Saving Review.*

The American Foundation for the Blind [7] is a national organization whose purpose is to promote the interests of the blind throughout the United States in close cooperation with Federal, State, and local organizations. It is managed by a board of trustees and is maintained by voluntary contributions and income from endowment and memberships.

The Foundation disseminates information regarding all phases of the work for the blind; promotes State and Federal legislation in behalf of the blind; develops and sells at cost special appliances for their use, such as Talking Book machines [8] and special Braille typewriters;[9] arranges for the establishment and improvement of agencies needed for the blind throughout the country; assists in increasing professional training courses for teachers and other workers for the blind; and conducts a special department to deal with the problems of the deaf-blind. The Foundation also cooperates with the authorities charged with the rehabilitation of war-blinded service personnel and with other Federal agencies working with the blind; awards scholarships; maintains a reference and lending library of inkprint books relating to the blind; conducts a model vocation center for blind girls and women; publishes books and pamphlets as well as four magazines—*Outlook for the Blind and the Teachers Forum, Talking Book Topics, Touch and Go* (for the deaf-blind), and *The Braille Book Review.*

The American Printing House for the Blind is a national, nonprofit agency sponsored by the Federal Government. Its primary work is the extension of its services to the schools and classes for the blind through the Federal act "To Promote the Education of the Blind." This act, originally passed

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[7] Affiliated agencies: American Foundation for the Overseas Blind, organized to provide aid to the blind of Europe and to assist in the rehabilitation of the blind in all parts of the world; and National Industries for the Blind, acting in a liaison capacity between Federal and other purchasing agents and the various workshops for the blind, and promoting cooperation among the workshops for the blind in broadening the employment of the blind.

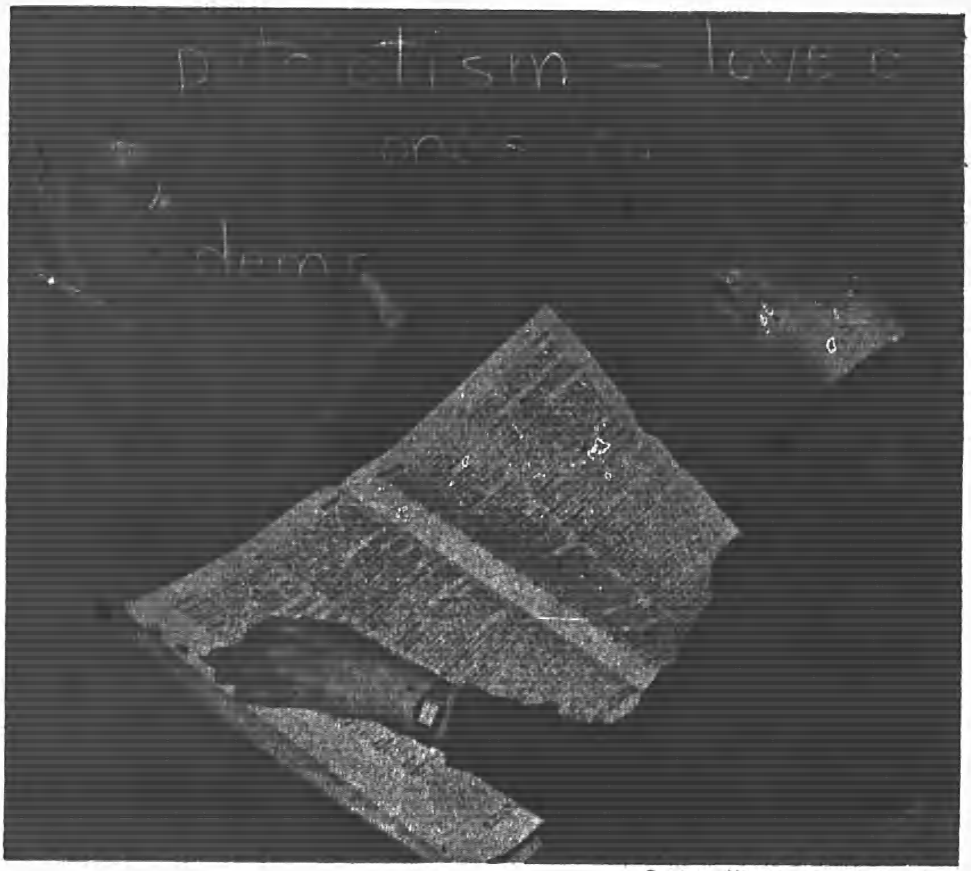
[8] A record-playing machine for which transcriptions of informational and factual books are available.

[9] (See illustration, p. 25.)

in 1879, is designed to furnish to the Printing House the funds to provide the free school texts, tactile apparatus, and other supplementary material necessary in the education of pupils under instruction in the schools and classes for the blind throughout the United States and its Territories. The Printing House maintains three catalogs, which are as follows:

1. A general catalog of Braille publications and appliances.
2. A music catalog.
3. A catalog of Talking Book records.

Since the Printing House is a nonprofit agency, it can offer its facilities to any other agency wishing to have the House do its manufacturing. Books and materials are supplied under contract in accordance with such specifications as may be required by the contracting agency.



Courtesy, Allentown, Pa., Public Schools

One partially seeing boy writes on board with large chalk while another boy finds word in large-type dictionary

WHAT SOME GOVERNMENTAL AGENCIES DO

The *Office of Education, Federal Security Agency*, includes in the Division of State and Local School Systems a Section on Exceptional Children and Youth. The term "exceptional" refers to: (1) The various types of physi-

cally handicapped, such as the blind, and partially seeing, the deaf and hard-of-hearing, cardiopathic, speech-defective, and those children with special health problems, such as epilepsy or diabetes; (2) the mentally retarded; (3) the mentally gifted; and (4) the emotionally disturbed or socially handicapped. The function of this Section. like that of the Office of Education as a whole, is to collect and disseminate statistical data and to give information and consultative services concerning the organization and management of schools. The Section on Exceptional Children and Youth gives such service with reference to special education. The staff members work closely with State departments of education, teacher-education institutions. residential schools, city and county school sysems, and national public and private agencies. Through publications, conferences, and correspondence. they also give information to individual parents, teachers, and others interested in exceptional children.

The *Office of Vocational Rehabilitation, Federal Security Agency*, has a program operating under the legislation passed in the act of 1920, as amended. Under this legislation Federal funds were made available on a grant-in-aid basis to State boards of vocational education. The provisions of this act have been extended so that all disabled persons of 16 years of age or over, with employment handicaps, may secure services through State and regional offices. These services include: Medical diagnosis and prognosis; vocational counseling; medical and surgical treatment; physical and occupational therapy and psychiatric treatment; and vocational training, placement, and follow-up. In each case such service must be directed toward employment. The State vocational rehabilitation agencies, working through their regional offices, are official sources of practical assistance to older boys and girls who are visually handicapped.

The *Children's Bureau, Social Security Administration, Federal Security Agency*, under the provision of the Social Security Act, now has a public program of services for crippled children. This program is carried on by State agencies, assisted by Federal grants-in-aid administered by the Children's Bureau. The term "crippled" is now so broadly interpreted that States may use Federal grant-in-aid funds for some types of visually handicapped children if the State agency so wishes. According to the Children's Bureau:

> The legal or administrative definition of a crippled child should be very broad, and not restricted to a limited number of handicapping conditions * * *.
>
> Many of the State crippled children's programs were initially limited to orthopedic conditions, but now, with additional resources, they include children with conditions requiring plastic surgery, with rheumatic heart disease, diabetes, cerebral palsy, hearing and visual deficiencies, and many other handicapping conditions.[10]

[10] Daily, Edwin F. To Restore Crippled Children. *The Child*. 14: 26-28, August 1949.

Making the school program serve the child's needs

SPECIAL PROVISIONS for the education of visually handicapped children are most commonly made in the United States either in public day schools (through adjustment in regular classes or placement in special classes) or in residential schools for blind children. For a small number of children, parents use private funds to employ tutors, but this practice is relatively rare. To decide what educational provisions are feasible or possible for a boy or girl, both the child and the resources of his community should be studied.

Not every community will find it practical or possible to provide special classes. Many children with partial vision, as well as those with other physical handicaps, live in communities where the population is too small to make special classes practical. Here and there in these communities will be found a partially seeing child failing in his school work; a blind child whose parents are unfamiliar with the educational provisions for blind children; a hard-of-hearing child isolated because he cannot hear; or a cerebral-palsied child growing up without the speech training he may so desperately need. Each of these children requires a special service. For example, the first one needs special equipment; the second one must learn Braille among other things; the third one should have special help with his speech; and the fourth should have a closely supervised medical program, perhaps including the services of physical and occupational therapists.

Meeting Educational Needs in Various Ways

The needs of visually handicapped children vary from one to another, just as community resources differ from place to place. After the child's needs and the community resources have been explored, a flexible plan should be made for his education. This plan should be reevaluated from time to time, and adjustments should follow periodically on the basis of these reevaluations.

One of the most pressing questions in special education is: "How are the schools to serve rural children who have serious handicaps?" Where there is a consolidated school it may afford the opportunity for a center for the education of handicapped children. In some communities, various interdistrict arrangements have also been made. In one county, a special education program is divided according to districts: One district takes all the crippled children in the county; another provides for all the partially seeing children. Where the population is sparse, even larger areas need to combine their efforts. Occasionally, inter-county arrangements are effective and practical. In one situation, for instance, a State line is disregarded so that day-school provisions can be made for physically handicapped children living in two States. Boarding homes have been used successfully in several States,

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particularly where isolated children do not have access to special-school facilities.

In Oregon, a State with a large rural population, a child may go to the residential school for the blind for a period of adjustment and training. When this is the case, the superintendent of the residential school works closely with the Consultant, Education of the Visually Handicapped, in the Oregon State Department of Education, in planning for the child. Before he goes back to his home county, much preliminary work is also done with his local school. The State consultant furthermore continues to supervise and to help his teachers after the child has returned to his home school.

In Oregon adjustments are made for many visually handicapped children so that they may remain in the local public schools. The Oregon plan is based on the principle that no child should be in a special school because of his handicap unless it is absolutely necessary. Oregon reports that for the 5-year period from 1943 to 1948 there were 175 new additions to the State School for the Blind in a total enrollment of 231 blind and partially seeing children. "One hundred sixty-two of the 231 children left the residential school by June 1948. Twenty-eight of these left for such reasons as illness. the remaining 134 left to attend public school * * *."[1]

For a good many partially seeing children, the opportunity for education will depend largely upon the ability of the regular classroom teacher to give them the necessary help. This may, in some cases, be in the form of equipment, such as a special desk, a typewriter, or large-type books. In other cases it may be help from a professional person able to give guidance to parents and teachers. Regular classroom teachers will be increasingly involved in the education of such children as the schools genuinely apply the theory of education for "all the children of all the people." Even when special classes are provided, the pupils usually spend as much as half of the day in regular classes. These conditions seem to mean that all teachers should know at least how to give some help to children with visual handicaps.

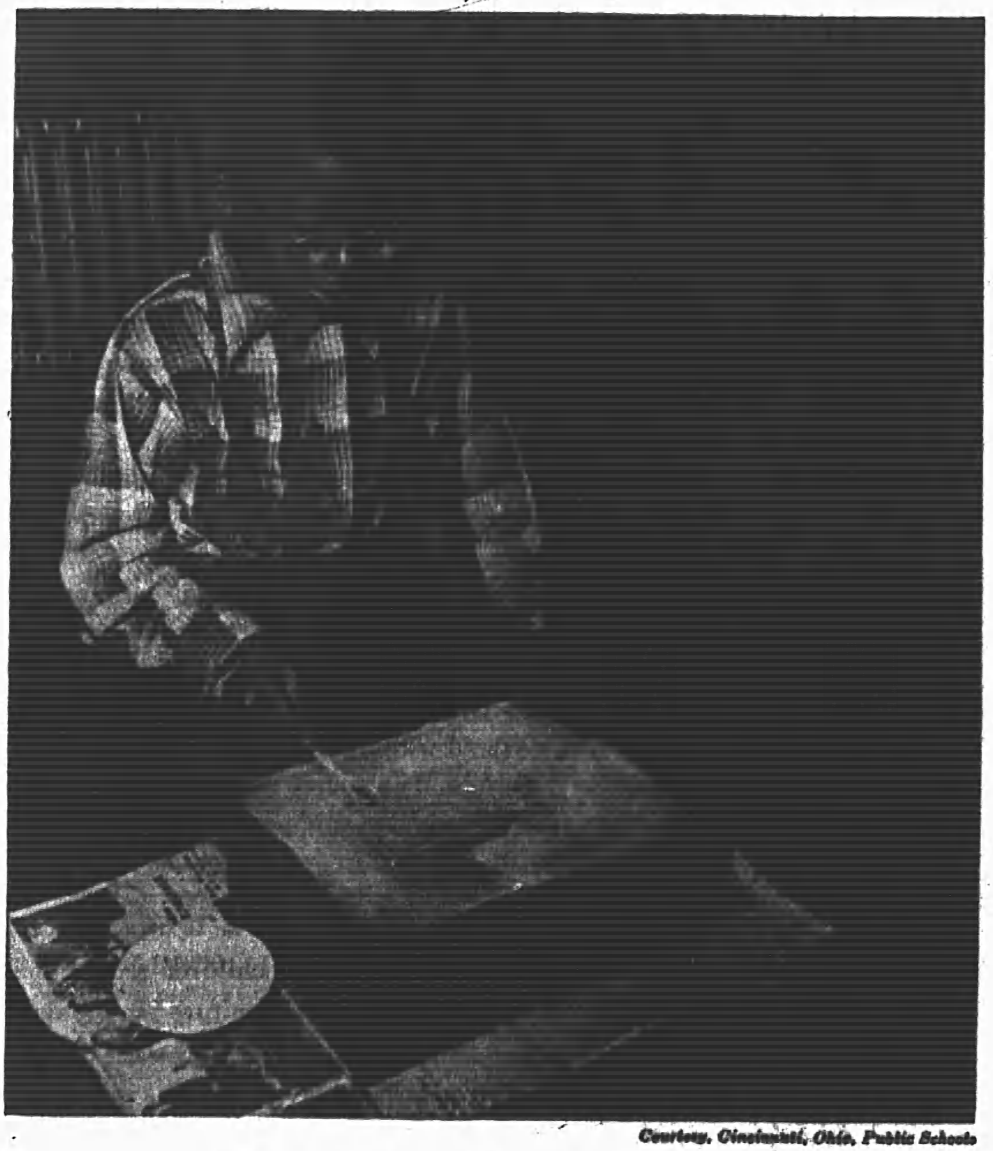
As one reviews the cases of Jane and John reported earlier in this bulletin, it is easy to see that they had many special needs and required special help from the schools extending over a long period of time. Jane will probably be able to secure an education only if she remains in a sight-saving class throughout her elementary years and possibly during high-school days. John in the course of his education attended a State school for the blind, a public day high school, and now attends a State university.

Special Classes for Children With Partial Vision

In the cities and in some rural school districts, the problem of partial vision is met increasingly by the services of a special day class for the low-visioned

[1] Dry, Walter R., The Coordination of the Work of the Residential School for the Blind with That of the Public School. *Outlook for the Blind*, 42: 207–212. September 1948.

in the regular public schools. As of the school year 1947–48, the number of partially seeing children reported indicated that there were approximately 700 classes for such children in the United States.[2] In such a class, a child has a good many advantages which perhaps cannot be provided in any other situation. Usually, a class is staffed by a teacher qualified to understand eye conditions and diseases and the problems of children with vision defects. Ideally, such a teacher knows how a vision handicap affects the child. She knows how the classroom should be decorated and arranged to give children



Courtesy, Cincinnati, Ohio, Public Schools

Partially seeing boy enjoys making a spatter print

[2] Office of Education, Federal Security Agency, *Statistics of Special Schools and Classes for Exceptional Children.* Washington, U. S. Government Printing Office, 1950. 81 pp. (Biennial Survey of Education in the United States, 1946–48, ch. 5.)

the best possible lighting advantages. She thinks of the entire group. She thinks also of the effect of lighting and seating on *each* individual child and helps make proper adjustments. She knows about instructional equipment, books, maps, recreational materials, and other things which enable children to use the vision they have. If she is resourceful, she can make many adaptations which will add to the comfort and normal growth of her pupils.

THE ROOM

The sight-saving classroom is a homeroom for partially seeing children and is usually located in a regular school building. The room should be of standard size and carefully selected insofar as natural and artificial lighting is concerned. It should be a model of good seeing conditions for the entire school. A standard of 50 foot-candles of light correctly diffused and distributed is recommended for sight-saving classrooms. If pupils are to make the best use of light, the ceiling should be white, the walls of light tints, the woodwork of dull finish and light in color. A light-colored, dull-finished floor will also improve the seeing conditions.

To control the natural light, a pair of buff or light gray translucent shades should be attached at the center of each window, one shade pulling up, the other down. With this type of shade, only the part of the window through which the sun is shining needs to be covered.

Light gray-green is a recommended color for the chalk boards. If the chalk boards are black, they absorb a large amount of light. However, if a room has been equipped with black chalk boards, which absorb a large amount of light, an ordinary window shade of light tone may be mounted at the top of the chalk-board frame and pulled down when the board is not in use. The same standards of lighting and ease of seeing conditions should be followed when selecting bulletin boards and room decorations. Bulletin boards should be light in color or covered with light paper. Pictures should be large and have little detail. To eliminate a source of glare, glass should be removed from framed pictures. Glass on cupboard doors should be removed or covered on the outside by light-colored paper or curtains.

EQUIPMENT AND MATERIALS

Equipment and materials should be selected to help children secure their education with the least amount of eyestrain. All the furniture [3] in the sight-saving room should be light in color and have dull finish to reduce glare. Desks should be moveable in order that the child may change his position to get the best seeing conditions. The desk top should be adjustable so that a child can place his work in the position and at the angle which will permit

[3] Specific information on furniture can be obtained from the National Society for the Prevention of Blindness.

him to see comfortably and at the same time maintain good sitting posture. Most sight-saving classes have typewriters with large type. By using the touch method, even pupils with poor vision can prepare written materials. The typewriters thus serve as a sight-conservation measure. Some classes have other mechanical devices such as dictaphones and wire recorders. An increasing number of books are available in large print so that children can enjoy them and learn from them as other children do. A dictionary in large type is now equipment frequently found in class rooms for the partially seeing. Colored outline maps of all countries are considered necessary equipment in a sight-saving class room. The paper which the children use is of dull finish and light buff in color. Pencils with soft, thick lead make broad lines which the children can see easily. The chalk should be large and soft. Such materials as paint, clay, and brown wrapping paper should be available to use in projects. The use of these materials insures relaxation and eye rest.

The National Society for the Prevention of Blindness has prepared an *Outline for Checking Lighting Facilities and Equipment for Eye Work in the Classroom.*[4] A part of this outline is included here.

NATURAL LIGHT

Windows

(Unless climatic conditions make considerations of heat and ventilation paramount, school buildings should be oriented in a direction to bring an abundance of light into the room without the necessity for use of shades over long periods of the day.)

1. Top of glass extending:
   (a) practically to ceiling (no wall space or broad window frames above glass area).
   (b) to height above floor at least equal to ½ width of room.
2. Bottom of glass starting at 3 to 4 feet above floor (may be lower in lower grades with glare and safety protection).
3. Windows extending as near rear wall as practicable.
4. Windows extending to front row of desks, or to front wall if left end of front wall is not used or is shielded from glare.
5. Glass area at least 18 percent of floor area if 3 feet from floor; 16 percent of floor area if 4 feet from floor.
6. Vertical divisions between windows very narrow and light in color.
7. Chief source of natural light provided by windows situated at left of students' desks or work tables.
8. Additional windows to give more uniform distribution of light within room:
   (a) All situated well above head level—e. g., clerestory windows.
   (b) None in wall faced by students.
   (c) Shielded or shaded to prevent direct sunight or skylight entering at angles within field of vision of students.
9. Daylight not obstructed by trees, shrubs, or buildings situated too close.

[4] This outline, prepared by the National Society for the Prevention of Blindness, 1790 Broadway, New York City, is in mimeographed form and may be obtained from that organization.

WINDOW GLASS

1. Clear glass in all windows

or

2. Glass blocks directing light toward ceiling in panes above head level, clear in lower panes.

DAYLIGHT CONTROLS

(Needed to improve quality of illumination by diffusing and directing light rays and by providing protection from glare and excessive brightness.)

1. Available for all windows exposed to direct sunlight or glare from sky.
2. If provided by shades:
   (a) Two shades for each window, one to pull up, the other down—mounted on rollers placed at or near center of windows with shield between to prevent streaks of light

   or

   (b) One shade at middle and one at bottom of window, both operating upward.
   (c) Neutral, light-colored.
   (d) Translucent, unfilled, durable material that will not crack.
   (e) Wide enough to prevent streaks of light at sides.
3. May be provided by other means such as:
   (a) Vertical louvers, located at window panes above eye level and so placed as to shield field of vision from sun or sky brightness by directing light toward front of room.
   (b) Diffusing glass screen, placed at upper portion of window and at 45° angle to it, to direct light toward ceiling and thence into the interior of the room.
   (c) Other devices—e. g., venetian blinds—provided they improve diffusion and distribution of light without introducing undesirable features such as glare or marked decrease in quantity of light.

   (NOTE: Where light from upper panes is controlled by means other than shades, shades are needed for bottom panes only.)

ARTIFICIAL ILLUMINATION

The choice between *incandescent* and *fluorescent* systems is usually one of economics rather than of quality. Both systems, when properly installed and utilized, will meet accepted standards if they have the characteristics listed below:

1. Artificial light available wherever light may fall below minimum requirements at any time during period room is in use.
2. Fixtures:
   (a) Indirect type (directing all light toward ceiling) with luminous or light-colored opaque bowls to reduce brightness contrast with ceiling

   or

   (b) Semi-indirect type (directing more light toward ceiling than downward).
3. All bare lamps concealed from view by:
   (a) Diffusing glass or plastic covering

   or

   (b) Baffles, or louvers, which cut off view of lamps (i. e. no lamps visible to least favorably seated child within 45° angle from horizontal line of vision).
4. All units placed against very light background, to reduce brightness differences between luminaires and their immediate surroundings.

5. Size, spacing, and suspension of units such that there are:
   (a) No noticeable spots of light and shadow on the ceiling.
   (b) No marked variations in quantity of light on work places in various parts of room.
   (c) No strong shadows cast on work by hand or work equipment to interfere with clear vision.
6. Wiring and switch arrangements which permit separate turning on and off of lights on the darker portions of the room.

QUANTITY OF ILLUMINATION

1. Minimum lighting levels at work areas (desks, tables, chalkboards, etc.) which meet standards recommended for the type of visual work performed in the room or area.
2. Levels of illumination as recommended actually maintained at all times room is in use, through:
   (a) Artificial illumination available when needed to supplement and equalize illumination within room.
   (b) Maintenance adequate to keep light levels up to standard.

Courtesy, Oregon State School for the Blind

Group of blind students listening to the talking book

CLASSROOM MANAGEMENT

Children of several grade levels are usually to be found together in a sight-saving classroom. Ideally, from 10 to 16 children are enrolled, depending upon the number of grades represented and the number of children who, because of their eye difficulties, require individual instruction.

In elementary schools partially seeing children usually have their instruction in reading, writing, arithmetic, spelling, and typewriting from the special sight-saving teacher. (For suggestions on teaching of reading see appendix 1, pp. 40–41.) They also prepare their written work in the sight-saving classroom. They usually spend part of the day in regular classes,

participating in such activities as social studies and health education with the other children in school. As a rule the special-class group will be in the regular-grade classes for all work not requiring close use of the eyes. They also engage in other school activities. Under this plan, they retain the advantages of association with the children in regular classes.

In junior and senior high school sight-saving classes, partially seeing pupils may attend all of their classes with the regular-grade pupils in the school. This is possible because of the help and guidance given by the sight-saving teacher. She helps the partially seeing pupils to choose programs which do not involve too much close eye work. In general, sight-saving pupils avoid such classes as sewing and mechanical drawing. As sight-saving pupils advance through school, many can make satisfactory progress if they have the help of a teacher qualified to work with the visually handicapped.

THE TEACHER

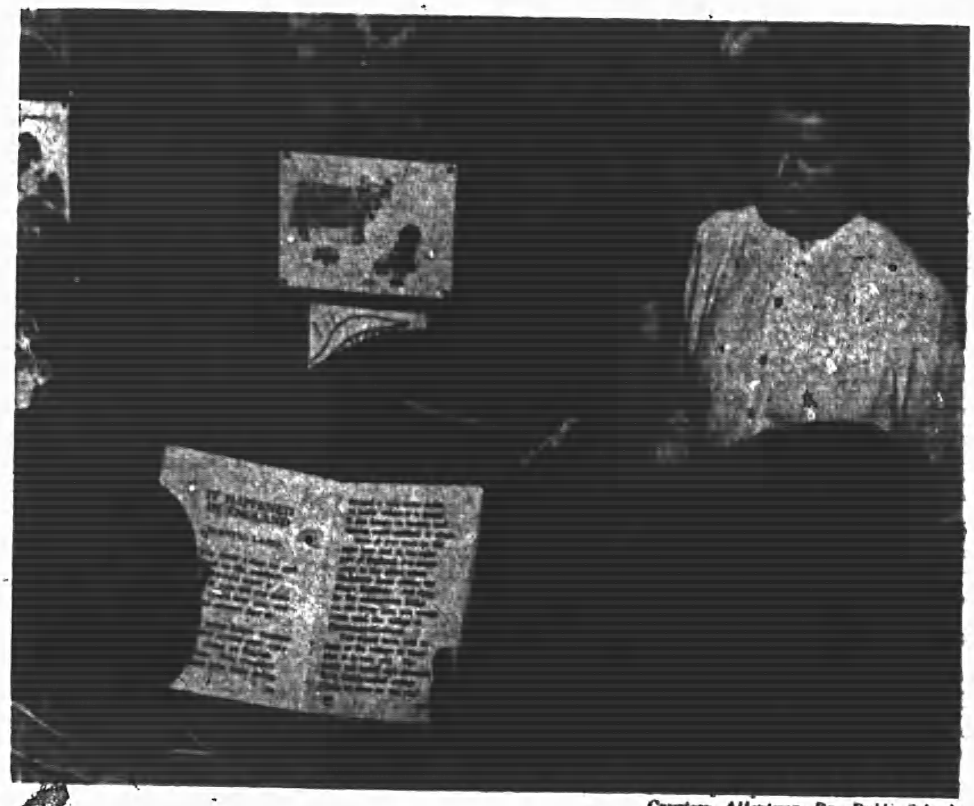
A qualified teacher helps pupils in many specific ways. She adapts the curriculum to the individual pupils. She emphasizes oral work and provides periods of eye rest. She prepares special instructional materials, such as reading material and sets of questions which she prepares in large type. She secures equipment such as Talking Books and records. She works with vocational rehabilitation agencies in guiding young people toward life adjustment.

The sight-saving teacher, regardless of the grade she teaches, should be a regularly qualified and certificated teacher. She should also be specially trained in order to understand the types of eye difficulties and their effects on the individual children. She should know about proper lighting and have the technical knowledge to understand proper use of special equipment and materials. In addition to helping to keep the room a model of good seeing conditions, she should be prepared to give other teachers in her building information or advice on seating and lighting and on proper eye hygiene.

The sight-saving class teacher (the home-room teacher), whether in an elementary or secondary school, has a responsibility which extends into many parts of the school. She has special guidance functions to perform. Most of her children will be going into regular classrooms to spend part of the day with the regular teachers who have had little or no training in the field of the visually handicapped. It will be one of the functions of the special teachers to make sure that the regular classroom teachers working with these pupils understand the individual physical disability of each partially seeing child. She will also be the person to explain the meaning of such a limitation in a school situation. An understading of the nature of the eye condition is basic to planning of reading material, play activities, hobbies, and

other materials and activities. It is also basic to good understanding of both child and parental attitudes.

While the teacher is providing these special services, she must also keep her eye on the general goal of the school program. The wise teacher is continuously concerned with the need for normal growth and development of each child. She should plan carefully for the preparation and presentation of materials in order to give each child a true sense of achievement. This is one of the principal needs of exceptional children because they, like all other children, should experience feelings of success.



Courtesy, Allentown, Pa., Public Schools

Usual child activities are experienced in a class for partially seeing

INSTRUCTION

Most of the classes for the partially seeing include children of a wide grade and age range. For example, there may be one 6-year-old and one 17-year-old in a group otherwise composed of 8- to 12-year-olds. When this is true, it is very important for the sight-saving teacher to look for ways of unifying the special class as well as for ways of identifying the children with the regular pupils in the school.

Projects of interest to children of all ages and levels of development are excellent devices. The importance of a well-organized program allowing

for group enterprises cannot be overemphasized. It is largely through such a program that the handicapped child establishes his social status. Group projects, such as the making of a newspaper, the raising of pets, or the cultivation of plants, allow pupils at all levels of maturity to contribute. An illustration of such an enterprise is the project resulting in the *Sight-Saving Lamplighter*, published by the pupils of the intermediate sight-saving class in Erie, Pa. This paper is prepared and issued at regular intervals. It contains news, poems, articles, and drawings. It is circulated in the Erie school system, and sample copies have also gone to many cities in the United States and to a few cities in foreign countries. Through a concrete enterprise of this kind, the morale of a class can be considerably heightened. Such a publication to which each child contributes acts as a powerful incentive to learning. It, furthermore, gives him social and emotional satisfaction and affords a situation for genuine recognition.

The school situation demands more of the visually handicapped child than it does of a so-called normal child. A visually handicapped child, for example, divides his time between the regular and the special class. As a result, it is possible for such a special-class child to have little sense of belonging to either the special or the regular group. The sight-saving teaching usually carries the main responsibility for overcoming these problems.

The Partially Seeing Child in the Regular Classroom

Special features, such as intensified medical care, proper classroom lighting and seating, as well as individual guidance, are essentials in special classes. These are also needed to some extent by visually handicapped children who are in regular classes of the public schools. Handicapped children who are in the regular classes are usually those with the milder disabilities. On the whole, they need less individual attention than those in the special classes. However, where there are no special classes, if supervision is available, adjustments can be made in regular schools to aid some children who have fairly serious defects.

Through conferences with State or regional education consultants, doctors, and nurses, and through written reports, the teacher of the regular class can learn something about the disabilities of the handicapped children in her class. She can seek the aid of agencies working for visually handicapped children. She can bring into the regular classroom some of the special features, such as large-type books and typewriters.

The regular teacher, furthermore, has a rich opportunity to influence the attitudes of the other children in the class so that they will be willing to accept the handicapped child and so that they will come to think of him as an individual who is like them in all respects, except that he happens

to have a physical deviation. As a member of a team concerned with the welfare of the handicapped, the teacher can work with parents and help them to secure authentic factual information regarding the condition of their child and encourage them to secure reliable professional advice and constructive guidance.

For those teachers who are in States not providing consultants or directors in the education of visually handicapped children, the following suggestions from The Illinois Plan for Special Education of Exceptional Children, *The Visually Defective*,[8] may be helpful:

1. Place seats and desks in the position which will give the best illumination on the children's work and protect them from glare. If seats are placed at an angle of 30 degrees from the windows, no child faces the light or sits in his own shadow. Left-handed children should have light from their right.

2. Give careful attention to both natural and artificial illumination. All light, whether natural or artificial, should be adequate for the type of work undertaken. Good classroom lighting is well diffused, evenly distributed throughout the room and free from glare, objectionable shadows, and strong contrasts. . . .

3. Keep shades adjusted to permit the best natural light without glare.

4. Do not sit or stand between the children and the window. Such a position requires the children to face the light when looking at the teacher.

5. Seat the visually handicapped child in the best lighted place in the room. Since he has poorer vision than any other member of the class, he should be placed in a position in which he can have sufficient light, see the blackboard, see the face of the teacher, or any other person who might be talking to the class, and avoid the glare from shiny surfaces or exposed light.

6. See that he has very black lead pencils, dull unglazed paper, and books with as large clear type as possible. . . .

7. Prepare copies of tests and other materials for him in large clear script or manuscript, rather than have him strain his eyes copying from the board. Copy work is especially hard for a person with a severe visual handicap.

8. Place all board work on the best lighted portion of the board in large clear writing or manuscript, using large, soft, white or yellow chalk.

9. Permit the visually handicapped child to write larger than average, and if manuscript is easier for him, he should be encouraged to use it. If a typewriter is available, the use of it will save him untold eye strain.

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[8] State of Illinois, Department of Public Instruction, *The Illinois Plan for Special Education of Exceptional Children, The Visually Defective*. Springfield, Ill., pp. 38 and 39. (Circular Series D, No. 12.)

10. Appoint a pupil reader for him, preferably a child in the same class who reads well, and who is capable of discussing materials he reads with the visually handicapped child. This helper can releive the teacher much time-consuming work and the handicapped chid of much eyestrain caused by lengthy reading assignments. Reading should be considered a tool for the visually handicapped child, rather than a leisure-time activity.

11. Eliminate as much home work as possible. Encourage use of the ear rather than the eye as the organ of learning. The discriminate use of the radio is particularly encouraged for both home and school as a tool for learning.

12. Discuss the pupils eye condition with te parent and doctor, and follow the doctor's recommendation concerning use of the eyes. Encourage regular visitation to the doctor.

13. Teach eye hygiene as a definite part of classroom work. Help the visually handicapped child develop a sane attitude toward his handicap and adapt himself to it.

14. Make every effort possible to get him in a sight-saving class. Perhaps a thorough screening program in the local and nearby communities will reveal ufficient number of cases to estabish a sight-saving class.

Educational Programs for Blind Children

For the most part, the education of blind children goes on either in a residential school for the blind or in a Braille day-school class for the blind. The reason for this is that the blind child needs to learn Braille (see p. 35 for description of Braille) and have other technical training to prepare him for adjustment in a sighted world. The blind child must learn through other senses than sight—especially through touch and hearing.

Residential schools serve by far the larger number of blind children in this country. Every State either maintains a residential school for the blind or makes some arrangement for its children to have access to one. The day-school classes (Braille) for the blind, however, are organized as a part of the public-school system, and their organization is similar to that of the sight-saving classes discussed in the preceding pages. It, therefore, seems logical to give attention first to the Braille classes in day schools.

Day classes for the blind in public schools (Braille classes) are conducted, of necessity, only in the larger population centers. Several cities have developed extensive day-school programs for children who are blind, as well as for those who are partially seeing. Such programs have been especially successful when the schools have employed supervisors who devoted their time to the needs and problems of visually handicapped children and worked with the parents of such children.

Braille Classes in Day School [6]

The Braille classroom is a homeroom for blind children and is usually located in a regular school building. Children in such classes receive services which help them to overcome their handicaps and prepare them for life in a sighted world.

The blind, like the partially seeing pupils, usually spend part of the day in regular classes. Participation with children of normal vision provides the blind with academic and social competition so important for their adjustment to life.

THE ROOM

The Braille classroom should be located where there is a minimum amount of noise. It should be a room of standard size or larger in order to have space for the children to move about freely and to store the special equipment and materials.

The room should have the same standards of lighting (50-foot candles of light) as a sight-saving classroom. All standards in a correct visual environment, such as white ceilings, walls in light tints, and absence of glare, should be observed. In such an environment the child who has enough vision to recognize gross objects will be encouraged to do so.

Children and teachers are happier in a room with cheerful appearance. Blind children enjoy helping to keep the bulletin boards and the room as attractive as possible. Even though they cannot see, they will gain satisfaction from the comments of people who come into a pleasant and orderly room.

FURNITURE AND EQUIPMENT

The furniture in the Braille classroom should be light in color and have a dull finish. Desks that have adjustable seats and tops help the children to maintain better posture. In addition, such desks facilitate the handling of Braille books and materials. For young blind children, kindergarten tables and chairs have been found useful.

Plenty of cupboards are needed for storage of Braille books and other cumbersome materials and equipment. There should be at least two tables in the classroom for Braille maps, globes which children use in their work, and other teaching material.

Pupils in Braille classes in junior and senior high schools require typewriters, Braille writers, and a variety of Braille books and magazines for the preparation of their lessons. Pupils at this grade level often have Talking Book machines in their homes. (See illustration, p. 25.) Braille writers, as well as Braille slates and stylus, are needed for writing in Braille. Most

[6] This section, Braille Classes in Day Schools, was prepard by Edith Cohoe, Supervisor, Braille and Sight-Saving Classes, City Public Schools, Detroit, Mich.

Braille rooms have standard typewriters and typewriting tables and chairs. Pupils learn to type by the touch method, usually beginning in about the third or fourth grade. They then prepare their written lessons for the regular class on the typewriter. Thus, typewriters serve as a means of written communication with the rest of the school. Talking Books greatly enrich the teaching program of any Braille room. Radios and recording machines are also most useful mechanical aids.

Courtesy, New York Institute for the Education of the Blind

Blind children, hesitant at first, acquire freedom through play in the jungle bar

BOOKS AND MATERIALS

All of the books used by children in classes for the blind (whether in day or residence schools) are in Braille print. The American Printing House for the Blind (referred to on pp. 16–17) is the chief source for embossed (Braille) reading materials for the blind. Special maps and globes on which the children can feel the outlines of continents and countries, and locate important cities are necessary school equipment. Models of certain buildings and machinery help these children get the correct impressions of the world about them. Likewise, pet animals and mounted specimens for the children to touch and examine are valuable teaching aids. Braille arithmetic slates and cubes are needed in solving arithmetic problems.

INSTRUCTION

Children of three or more grade levels may be found in any Braille room. Six to eight pupils are considered an adequate number since they require more individual attention than do the partially seeing. Like sight-saving classes, Braille classes follow, for the most part, the curriculum of the school in which they are located.

The absence of vision prevents blind children from learning many things which seeing children know from casual observance such as the location of the corner mailbox or firebox. Thus, a trip to the corner mailbox or firebox may be a necessary part of the instruction for the blind child.

In elementary classes, blind children usually get their instruction in Braille reading and writing, arithmetic, spelling, and tpyewriting from the special Braille teacher. She teaches them at least enough pencil writing to enable them to sign their names. Blind pupils usually prepare their lessons in the Braille classroom.

Blind children of elementary school age enjoy sand tables for working out projects. Kindergarten-age blind children get pleasure from playing in the sand much as sighted children do. Handcraft materials, such as yarn and knitting needles, leather, and modeling clay should be available. An elementary Braille classroom may also have a piano to be used in teaching rhythms and singing games. The music may encourage these children to try to run, skip, and hop—things they frequently have not tried before coming to school.

In addition to the special Braille homeroom teacher, classes for the blind in large cities usually have the services of handcraft and music teachers. The handcraft teacher gives instruction in weaving, knitting, crocheting, basketry, leatherwork, and other handwork. Such work helps to develop muscular coordination and strengthens fingers for Braille reading and writing. It also gives the child confidence in himself and furnishes him with occupation for his leisure.

The music teacher may teach rhythms to the young children, sometimes forming rhythm bands which the children enjoy. She may also give individual piano lessons by the Braille method to older pupils. This gives a child confidence in himself, is an occupation for leisure time, and makes him more acceptable socially. Much that is not mentioned in connection with Braille class instruction will be discussed in the following description of residential schools.

Residential Schools for the Blind [7]

Efforts to educate blind children are of comparatively recent date. The first school for blind children was established in Paris, France in 1785.

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[7] This section, Residential Schools for the Blind (pp. 33-39), was written by Dr. Berthold Lowenfeld, Superintendent, California School for the Blind, Berkeley.

America followed in the period between 1829–32, when the three great Eastern institutions for the blind were established: Perkins Institution at Watertown, Mass.; The New York Institute for the Education of the Blind; and Overlook School for the Blind near Philadelphia. Only shortly thereafter the State of Ohio appropriated funds for the establishment of a State school for blind children, and from then on many States founded schools of their own so that now all States have residential schools for their blind children or provide education for them in residential schools of neighboring States. The size of these schools varies from State to State. Small schools may have 50 or 60 pupils and the largest ones may have about 250. Braille classes as well as residential schools have a common aim—to prepare the blind child for a life which will make him a productive member of his community. The Braille class aims at doing this by giving blind children the assistance necessary to enable them to take part in regular classroom work in public day schools. The residential school provides an environment which is entirely geared to the needs of the blind child.

SERVICES RENDERED

It is now generally recognized that the education of a blind child should not impose upon the parents an additional financial burden. For this reason education in residential schools for blind children is provided free of charge. Residential schools are usually in session from September to June, giving children a 3-month vacation at home with their families. Many residential schools accept blind children for kindergarten training and keep them through high school. Graduation from a school for the blind in general entitles the graduate to college admission.

In passing a residential school one may see children at play or at work and hardly recognize that they are blind. They move about, laugh, and entertain themselves just as any other group of children. That they can do these things is due to a great deal of love and effort on the part of the parents and to a system of education which provides them with opportunities for growth and develops in them skills needed to pursue work and play.

The importance of training for blind preschool children has impressed itself upon those concerned with particular force during the last years when the number of blind infants increased because of an eye defect caused by premature birth. In spite of this increased need, organized assistance to help the parents is provided only in comparatively few States. Some States, including New York, Illinois, Ohio, California, and Oregon, provide the services of visiting teachers for blind preschool children. These teachers visit the families where a blind preschool child grows up and help the parents to better understand their own emotional problems in accepting the child. They also assist them in the training of their child and in solving other problems that may arise.

It is natural that parents will feel deeply disturbed if they find that their child has a severe visual handicap. Not knowing what the blind child needs and not being able to find information about it readily available either through contact with other parents or in printed form, they either overprotect their child or neglect his needs and thus may seriously hamper his normal development. Information on available services can be obtained from local or State agencies serving the blind or from the American Foundation for the Blind, 15 West 16th Street, New York 11, N. Y.

SOMETHING ABOUT THE BLIND CHILD

Parents and teachers must keep in mind that the blind child is first of all a child. His intellect, his emotions, his desires are fundamentally like those of other children. The visual handicap makes it necessary to modify methods and approaches. The blind child is, however, first of all a *child*, and therefore all that parents and teachers can learn from child psychology, from education, from child guidance will help them in their special task of educating blind children. In general, blind children follow the same pattern of development as seeing children do. They learn to walk, to talk, to feed themselves, and to play just like all other children. It may take them a little longer to acquire skill in one or the other activity, but with patient understanding and consistent guidance they will succeed. It might be interesting to note the reason for one developmental deviation that has been observed in some blind children who do not go through the crawling stage in learning to walk. Children who can see make their first movements toward objects because they are visually attracted by them. The blind child does not experience attractions of this kind and therefore may skip the crawling stage.

EDUCATIONAL ADJUSTMENTS

When one talks about special methods in teaching blind children, one probably thinks at first of the changes that are necessary in teaching the "three R's"—reading, writing, and arithmetic. Blind children learn to read and write a system of dots which is called "Braille" after its originator, Louis Braille, who was a blind teacher at the School for the Blind in Paris in the 1820's. The full Braille sign consists of 6 embossed dots—2 vertical rows of 3. The letters of the alphabet are made up by different combinations of these 6 dots, of which 63 are possible. Braille Grade One is uncontracted and written in full spelling. Standard English Braille Grade Two, the official system for the English-speaking countries, makes use of contractions of letter combinations, syllables, or words. Braille Grade Two can be read and written faster, and books printed in Braille Grade Two take up less space than those printed in uncontracted Braille.

Whether the blind child has gone to a regular kindergarten or to a special kindergarten, he should be ready to enter school at about the same age as seeing children. At school entrance he should be able to take care of his physical needs, to dress himself, to eat with a spoon and fork, to move about in familiar surroundings, and, of course, he should be able to talk as freely as other children of his age. He should be able to play by himself and with other children and grown-ups. At the residential school, the blind child learns grade by grade about the same material that seeing

Courtesy, American Foundation for the Blind

Through clay modeling a blind child finds self-expression

children learn so that at graduation he has covered the same ground as all other youngsters who are ready to leave school.

Compared with visual reading, touch reaching of Braille is slow. It has been observed that the reading speed of Braille readers is about one-third

of that of seeing readers. In the 1930's, a supplementary reading medium, the "Talking Book," was made available to the blind and to schools and classes for the blind. Talking Books are long-playing phonograph records on which texts are recorded by a skilled reader. Talking Books for children are often illustrated by sound effects or use dramatizations to make the reading more lively and interesting.

Children learn to write Braille with a stylus and slate or on a mechanical Braille writer. In addition to learning this system which they can read and write, blind children also learn to use the regular typewriter which permits written communication with the seeing, although the blind themselves cannot read what they have typed. In number work particular stress is laid upon the development of number concepts and on skill in mental arithmetic. Blind children also learn to use an arithmetic slate for computations and in geometry embossed diagrams are used. In geography, relief maps and globes replace the printed maps. Other adjustments are made in the study of such subjects as physics and chemistry. In all these, demonstrations must be directed towards the senses of touch, hearing, smell, or taste in order to become meaningful for the blind students. Although adaptations are necessary, practically all subjects can be taught and have been taught to blind students.

In the area of creative activities, painting and drawing can be done only by those pupils who have some sight. Modeling is a valuable creative art activity, and many blind children greatly enjoy working with clay or plasticine. It is not the product which determines the value of an art activity, but the process and its effect on the personality of the child. Music holds an important place in the education of the blind. Provided the blind child has the necessary talent, there is no instrument which he cannot learn to play. Learning to play an instrument, however, is much more difficult without sight because all practice material must be memorized since the reading organ, the hand, can be used only for reading or playing. Besides being a possible vocation for a few highly gifted blind people, music is important as a social asset in the life of the blind.

Various handcrafts are taught in the school for the blind, such as woodworking, metal work, basketry, and weaving. Homemaking and household arts are taught to boys as well as girls.

SPECIFIC PROBLEMS

Blind people are confronted with difficulty in getting about. This is often one of their greatest problems. Blind children must become as independent as possible in walking around in familiar territory and must acquire the necessary skills that will enable them to move about in unfamiliar surroundings. They must learn to use such aids as the cane and must also become

alert to and aware of the many sensory clues which are so important in orientation and locomotion. The future success of a blind person at college or at work may depend to a large extent upon his skill in getting about. Gymnastics, corrective posture work, all kinds of outdoor activities, and such sports as swimming, running, and wrestling are taught in most schools for the blind.

The education of blind children calls not only for changes and adaptation like those already discussed, but also for changes in methods based on the psychological effects of blindness. The teacher of blind children knows that verbal description of objects does not suffice, but that he must supply his pupils with concrete experiences of objects and situations in their environment. He can do so by letting the children observe the object itself or a model of the object so that they will gain an actual knowledge of its form, size, and other qualities. Such concreteness in teaching will help his pupils to gain experience of the world in which they live.

Another factor that must be considered in the education of blind children is their inability to learn by visual imitation. Many of our social behavor forms are acquired on the basis of observing others, and such imitation is of great importance in the learning of walking, talking, and playing. In these skills, as well as in the large area of conforming to the social behavior patterns of his group, the blind child and adolescent must learn by nonvisual methods. A blind child learns to enter a bus or streetcar and to find a seat or place for himself through repeated actual experience, while a seeing child learns these things as a matter of course. Teaching by study units is particularly important for blind children during their first years at school. For instance, a unit on the grocery store will acquaint the blind child with all important features of such a place, about which he is not likely to learn if this is left to himself. Thus the teacher of blind children must supply them with many of the experiences which can be taken for granted in the case of youngsters with sight.

PERSONAL AND VOCATIONAL GUIDANCE

Most schools for the blind offer only prevocational training and little vocational training except perhaps in one field, piano tuning, where early training is considered to be a necessity. Vocational guidance, however, is a very important function of the schools. Blind adolescents are greatly concerned with their vocational or professional outlook, and schools must not only give them information on vocations, but also help them to find out along which line their own interests and aptitude should be developed with best chances for success. Cooperation with the State office of vocational rehabilitation has been found very advantageous.

Forward-looking residential schools for the blind are continuously aware of the importance of keeping the child in close contact with his family and with the community. Whenver a child lives close enough, they accept him

as a day pupil so that he can remain with his family. For those children who are in residence they encourage home visits for week ends and for as many holidays as possible. A cooperative relationship between the school and the child's home is most desirable. Church and Sunday school attendance and participation in such activities as scouting provide valuable opportunities for community contact.

An increasing number of residential schools are sending either all or some of their high-school students to the local regular high school where they can experience work and competition with their seeing peers. Reading service and tutoring are provided for them at the residential school in order to insure their best possible success in regular classroom work.

Thus, the modern residential school has moved far ahead from its beginning as a charitable and segregated institution to become a part of the educational system designed to meet the total needs of blind children as a step toward their integration into society.

Appendix 1

Reading in classes for partially seeing children

BELOW are some specific suggestions for teaching reading in classes for partially seeing children. This material is quoted with permission from The Illinois Plan for Special Education of Exceptional Children, *The Visually Defective.* (The Illinois bulletin, pp. 18–21, contains other helpful suggestions for teaching arithmetic, writing, typewriting, language, and other skills.)

READING

1. Set up a practical reading program for each visually handicapped child in the light of the ophthalmologist's report. Arrange periods of reading so they will be short and scattered throughout the day.

2. Supply visually handicapped child with clear-type, large-print readers as basic materials for use in developing reading skills and abilities.

3. For the great majority of pupils with defective vision, reading should be restricted chiefly to the informational type with very little of the recreational type. Therefore, see that the time the child uses eyes in learning to read and in reading gives maximum results. During the day, if materials for the content subjects are available in suitable type so the child does considerable reading, it is well to omit a reading lesson as such.

4. Since good methods of teaching reading will stimulate interest in reading for pleasure and recreation, have in the classroom a number of good library books in large, clear type, which may be read for short periods by some pupils upon the recommendation of the ophthalmologist.

5. Satisfy pupil's desire for reading through oral reading by the special teacher, paid readers, pupils from the regular grades, and members of the child's family. Correct use of mechanical devices, such as the radio, dictaphone, and Talking Book, is very helpful in reducing the amount of reading and as a means of improving reading.

6. Select materials for reading which will not only meet the requirements of good eye hygiene, but will also be of real interest and educational value.

7. As reading skills cannot be neglected, aim to develop the type of skills needed in connection with all subjects where reading is required.

8. Attempt constantly to build up background and concepts through purposeful activities other than pupil's reading in order to enrich meaning of what is read.

9. Provide for oral as well as silent reading experiences.

10. Use of good clear-cut pictorial materials, such as pictures, posters, graphs, etc., will often give a child more exacting information than he can derive from reading several pages.

11. Keep a card catalog or a bibliography of all available reading materials in the clear-type, large-print books.

Appendix 2[1]

Causes and frequency of visual handicaps

THE UNDERLYING CAUSES of blindness can be readily understood even by the average layman, since the terminology in which they are described is already familiar. It is in description of the topographical factors (i. e., the location and nature of the eye affection) that the examining ophthalmologist uses the technical vocabulary of his specialty. It is desirable that the teacher, nurse, or social worker wishing to help a child know the significance of terms used in diagnosis in order to understand better the nature of visual handicaps.[2] If one knows each of the main parts of the eye by name, where it is situated, and its basic characteristics and functions, one can more easily understand why and how a condition of that part will affect vision.

For example, an essential feature of the cornea, which covers the front portion of the eye (over the iris), and of the lens, situated just behind the iris, is that they shall remain crystalline clear and transparent so that light rays may pass through them. Hence any diagnosis implying infection or injury of the cornea might be expected to result in opacities of the cornea, and an injury or disturbance of normal metabolism of the lens would cause opacity (cataract) of the lens. These opacities would therefore obstruct vision in proportion to their density and extent.

Similarly, if one recognizes the retina as the innermost of the three layers forming the eyeball and knows that it contains nerve tissue which registers visual images, a diagnosis of central retinitis or macular degeneration of the retina would imply a loss in central visual acuity, but most of the other

[1] Appendix 2 was prepared by C. Edith Kerby. Refer to pp. 7–10.

[2] For a simple text on eyes *see*: Sidney A. Fox, M. D., *Your Eyes*. New York, Alfred A. Knopf, 1944, 191 pp. A mimeographed list of definitions of eye terms is available on request from the National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N. Y.

terms (retinal detachment, retinal hemorrhage, retinitis pigmentosa, etc.) imply impairment of sight in other areas of the field of vision.

Nutrition of the eye is provided by the middle layer (uvea) which contains blood vessels and consists of the choroid (the portion under the retina) and the ciliary body and iris toward the front of the eyeball. It is therefore easy to understand that when one part of the eye becomes diseased the other parts are frequently affected. For example, areas of choroidal atrophy or degeneration would impair vision in the portions of the retina above these areas.

SITE AND TYPE OF AFFECTION

In the table on page 43 in which causes of blindness are shown by site and type of eye affection, it will be noted that cases are classified by part of eye affected. The largest group is the 36.1 percent affecting the eyeball in general. These include the various structural anomalies of the eye. In the order of their frequency these anomalies are: The eye with several structural defects, the excessively large (buphthalmic) eye which is the congenital type of glaucoma, the albinotic eye which lacks pigment, the excessively small or microphthalmic eye, the eye with a cleft (coloboma) in one or more of its parts, the eye without an iris (aniridia), finally the eye which fails to develop at all (anophthalmos). These defects are often inherited, but may be due to other prenatal factors.

The entire eyeball may be affected also by a general inflammation because of infection (panophthalmitis or endophthalmitis) or to a serious penetrating injury which may cause degeneration of the eyeball. Refractive errors, if extreme, may cause blindness. This is especially true of myopia (nearsightedness) of the progressive malignant type which is invariably associated with pathological affection of the choroid and retina. The amountof blindness from myopia in the school-age group is not large (2.6 percent of the total). Fortunately, much of the myopia in school children is not of this serious type. While it may tend to increase somewhat during the period of growth, it finally becomes static while still moderate in degree and can be fully compensated by eyeglasses.

Blindness involving the crystalline lens accounts for 17.8 percent of the total. These are chiefly the cataracts which are prenatal, sometimes hereditary in origin, but cataracts may also be caused by injury or disease. Dislocated lenses, although much less frequent (0.7 percent), are usually prenatal in origin. The recently identified retrolental fibroplasia is also classified here. The numbers included in the 1947–48 tabulations do not reflect the true frequency, since few of the children known to be affected had not then reached school age.

Affections of the optic nerve are involved in 14.9 percent of the blindness

Causes of Blindness Among Pupils in Residential Schools for the Blind and Braille Day Classes, by Site and Type of Affections, 1947–48

Site and Type of Eye Affection	Percent of pupils	Total enrolled
Eyeball, in general		36.1
Structural anomalies	(25.3)	
Multiple structural anomalies	8.7	
Megalophthalmos (buphthalmos, infantile glaucoma)	8.7	
Albinism	2.3	
Microphthalmos	1.9	
Coloboma, any part (excluding surgical)	1.1	
Anophthalmos (excluding surgical)	.6	
Aniridia	.5	
Other and not specified	1.5	
Refractive errors	(3.6)	
Myopia	2.6	
Other and not specified	1.0	
Panophthalmitis and acute endophthalmitis	(1.1)	
Degenerative changes	(3.7)	
Other and not specified	(2.4)	
Cornea		8.6
Keratitis, ulcerative	5.3	
Keratitis, other and not specified	2.0	
Other and not specified	1.3	
Iris and Ciliary Body		5.8
Iridocyclitis, and uveitis	2.3	
Sympathetic ophthalmitis	2.5	
Other and not specified	1.0	
Crystalline Lens		17.8
Cataract	15.6	
Dislocated lens	.7	
Retrolental fibroplasia	1.5	
Choroid and Retina		12.3
Choroiditis, retinitis, and chorioretinitis	6.0	
Retinal degeneration (including pigmentosa)	3.6	
Detached retina	.8	
Other and not specified	1.9	
Optic Nerve, Visual Pathway, and Visual Cortical Centers		14.9
Optic atrophy and optic neuritis	10.3	
Retrobulbar and intra-cranial lesions	3.9	
Neuroretinitis	.7	
Vitreous (exclusive sequellae of known ocular disease)		0.1
Miscellaneous and of unknown or uncertain cause		4.4
Total, all causes		100.0

in school children. They may be present at birth, or due to an infectious disease, chiefly syphilis or meningitis, or to an injury or brain tumor.

Affections of the choroid and/or retina account for 12.3 percent of the total cases. They are largely of prenatal or infectious origin, but the cause in many cases is unknown.

Affections of the iris and ciliary body (5.8 percent) occur most often in injuries, but may also be due to infectious disease or to unknown cause. The corneal affections (8.6 percent) are due chiefly to infections, especially ophthalmia neonatorum and syphilis, but may be due to other causes such as injury.

CAUSES OF BLINDNESS

Of the known causes of blindness the most important are the infectious diseases, which in 1947–48 accounted for 16.8 percent of the total cases. Ophthalmia neonatorum (infection of the eyes of newborn) with 7.5 percent and syphilis with 3.2 percent still head the list. The figure for percentage of blindness because of syphilis is believed to be higher than this, since many cases of a type which might have been caused by syphilis are diagnosed as "unknown." However, blindness from both ophthalmia neonatorum and syphilis is decreasing. For example, among new pupils entering the schools for the blind in 1947–48, the percentage due to ophthalmia neonatorum was only 2.2 percent. Because of public health control measures, blindness from diseases such as smallpox, diphtheria, and typhoid fever is no longer a problem.

Trauma, or injury, ranks second on the list of known causes, with 7.6 percent of the total. Eye accidents incurred in play or sport are responsible for most of these cases, or 4.8 percent of the total. Blindness from trauma is decreasing, because of the success of safety measures, such as legislation to control the use of fireworks and air rifles and of safety education directed to parents and children, stressing the hazards of sharp or pointed objects, of explosives, and of blows or falls. Blindness from trauma is decreasing also because of prompt ophthalmological care. This is sometimes necessary in order to save the uninjured eye.

The third cause, neoplasms, although not large in numbers (3.8 percent of the total) is increasing. It is believed that the reason for this increase is not so much an increase in cancer as the fact that surgical removal of brain tumors located near the optic nerve often saves the life of a child but not his vision.

Other causes of blindness are general disease (1.2 percent) and poisonings (0.2 percent). Reported cases are relatively few in available data, but their actual frequency may be greater than the figures indicate, since in the ophthalmological examinations made at the school for the blind, usually long after blindness has occurred, it would be quite difficult to determine the cause. The presence in data of even a few cases attributed to toxic poisoning or to some systemic disease provides proof of the importance of good general health in the protection of eye health.

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