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BLIND Children

Degree of Vision
Mode of Reading

An Analysis of Children Registered With the American Printing House for the Blind in January of 1960 Under the Act "To Promote the Education of the Blind"

Prepared by
JOHN WALKER JONES, *Specialist*
Education of the Visually Handicapped
Section on Exceptional
Children and Youth

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE · ABRAHAM A. RIBICOFF, *Secretary*
Office of Education . . . . . STERLING M. MCMURRIN, *Commissioner*

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Foreword

BLIND CHILDREN are entering the Nation's schools in larger numbers than ever before. In addition to those blinded by usual causes, a new eye condition primarily affecting prematurely born infants swept the Nation between 1945 and 1955 leaving thousands of visually handicapped children. Most of these are attaining school age at this time. There has been an increasing demand for statistical information of the type provided in this publication as more and more general and special educators have become involved in meeting the needs of these children.

The summary findings presented are based on facts about the largest number of blind children known to have been included in an educational study in this special field. It was made possible through the cooperation of officials at the American Printing House for the Blind, who made available to the Office of Education information on the more than 14,500 children registered for the 1959–60 school year under the act "To Promote the Education of the Blind."

E. GLENN FEATHERSTON,
Assistant Commissioner,
Division of State and
Local School Systems

J. DAN HULL, *Director,*
Instruction, Organization,
and Services

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Assistance was received also from many educators throughout the Nation who are actively engaged in work in this special field and who gave generously of their time and experience to review the preliminary tables and charts. Among those who reviewed the material and offered suggestions about the analyses were: Georgie Lee Abel, professor of education, San Francisco State College; Dr. Samuel C. Ashcroft, assistant professor, George Peabody College for Teachers; Mrs. Dorothy Bryan, consultant, Illinois State Department of Public Instruction; Father Thomas J. Carroll, director, Boston Catholic Guild for the Blind; Edith Cohoe, supervisor, Detroit Public Schools; Helen Gibbons, consultant in education, National Society for the Prevention of Blindness; Elizabeth M. Hatfield, consultant in statistics, National Society for the Prevention of Blindness; Dr. Berthold Lowenfeld, superintendent, California School for the Blind; Maurice Olsen, executive secretary, American Association of Instructors of the Blind; Egbert N. Peeler, superintendent, North Carolina School for the Blind and Deaf; Josephine Taylor, director, Educational Services, New Jersey Commission for the Blind; Dr. Edward J. Waterhouse, director, Perkins School for the Blind; and Dr. Everett E. Wilcox, program specialist in education, American Foundation for the Blind. Their many constructive suggestions are gratefully acknowledged.

Special appreciation is due Mrs. Florence Henderson, former associate professor of education, San Francisco State College, who aided in the data analysis and provided much guidance in the final writing of the report.

Chapter I. Introduction

SHORTLY AFTER the turn of the century the prevalence of blindness among children dropped dramatically. As medical science found effective preventive and corrective measures for ophthalmia neonatorum and some other major causes of blindness among infants and young children, special residential schools, which were the primary source of education for blind children, underwent a period of change. Staffs were reduced, and children with partial vision who were able to read print were admitted to special classes within some of these schools, which were organized to serve partially seeing as well as blind children. Other schools became educational diagnostic centers for students with all ranges of visual loss.

However, in 1942 a new eye condition was reported—retrolental fibroplasia—affecting for the most part prematurely born infants. At first only a few cases were discovered, but soon steadily increasing numbers were reported from all parts of the United States and many parts of the world. By 1955, when medical research isolated the major cause of this condition as the administration of high concentrations of oxygen to prematurely born infants, thousands had been added to the number of visually handicapped children. In addition to this new development, some other eye diseases and conditions have persisted in spite of medical progress. The prevalence of these conditions has remained fairly constant, but the number of blind children increased significantly in recent years because of the abrupt rise of the birth rate.

Thus, the usual causes of blindness coupled with a rising birth rate and the eye condition retrolental fibroplasia have produced a "wave" of blind children. This "wave" is reflected by larger residential school enrollments in recent years than ever before, by a change in the visual nature of the children enrolled in these schools, and in the establishment and expansion of local school programs for such children. Comparative figures on students registered with the American Printing House for the Blind for 1956 and 1961 give some indication of both the magnitude and recency of this surge in numbers. In 1956, approximately 6,100 students were reported by residential schools

and about 1,900 by local schools.[1] Figures for 1961 reflect a steady growth in residential school registrants to about 7,500 and a rapid growth in local school registrants to approximately 8,250.

The Federal act governing the distribution of special books and educational aids manufactured by the American Printing House for the Blind was amended in 1956 to include blind children enrolled in regular classrooms as well as those in special schools and special classes. This may account for a portion of the sudden increase in the local school registration.

Meaningful statistical information about blind children has been difficult to obtain. There has been an increasing demand during recent years for this type of information as more and more blind children and those with serious visual impairments have attained school age. In this report, some basic facts about a large segment of blind children enrolled in the Nation's public schools have been tabulated, compared, and summarized.

Scope

Under the Federal act "To Promote the Education of the Blind" (amended by Public Law 922, 84th Congress), the American Printing House for the Blind in Louisville, Kentucky, makes available special materials and apparatus for the education of blind children enrolled in public local and residential schools. These aids are distributed on a per child quota allotment basis. To be eligible under the provisions of the act, it is required that children be registered annually by their schools or State education departments with the American Printing House for the Blind. Each child's visual impairment must be such as to render him legally or officially blind. Most State and Federal laws pertaining to blind persons define blindness for various official purposes as a visual acuity in the better eye with best correction which does not exceed 20/200 or a defect in the visual field so that the widest diameter of vision subtends an angle no greater than 20 degrees. The person with 20/200 visual acuity is able to recognize from a distance of twenty feet things which those with average vision see at a distance of two hundred feet. These requirements have been used in the regulations of the American Printing House for the Blind which govern the administration of this Federal act.

Possibly, more than 90 percent of the legally blind children in the Nation who are without major second handicaps, who are in serious

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[1] *Eighty-Ninth Report*, American Printing House for the Blind, Inc., Louisville, Kentucky, for the year ending June 30, 1957.

need of special education, and who are enrolled in public local or residential schools are registered each year under this act so that the schools they attend may obtain allotments of special aids and materials for use in their education. For the 1959–60 school year, as of January 1960, more than 14,500 children were registered. This group of children, therefore, represented a vast readymade cross-section of the Nation's legally blind school-age population. Through the courtesy of officials at the American Printing House for the Blind, data concerning them were made available to the Office of Education for tabulation and analysis.

Purpose

Basic facts provided with the registration of these children were tabulated and analyzed in such a way as to compile some fundamental statistical information about the visual nature of blind children and the grade distribution of this segment of the child population. Data on the degree of each child's residual vision were related to the mode of reading he was reported using. This comparison was made to explore the relationship between the extent of visual loss and the child's use of print, braille, or both print and braille as his primary reading medium. Information of this type has become increasingly important in recent years because a basic change in educational philosophy with broad program implications has coincided with the sharp increase in the number of children with visual impairments in the Nation's schools.

In the past it was a common belief that most children with limited vision would damage what little remained if they used it to full extent in school. Some students, as a result, were routinely educated as blind children and taught to read by means of braille whether or not they could see to read print.

It is now an accepted fact that children should be encouraged to attempt to develop to maximum use even slight amounts of residual vision.

Thus, to form some basis for estimating how much this relatively new philosophy had been put into practice by the Nation's educators and to which children it was most frequently applied, the comparison between mode of reading and degree of visual loss was made. This comparison also throws light on current educational classification and placement practices. At present the decision, as to whether a child with limited vision is placed in a special school program for blind or for partially seeing children where separate programs are maintained, is frequently based on the primary reading medium he utilizes rather

than the degree of his remaining vision. Thus, the report gives some indication of the degree of vision of those legally blind children who for instructional purposes may be considered by educators in the Nation as either blind or partially seeing.

Procedure

Copies of registration forms provided the Office of Education by the American Printing House for the Blind contained all the information submitted by schools and State education agencies, with the exception of the names of the children. The portion of the forms containing the names was removed by officials at that agency because of their agreement with school administrators that the names of children reported to them would not be disclosed.[2] The part of the form utilized in this analysis contained the following information:

Name of special school, city or county public school system attended by the pupil

Grade level of the pupil

Degree of vision in each eye with correction as reported by an eye specialist

The primary mode of reading used by the pupil—braille, large type, or both

Corrected vision in the *better* eye was used as the basis for tabulation. The information was then compiled in accordance with levels of vision established for this study and in terms of primary mode of reading.[3] Relative percentages were then computed and prepared in graph form for children with various degrees of remaining vision; for those reported as using print, braille, or both, as their primary mode of reading; and for those enrolled at each grade level. Early in the tabulation it became evident that substantial differences existed among and particularly between local and residential schools, both as to the visual nature of the children and their mode of reading. Separate tabulations were made of the local and residential school registrations to further explore the differences between these two groups of students.

Selected Local School Sample

Comparatively few States have statewide programs for the education of blind and partially seeing children. It was thought that some

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[2] For replica of the portion of the form used by State education departments, see the appendix.

[3] See page 7 for a description of the levels of vision.

significant differences might exist between those with and those without such programs, both in regard to selection of children for registration with the American Printing House for the Blind and educational practices affecting their classification as readers of print, braille, or both. A separate tabulation was made of registration data on children from five of the States with statewide supervisory programs. This tabulation was compared with the total local school registration and then again with this registration after that of the five sample States had been removed. It is believed that the majority of children from these five States have been classified and registered as readers of print, braille, or both, in keeping with their educational needs as determined by specialists in the education of such children. In the States without such programs, special educators may or may not have helped determine the mode of reading of the children registered by the local schools.

Comparisons of the distributions of the total local registration, the selected sample, and the local registration with the sample removed are shown in the appendix. Interpretations which go beyond the major trends should be made with full realization that the validity of some of the details on which they are based are subject to question as pointed out in chapter IV of this report. The five States with statewide programs in the selected sample, according to data furnished the American Printing House for the Blind, seem to register more children with little or no useful vision and fewer of those seeing comparatively well. This is particularly noticeable when the distribution of the selected sample is compared to the local registration, with the figure for that of the sample States removed. Forty-five percent of the children in the local registration minus the children from the States in the selected sample, for instance, are reported as having 20/200 visual acuity. Only 38 percent of the children registered by the five States in the selected sample are reported as having this much vision. It is apparent, however, that on the whole these distributions are very similar in regard to both the degree of vision of the children officially classified as blind and the mode of reading which they use.

It would appear on the basis of these findings that similar selective and registration practices are followed in the local schools of States with, as well as those without, statewide supervisory programs. Thus, the data suggest that these practices are followed in States where the selection of such children is made without close guidance from specialists and in those where the selection process comes under the supervision of special education personnel with considerable experience and training in the education of blind and partially seeing children.

Findings

The summary findings of the remainder of the report are presented in terms of the degree of vision and mode of reading of legally blind children (chapters II and III). The concluding chapter presents some implications of these findings and reviews some of the many questions they raise in regard to current practices, standards, and possible future research.

Chapter II. Degree of Vision

INFORMATION about the degree of vision of the children registered with the American Printing House for the Blind in 1960 is presented in graph form for the total registration in local and residential schools and for the registration in the local and residential schools separately for purposes of comparison. The graphs represent distributions of these three populations according to the percentages of children falling into each of nine levels of vision, which were utilized in order to simplify reporting of trends.

Levels of Vision

Vision level I contains children reported as having 20/200 visual acuity, the best or upper level of vision within the legal definition of blindness. Progressively diminishing levels of vision were established in order that data on reasonably large numbers of children with various degrees of remaining vision could be analyzed. It was considered important to attempt only to identify major trends and to keep the numbers of children at each level fairly large even if this involved grouping together rather wide ranges of vision instead of grouping by each visual acuity reported. It was hoped that this procedure would increase the validity of the findings, since there was no way to verify how precisely the eye report information about the children was reported or how recently the eye examinations on which these reports were based had been conducted.

Wide ranges of vision were reported in many different forms and for purposes of this study were tabulated on the basis of the corrected vision in the better eye and grouped as indicated below:

Vision Level	*Visual Acuity or Designation*
I	20/200
II	15/200 and 20/300
III	10/200, 20/400, 15/300, 20/500, and 15/400
IV	20/600, 10/300, 15/500, 5/200, 10/400, 20/800, and 10/500
V	5/400, 10/800, 5/800, 5/500, 2/200, 1/300, to 1/500, 20/1,000 to 20/4,000, and 2/400
VI	Counts fingers
VII	Hand movement
VIII	Light perception
IX	Totally blind

A great variety of visual acuities were reported. For study purposes these were rounded and grouped according to the nearest classification:

2/200 includes all reported as either 1/200 or 2/200

5/200 includes all reported as 3/, 4/, 5/, 6/, and 7/200

10/200 includes 8/, 9/, 10/, 11/, and 12/200

15/200 includes 13/, 14/, 15/, 16/, and 17/200

20/200 includes 18/, 19/, and 20/200

The same pattern was followed for children tested on the 300-, 400-, 500-, 600-, and 800-foot symbols. Those reported within the 20/1,000 to 20/4,000 range were grouped together because of their small number.

The *counts fingers* category (vision level VI) includes those reported as such or for whom the notation "C.F." was made. Children classified under *hand movement* (vision level VII) include those reported as being able to distinguish hand movements or those for whom the notation "H.M.," gross form, object perception, or light projection was made. Tabulations were made of the distances at which children were able to count fingers and perceive hand movement. Resulting subclassifications contained so few children in each, however, that valid generalizations based on such small groups could not be made. It was impossible, also, to determine to what extent eye specialists had attempted to ascertain the distance at which each child could count fingers or perceive hand movements or whether such findings had been reported if they were available. The vast majority of children in the *hand movement* level were reported, for instance, only as perceiving hand movement; distance was not specified.

The *light perception* vision level includes those children reported with this notation or for whom "L.P." was listed. This level may include some with light projection, inasmuch as it was not possible always to differentiate between the two on the basis of the information in some of the reports. The classification *totally blind* contains those so reported and those with such notations as: "none," "enucleated," and "prosthesis."

Only 74 children in all were registered as having *restricted field*. This would seem to suggest that those with both restricted field and lowered visual acuity may have been reported only on the basis of their low acuity or that the number of such children being identified and reported is much smaller than many have predicted. This small number of children was not included in the analysis as a separate level of vision. Tabulations of these children appear in table I of the appendix.

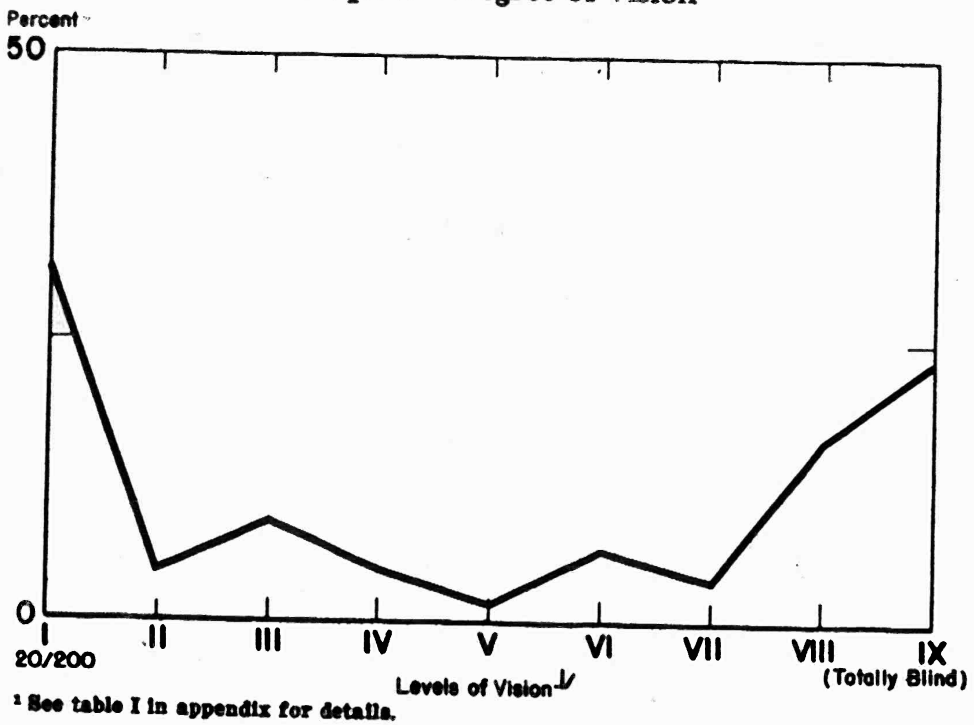
Approximately 450 registrants were not included in the tabulations

because they could not be fitted into one of the classifications. The vision for some was reported in a rather vague manner, such as "less than 20/200," or in such an uncommon way that there were too few to warrant grouping. Many of those who were excluded were multiply handicapped children clearly identified on the reports as deaf, cerebral palsied, or mentally retarded and those for whom the grade level was not clear or not specified. The total registration with the American Printing House for the Blind was about 14,570 children, with adult rehabilitation cases removed. The study includes information on 14,125 children, or approximately 97 percent of the total register.

Major Findings

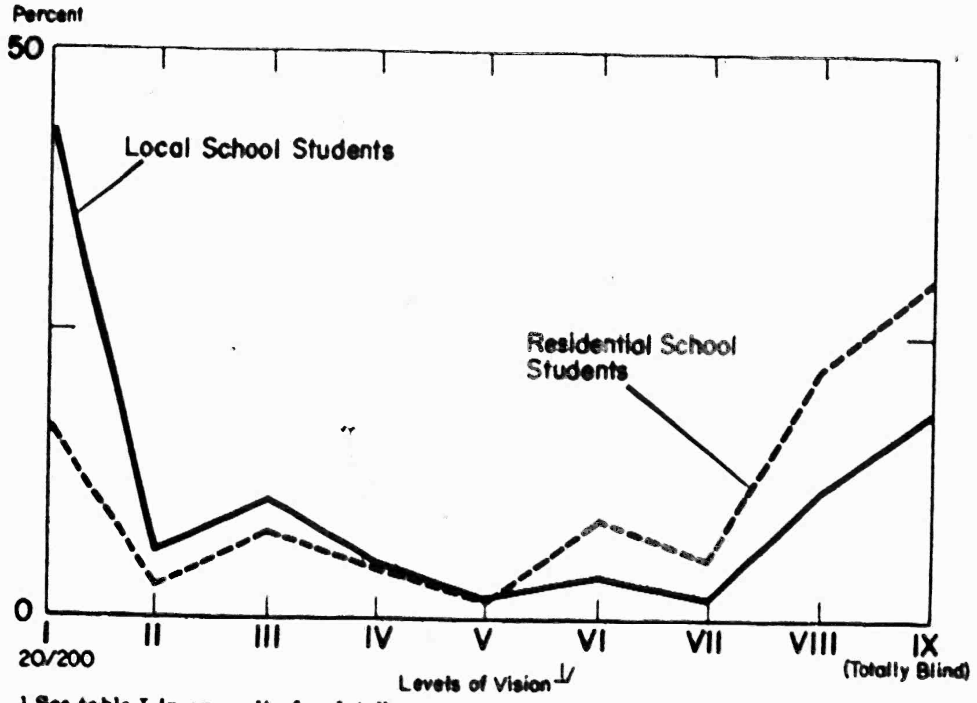
Compilations of the data according to degrees of remaining vision reveal several major findings. Only 24 percent (3,331) of the children were reported as totally blind and 16 percent as having light perception, according to the eye information submitted with their registration. About 60 percent of the 14,125 students studied reportedly have residual vision in excess of light perception or a sufficient amount to be of practical use in many phases of their school programs.

Graph 1.—Degree of vision



[1] See table I in appendix for details.

Graph 2.—Local and residential school registrants by degrees of remaining vision



[1] See table I in appendix for details.

Nearly 31 percent (4,365) were registered as having 20/200 visual acuity. When the children are grouped into nine vision levels according to approximate degrees of remaining vision, about three-fourths appear to fall into the two levels at the extreme ends of the distribution, that is, into vision levels I, II, VIII, and IX. Relatively few children were reported in the borderline classifications between these two extremes. These findings should not be taken at face value. Questions concerning the validity of the data on which they are based are presented in chapter IV.

Local and Residential School Students Compared

Legally blind children in residential schools seem to be characterized by a majority with little or no remaining vision as contrasted to the local schools where the majority of legally blind children are reported to have sufficient residual vision for it to be of substantial use in their school programs. More than half of those registrants from the residential schools included in the study were listed as totally blind or only able to perceive light. Several surveys, such as that reported by Lowenfeld,[1] indicate that the percentage of children

[1] Lowenfeld, Berthold, "Incidence and Effects of R.L.F.," *New Outlook for the Blind*, Vol. 53, January 1959, pp. 15–19.

without useful vision who were found in the residential schools in 1960 is probably much higher than would have been found only a few years earlier.

About 29 percent of the local school registrants did not have sufficient vision for it to be of substantial use in their education. On the other hand, only about 17 percent of those in the residential schools, as contrasted with nearly 43 percent in local schools, were reported as having 20/200 visual acuity, the upper acuity limit of legal blindness. Thus, it would appear that in recent years local school systems have absorbed many children with little or no remaining useful vision and large numbers with moderate to severe visual limitations who in the past quite possibly would have been enrolled in the residential schools.

However, on the basis of these data, many aspects of the visual nature of the two populations, are strikingly similar. Distributions according to degrees of remaining vision, as shown in graph 2, follow patterns which are very much alike in spite of the differences at the two extreme ends which cause the U-shaped curves to tilt in opposite directions. When the needs of children officially classified as blind are considered, educators in both the local school systems and in residential schools face the problem of designing programs for relatively large numbers of students who have considerable vision, as well as large numbers who have very little or no remaining sight.

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Chapter III. Mode of Reading

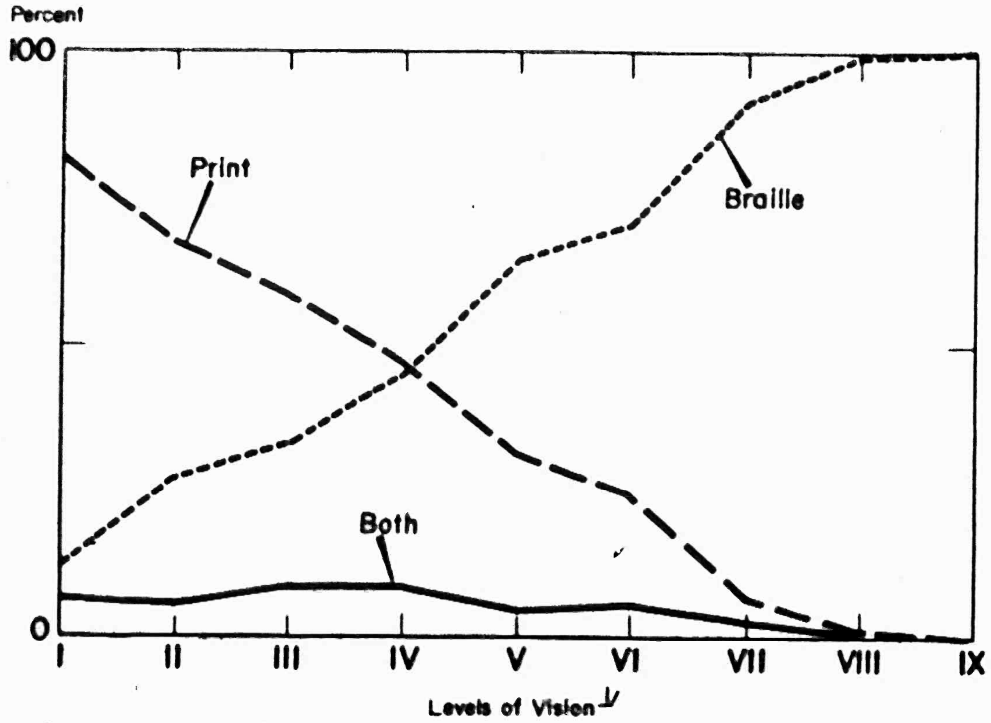
THE DATA on mode of reading of legally blind children registered with the American Printing House for the Blind in 1960 have been analyzed in several ways. All readers of print, braille, and both have been related to the nine levels of vision in graphs 3 and 6. Graphs 4, 5, and 7 show this relationship for the local and residential school students separately. Graphs 8 and 9 bring together, for comparison, summary information about children in vision levels I through VII. Since there is reason to believe that some of the basic data is not fully reliable, (see chapter IV) attention should be directed to the major trends revealed by the graphs rather than to the comparisons made within each of them. Graphs 10 through 13 compare grade distributions of children using the various modes of reading and relate these distributions to that of the total full-time public elementary and secondary day school pupil enrollment.

Mode of Reading in Relation to Degree of Vision

Analysis of the mode of reading of the children covered by this report in relation to their degree of vision revealed several predictable trends. If the degree of remaining vision is an important factor in determining mode of reading, the decided U-shaped distribution according to the nine levels or degrees of remaining vision for the total study population, graph 1, would lead to the prediction that most of the children would be registered as readers of either print or braille and few would be reading both. This prediction seems to be borne out by the finding that approximately 58 percent of the 14,125 children are registered as using braille and 38 percent as using print for their primary mode of reading. About 4 percent are registered as readers of both print and braille. Similarly, on the basis of this hypothesis, one would expect to find that most of the readers of print have the best vision and are in the upper classifications (vision levels I–V) and most of the braille readers are in the lower classifications (vision levels VI–IX). These suppositions are confirmed by the findings rendered in graph 3.

The distributions of print and braille readers are presented in

Graph 3.—Mode of reading

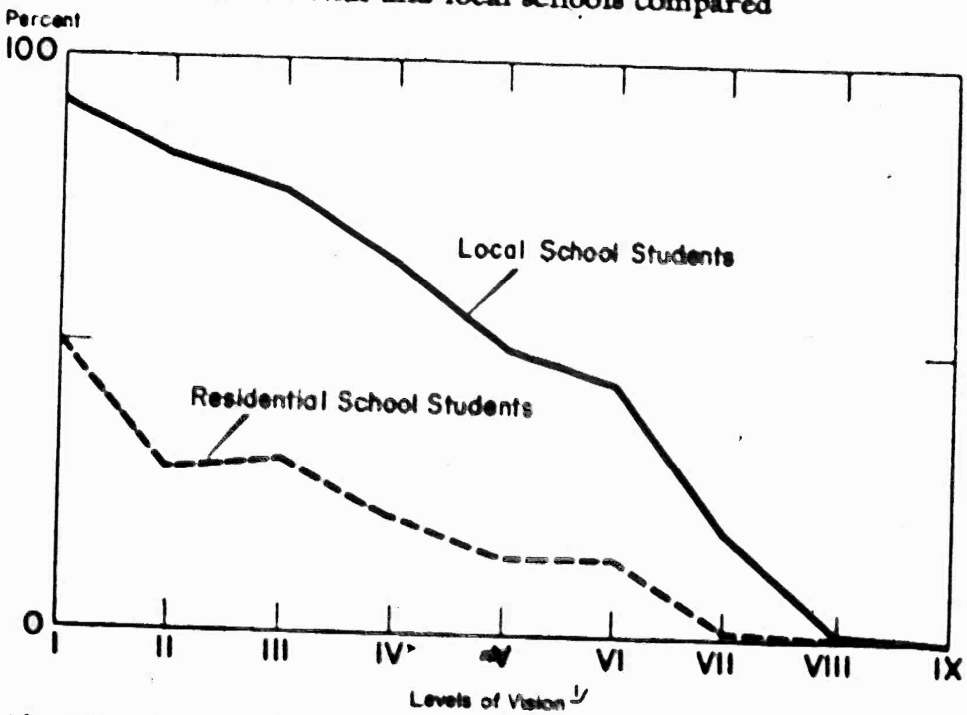


[1] See table I in appendix for details.

graph 3 for the total study population and in graphs 4 and 5 for the children in residential schools and those in local schools separately. The trends reflected in these distributions progress in so orderly a manner as to appear almost artificial. They would seem to provide additional evidence that, according to present instructional practices, one important factor in determining whether a child reads print or braille is the degree of remaining vision as indicated on his eye examination report. The change in practice from restricting the use children make of their eyes to encouraging maximum use of residual vision along with a new interest in exact refraction and high-powered optical reading aids seem to be reflected in these findings. Eighty percent of the children reported as having approximately 20/200 visual acuity are registered as using print as their primary mode of reading as shown in graph 3. Although comparative data are not available, it seems most unlikely that such high percentages of print readers would have been found among legally blind children as recently as 10 years ago.

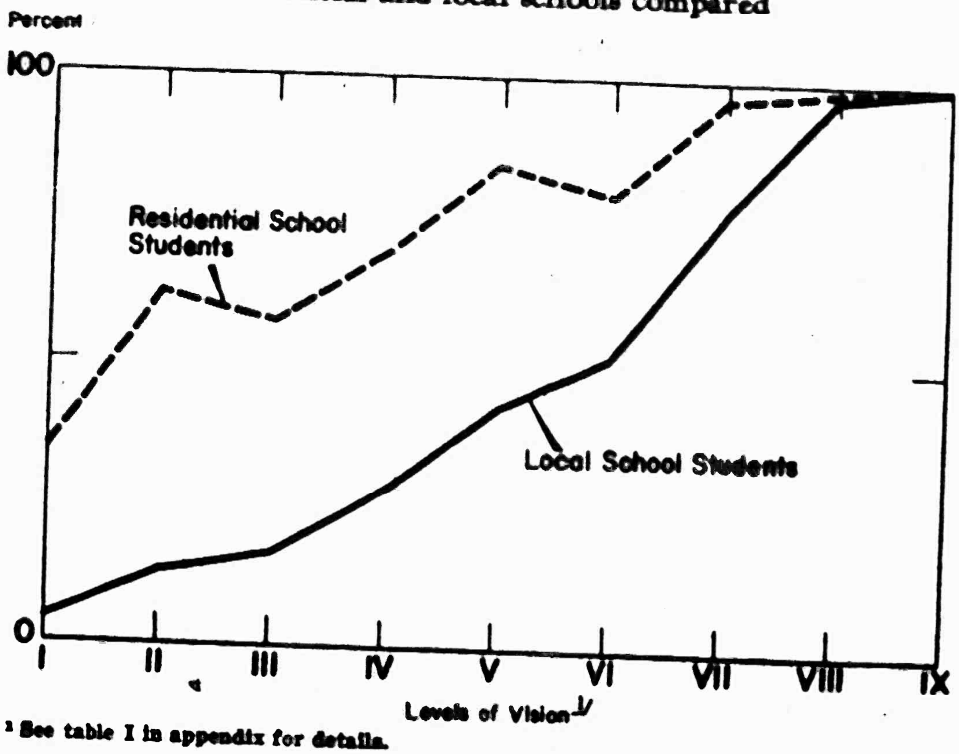
The distribution of all readers of *both* print and braille does not follow the pattern one might assume on the basis that children with some, but markedly reduced, vision would fall into this group. The percentage of readers of both for the total population studied instead

Graph 4.—Students registered as using print only: residential and local schools compared



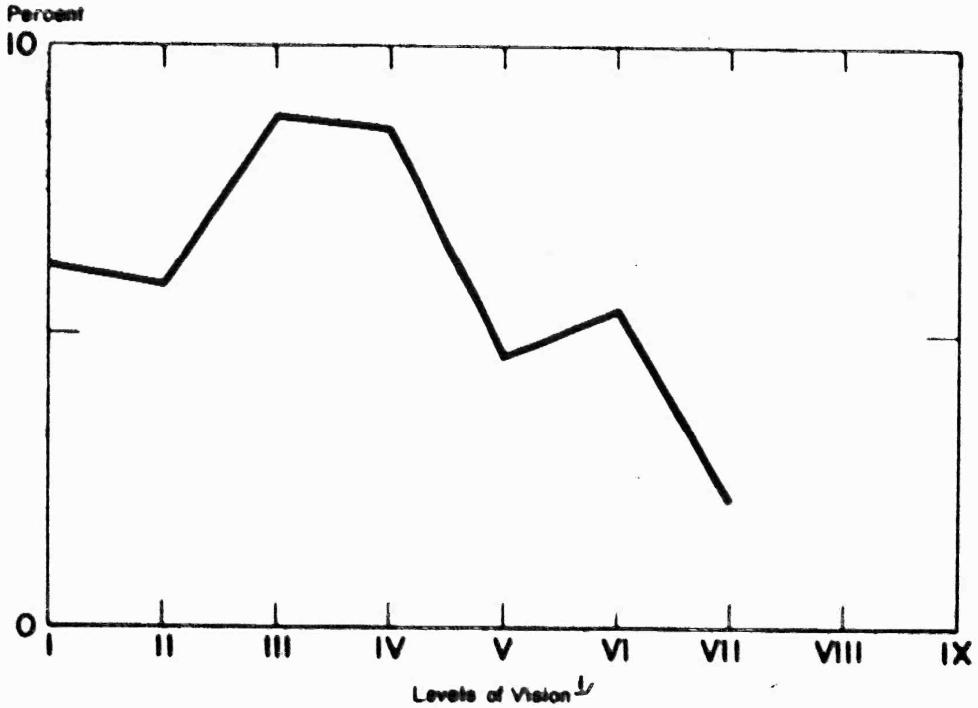
1/ See table I in appendix for details.

Graph 5.—Students registered as using braille only: residential and local schools compared



1/ See table I in appendix for details.

Graph 6.—All students registered as readers of both print and braille



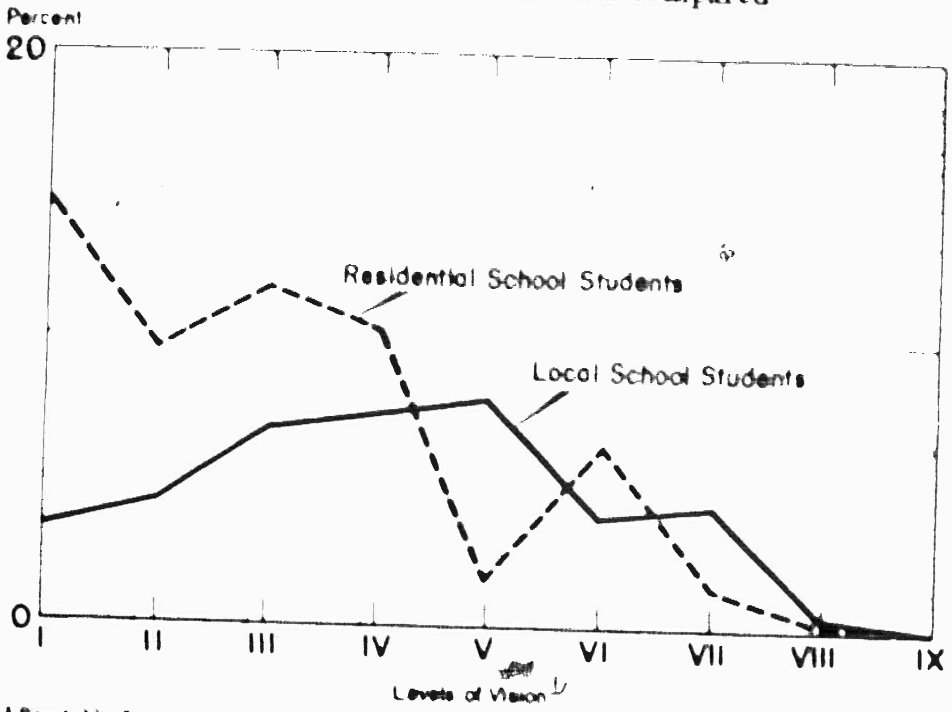
[1] See table I in appendix for details.

of rising for the middle or borderline levels of vision as might be assumed, remains comparatively even at the upper levels (I–IV) and begins to conform to the expected trend more closely at the lower levels, as shown in graph 6. It will be noted, however, when distributions of these two populations are separated in graph 7, that most of the deviation from the expected trend may be accounted for by the distribution of readers in the residential schools. The majority of these readers are in the upper vision levels, while those in the local schools follow more closely predictions which might be made on the basis of the degree of their remaining vision.

Local and Residential Students Compared

One would anticipate finding a higher percentage of legally blind children in residential schools using braille as their primary mode of reading than in local schools. As illustrated in graph 8, about 29 percent of those in local schools, as compared to more than 52 percent of those in residential schools, fall into vision levels IX and X (light perception and totally blind) and could not be expected to read print if the information on their degree of vision has been precisely re-

Graph 7.—Students registered as using both print and braille: residential and local schools compared



[1] See table I in appendix for details.

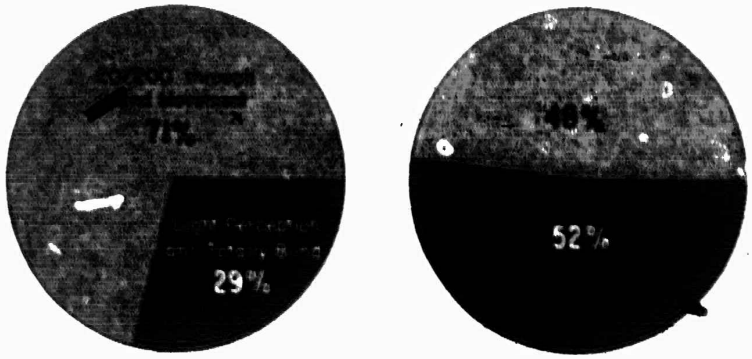
ported. Some of the children in vision levels I through VII, on the other hand, may conceivably be considered as potential readers of print. (See table I, appendix.) It will be seen that some striking differences are found when the modes of reading of children with similar degrees of visual impairments from local schools are compared to those from residential schools as in graph 9. An overwhelming majority of local school students with this much vision are reported as reading primarily by means of print as compared to only 29 percent of the residential school students.

Grade Distribution

In graph 10 may be seen the grade distribution of all legally blind children studied and the grade distribution of the total full-time public elementary and secondary day school enrollment in the United States for 1958.[1] (Statistics for 1960 are not available.) It seems to suggest that, in general, schools are able to retain legally blind chil-

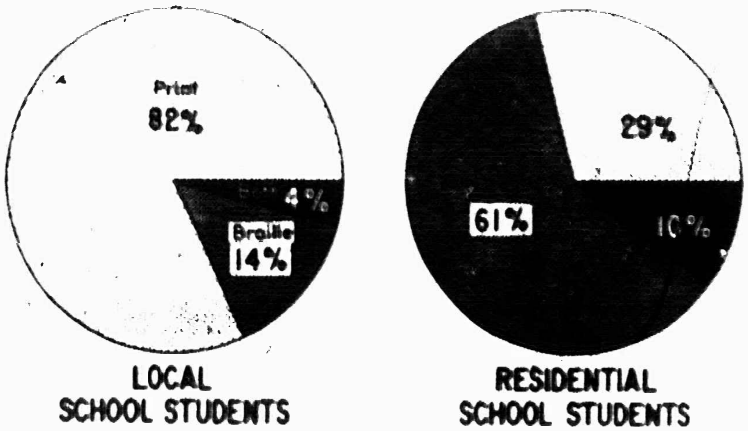
[1] Schloss, Samuel; Hobson, Carol Joy; and Foster, Emery M., *Statistics of State School Systems, 1957–58, Organizations, Staff, Pupils, and Finances.* Chapter 2 in Biennial Survey of Education in the United States, 1956–58. Washington: U.S. Government Printing Office, 1961.

Graph 8.—Percent of children with object perception and better compared to percent with light perception and totally blind (vision levels I through VII compared to levels VIII and IX): local and residential registrants compared



dren with about the same degree of success as they are those with average vision. A slightly greater percentage of blind children was enrolled in kindergarten through grade 3, and slightly smaller percentages in the upper grades as compared to the total pupil population. Probably the highest percentage of children blinded by retrolental fibroplasia should be in grades 2 through 6 on the basis of their chronological ages. Since this eye condition is known to account for a significant proportion of blind children in the country in this age group, how can the fact that grades 2 through 6 do not contain higher percentages be explained? Additional information appears

Graph 9.—Mode of reading of children with object perception and better (vision levels I through VII): local and residential registrants compared

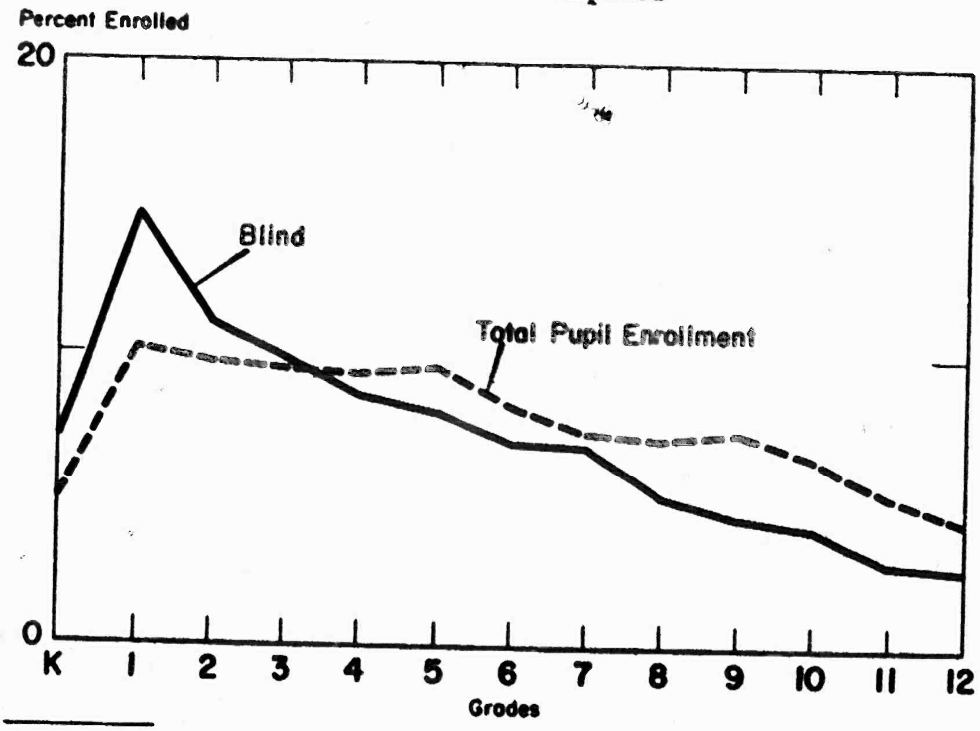


to be needed before this and related questions may be answered satisfactorily.

The lack of uniform kindergarten facilities in the Nation probably explains to a considerable extent the discrepancy between kindergarten and first-grade enrollments for both of these distributions. However, the reason for the disproportionate first-grade peak of blind students is not clear. In graph 11, showing the grade distributions of print and braille readers, it is indicated that this high first-grade enrollment is only characteristic of braille readers and not of those legally blind children who read print. It will be noted that the grade distribution of braille readers differs more from that of the total pupil enrollment than does the distribution of those reading print. A purely statistical factor may account for some of these differences. Since more braille readers are in the lower grades, kindergarten through grade 2, than in the other two distributions, fewer remain for placement at the higher grade levels.

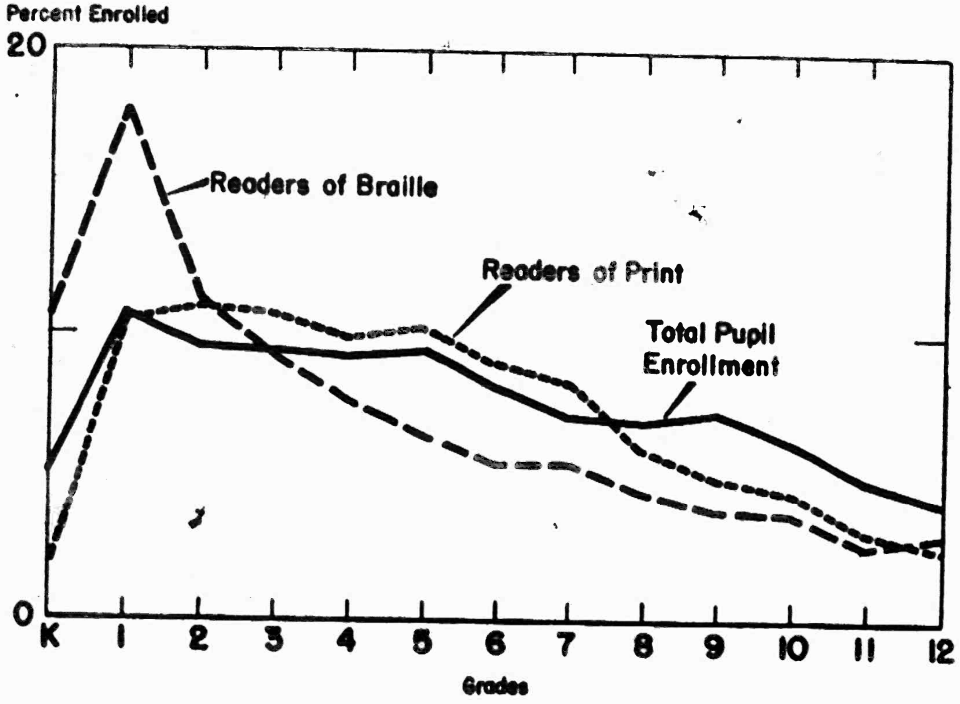
The highest percentage of legally blind children registered as

Graph 10.—Grade distribution: blind students and total enrollment [1] compared

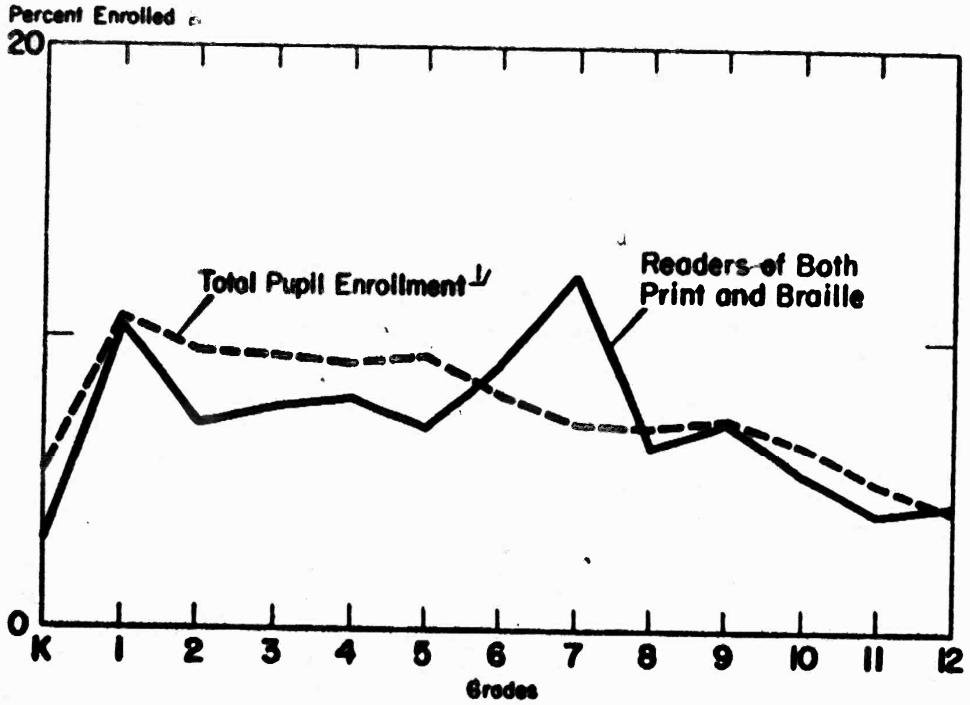


[1] Total pupil enrollment is based on 1958 statistics from Chapter 2, *Statistics of State School Systems: 1957–58, Organizations, Staff, Pupils, and Finances*, Biennial Survey of Education in the United States, 1956–58. Washington: U.S. Government Printing Office, 1961.

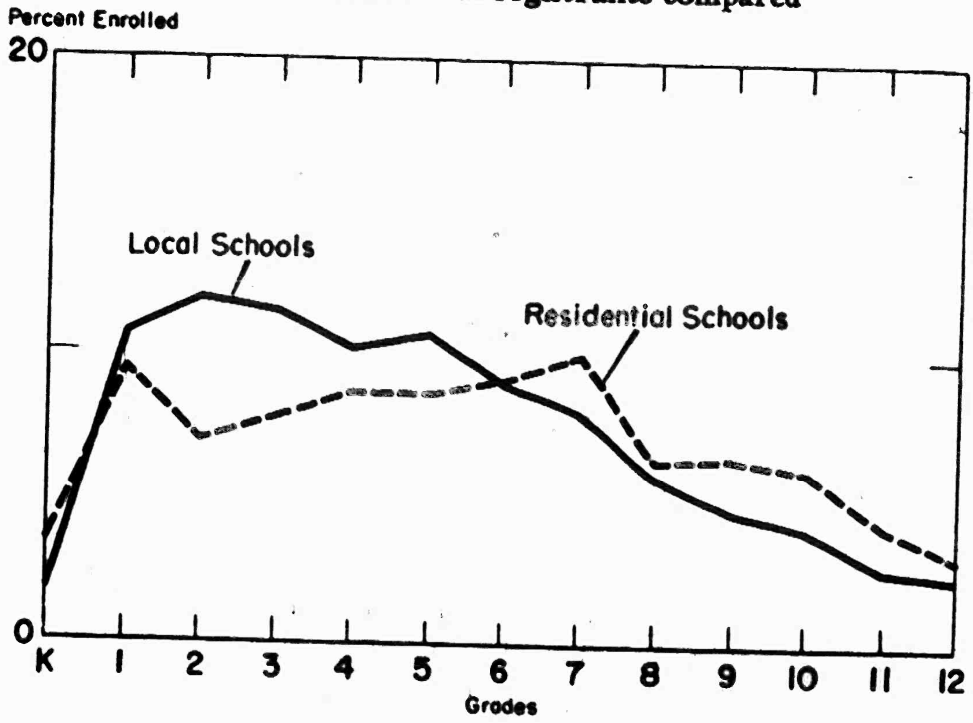
Graph 11.—Grade distribution: readers of print and braille and total enrollment compared



Graph 12.—Grade distribution: readers of both print and braille and total enrollment compared



Graph 13.—Grade distribution of readers of print: residential and local registrants compared



readers of *both* print and braille is enrolled in grade 7 (see graph 12). Many educators contend that teaching both print and braille to children in the primary grades before they have mastered one skill tends to bring about confusion and academic retardation. This may account for some of the differences between this distribution and those for readers of either print or braille.

Graph 13, showing print readers in local and residential schools, seems to indicate again the tendency to use print with legally blind children in local schools and the tendency to use braille with students in residential schools, particularly in the early grades. It also would appear that teachers in the residential schools are more prone to start potential print readers on braille and shift them later to print. A greater proportion of the print readers in residential schools are in the upper grades than of those in the residential schools who read braille or of the legally blind children in the local schools who read print.[2]

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[2] Other distributions were tabulated and graphs prepared, but not printed, for local and special school students reading braille, print, and both at each of the nine levels of vision. Copies of these graphs are available for loan from the Section on Exceptional Children and Youth, Office of Education, U.S. Department of Health, Education, and Welfare, to those wishing to make more detailed comparisons.

Chapter IV. Implications

THE FINDINGS of these analyses of information about legally blind children raise far more questions than they answer. An attempt is made in this chapter to point out some of the implications some of these questions may have for educators in this field.

Accuracy of the Data

The 14,125 legally blind children included in this study probably represent one of the largest and most representative populations of such children involved in an educational study to this date. Because of the nature of the data on which the study is based, however, reservations must be made about any conclusions drawn, especially those which go beyond the broad trends.

The primary purpose for registration of a child with the American Printing House for the Blind is to establish the fact that he has sufficient visual impairment to be qualified legally, or officially, as blind so that special aids and materials may be made available under a quota system to assist with his education. There are several reasons for questioning the accuracy and recency of the eye report information on which this eligibility is based. Some special education programs for blind children are governed by strict standards concerning eye examinations. Others have no such standards. Some require frequent eye examinations by qualified specialists. Some have no specific followup requirements and the information in their records may be many years old in spite of the fact that visual acuity findings are known to fluctuate particularly among young children.

Moreover, the widely diverse ways in which eye examination findings were reported for these children reflect the lack of a standardized eye examination and reporting system. One educator with many years of experience in this field commented as follows:

> We find that almost every report of a young child received before entry to the school is inaccurate and that tremendous fluctuations are found. The techniques used by our school ophthalmologist vary, at least to some degree, from those of the ophthalmologist who only sees an occasional legally blind child.

Another authority stated:

> Because of the legal definition of blindness, there is a tendency to record the visual acuity as 20/200 when in actuality it may be anywhere less than 20/100 down to total blindness. This is also evidenced by the recording of visual acuities of "less than 20/200 and nil."

There can be little doubt that numerous variables are reflected in this report. The U-shaped distribution of the legally blind children according to degrees of remaining vision, as shown in graph 1, indicates that very few children fell into the middle levels and that most of them are at the two extreme ends of the distribution. This may reflect some of the problems in eye examination practices mentioned above rather than the true visual nature of legally blind children. It also may reflect a failure on the part of educators to communicate to the specialists performing these examinations the need for frequent and precise information on which can be based programs designed to meet the varying individual needs of children.

Whether this large nationwide sample of legally blind children is of sufficient size to reduce the effect of problems related to eye reporting is unknown. Such factors may be of increased significance when study is attempted of children at the levels of vision where the numbers are comparatively small such as level v (237 children).

The finding that more than 18 percent of the children in the local schools reportedly only able to perceive hand movement (level VII) are using print as their primary mode of reading gives cause for concern. Only about 1½ percent of those in the residential schools at this level are reported as reading print, which could suggest that the eye report information submitted by the residential schools is more accurate and more recent than that supplied by the local schools. The discrepancies in modes of reading found at the higher levels of vision could be interpreted to reflect different practices on the part of educators in local and residential schools. However, it is most unlikely that a child able to perceive only hand movements could develop efficient print-reading skills. The fact that so many children in the local schools whose eye reports indicate they are only able to perceive hand movements are listed as readers of print seems to lead to a questioning of the accuracy and recency of these reports.

Selecting the Most Suitable Mode of Reading

In spite of some of the limitations of the data, this analysis raises a number of questions of considerable importance to educators of visually handicapped children. Graph 3 shows the distribution of percentages of children reading print or braille in relation to the

degree of remaining vision. These trends seem to indicate that visual performance, even as determined beyond the reading distance and as measured and recorded during the usual eye examination under current practice, is related to a considerable extent to the selection of the principal reading medium the child is to use. It is interesting to note that distinct trends occur in an orderly and predictable manner when the children are grouped into the nine vision levels. Information on the nature of the eye conditions of the children was not available for comparison with the degree of vision and reading mode. Probably a considerable number of the children at all of the nine vision levels have myopia or other eye conditions in which the very near visual performance tends to be quite different from the far point performance. Why then should these trends be so systematic and orderly as they appear to be under current practices? Were the educators who were responsible for helping the children decide upon the mode of reading best suited to their needs unduly influenced by the eye examination reports, containing, for the most part, only information on measurements made well beyond the reading distance? Would the same marked trends occur if the vision levels of the children were unknown to these educators? Research on mode of reading in relation to eye examination findings containing information on both *near* and distance vision as well could prove to be valuable. Since the decision of whether a child uses print, braille, or both inevitably is based on his performance at the reading distance, more exploration of this problem is needed.

Looking at the trends reflected in graph 3 from another point of view, it would appear that, as the degree of vision approaches total blindness, factors other than those reported by the usual eye examination become increasingly important in determining the child's mode of reading. If this is true, can these factors be identified and evaluated? How do the 12 percent of the children in vision level 1 who read braille differ from the 82 percent reading print and the 6 percent reading both print and braille? Could these traits be identified at an early age so as to avoid the trauma experienced by some children when they encounter failure and are transferred from one mode of reading to another? Do children represented by these percentages have similar eye conditions? Is the medical prognosis poorer for the braille readers than for those using print? Do many of the children have useful vision in one eye only? Do they tend to have handicaps in addition to their visual impairments? How many utilize optical reading aids? At what age and with what type and level of vision are these most effective? If there are no characteristic differences among the children utilizing braille, print, or both, was there a differ-

ence in their environment, in the attitudes of their parents, teachers, or on the part of their eye specialists which might account for their choice of reading medium?

Many educators contend that negative attitudes toward braille—such as references to it as a difficult, slow, or cumbersome skill—expressed by parents, other students, and even by some teachers interfere with a blind child's motivation to learn to use it as a primary mode of reading. The wide discrepancies found in this study in regard to the mode of reading of children with similar degrees of remaining vision may have important implications. These discrepancies would seem to indicate that environmental factors may be just as important for readers of print as for readers of braille in encouraging or discouraging the child with very limited vision to put forth the necessary effort required to develop adequate visual skills. Specific answers to these and other related questions would prove of real value to educators who must help the child with very low vision decide upon the mode of reading which he is to utilize throughout his years of formal education and probably his adult life as well.

Reliable information is needed not only on the selection of the mode of reading but on the reading performance of children with very low vision. Now that the fear of damaging through use the residual vision of most children with moderate to severe impairments has been removed, the door to experimental research on this educational problem has been flung open wide. Controlled studies isolating some of the suspected variables could bring much understanding to this area of special education. They could substantiate the intuitive knowledge held by special educators and make possible dissemination of information which would be helpful to teachers. Studies are needed to discover to what extent these children are able to make practical use of reading by means of print, braille, or both print and braille and to identify some of the reasons why certain children succeed where others fail.

Among some of the broad questions which this type of research might help answer are those dealing with some rather basic issues. Do certain degrees or types of visual limitations adversely affect normal reading skills and habits? Is there a point between normal vision and total blindness where print reading tends to become impractical? Does a given degree of residual vision interfere with the average child's development of skill in reading braille as many suspect and, if so, what degree of remaining vision is important? Does proficiency in the use of residual vision tend to develop at a significantly faster rate for younger children than for those in their teens and for those with certain types of eye conditions more than for others?

What constitutes an adequate trial period and an adequate trial climate for students with borderline residual vision when they attempt to decide which mode of reading to use? Does the introduction of braille as the first trial reading medium result in a loss of the opportunity for the young child to develop the use of his residual vision at an age when the chance for this development is at its optimum? Or does the introduction of print as the first trial reading medium to children with inadequate vision result in a loss of the opportunity for them to develop satisfactory skill in reading by means of braille?

Studies covering all aspects of the use of optical reading aids by these children obviously should be conducted, along with studies in the efficiency and effects of other aids including magnification devices, reader service, and large-print books and materials. Teachers have observed for some time that a considerable number of children with borderline vision read ordinary or even very small print faster and more effectively than they do large print. Much more needs to be known about the nature and extent of the use made of large-print books. This should be explored in relation to such factors as degrees of visual loss, certain types of eye conditions, intelligence, type of educational program, age, and grade. It is important to discover whether the child uses special print for all, most, or very little of his reading and to ascertain the opinions of those instructing him as to his need to use it.

Comparison of Local and Residential School Students

The discrepancies in modes of reading between local and residential school students with similar degrees of remaining vision are so pronounced that some effort should be made to discover the primary reasons for them. It is known that similar differences of somewhat lesser magnitude exist between different residential schools and also different local school systems. Although it was not possible to tabulate these differences completely for this report, it was evident that some residential schools, for instance, taught braille to all students enrolled in spite of the fact that many were registered as having 20/200 visual acuity and that the practice in other schools was much more selective. Somewhat similar differences were apparent among the local school systems reporting legally blind children, although the major differences were found to exist between residential and local school populations. It is possible that selective factors which determine the placement of children in either local or residential schools may account for much of the apparent preference among local school students for print and among residential school students

for braille. There may be a tendency to place those children with more severe eye conditions in residential schools, particularly those with conditions affecting near- as well as far-point performance. Until the contributing factors are isolated and studied, explanations of these differences remain in the realm of conjecture.

Precise Eye Reports

One basic point is made clear by this study. Experimental studies conducted on children with very limited vision should be based on highly reliable and precise information about the nature and extent of the visual disabilities of the children involved. Eye reports would have to be recent. Students with reports more than one year old should be excluded. Ideally, the examinations would be made by one specialist or a team of eye specialists who could be oriented to the need for detailed and precise reporting. A standard system for recording results by the specialists would be helpful. It was found in this nationwide sample of legally blind children that 128, or 44.5 percent, of the 288 in the local schools and 79, or 13.7 percent, of the 474 children in the residential schools recorded as able only to count fingers were registered as readers of print. (See table I in appendix.) It is impossible to know how recently these finding were obtained and whether the eye specialists recording them provided adequate trial of the 20/200 or larger symbols used during the examination. Counting fingers requires considerable visual discrimination and if this can be performed efficiently at approximately three feet, it probably corresponds roughly to 3/200 visual acuity. If the procedure for examining these children could be agreed upon and described, research findings could be interpreted with more certainty. Comparisons also could be made to similar studies conducted in different locations.

Terminology

The difficult question of terminology, particularly as it applies to definition, has hampered communication among educators in this field for years. It is brought into sharp focus by the findings in this study. In terms of degree of vision, legally blind children represent a heterogeneous group. Viewed educationally, their needs are quite different. Some, obviously, are much more like their normally seeing peers than they are different from them. Others clearly are blind in the literal meaning of the word. The use of arbitrary visual acuity cutoff designations for defining and classifying children for

educational purposes as blind or partially seeing has become of increasing concern in recent years. Such designations applied in conjunction with information on diagnosis and medical prognosis proved to be fairly satisfactory during the period when it was believed that use of residual vision resulted in permanent ocular damage. Now, with the recognition that such use is seldom if ever injurious even for children having serious visual impairments, educators have been seeking new criteria for placing visually handicapped students in special education programs. Many decide whether a child with visual impairment belongs in a program for blind or for partially seeing children, where separate programs are maintained, primarily on his mode of reading. Educational references to a child as blind is coming to imply use of braille as the basic reading medium. Those legally blind children able to use print as their basic reading medium tend to be classified among the partially seeing. This practice, however, is not uniform throughout the country and, since it may involve a trial placement for many children with borderline vision, much confusion concerning the educational definition of blindness remains.

Adding to this confusion regarding definition is the general finding from this analysis that a wide range of vision is found among children currently reading braille and among those reading print. Thus, classification of children as blind or partially seeing on the basis of their mode of reading under current practices appears to be only a partial solution to the problem of definition. Systematic research exploration of all matters relating to this basic problem is of major importance.

Retrolental Fibroplasia

It is somewhat puzzling not to find the often mentioned "wave" of children blinded by retrolental fibroplasia more clearly reflected in the grade distributions of graph 10. Identification of the ages and grades of children with a primary diagnosis of retrolental fibroplasia and the extent of their visual impairments probably would provide information which could lead to more refined experimental research and to a better understanding of their educational needs. It also would help to provide a more stable basis for making prevalence estimates and predictions with significant implications for special teachers, programs, and equipment needed in the future.

Grade Distributions

The much higher percentage of braille readers in the first grade than of those reading print, as shown in graph 11, seems to warrant further

investigation even though some possible explanations can be suggested. Closer medical observation and treatment of these children upon their reaching school age may improve the vision of some sufficiently to enable them to read print or even remove them from the legally blind classification. Some students who were started as braille readers may later be transferred to print, to regular classrooms, or, because of multiple handicaps such as mental retardation or emotional disturbance, to other special programs and they may no longer be registered with the American Printing House for the Blind. Perhaps more braille readers than print readers, are experiencing difficulty adjusting to school so that it is necessary for them to repeat this first year.

This high percentage of first-grade braille readers becomes more puzzling when, as shown in graph 10, it appears that a higher percentage of potential braille readers are having the benefit of some type of kindergarten experience than either the potential readers of print or so-called normal children. These findings would seem to lead us to several questions. Are more of the visually handicapped students who use braille repeating the first grade than those who use print, as the distributions may suggest? Should this be confirmed? Could this retention in the first grade be caused by problems associated with the reading of braille? An investigation of the adequacy of prereading programs and of the introduction of the teaching of reading by means of braille would seem to be warranted.

Conclusions

The findings of these analyses of the legally blind children registered with the American Printing House for the Blind raise more questions than they answer. The analyses appear to reflect a variety of conflicting opinions and practices in the education of children with moderate to severe visual impairments. These discrepancies seem to exist not only between residential and local school educators but also among those within each group. They point to the lack of agreement existing among authorities in regard to the definition of which children are to be considered blind for educational purposes and to the lack of systematic approaches to instructing those presently so classified. Under current practices, classifying children as blind on the basis of their mode of reading appears to be only a partial solution to the problem of definition. According to the information analyzed in this report, many children who read braille see as well as many others who read print. The findings suggest that misconceptions will occur if broad generalizations are

made about "blind" children without first carefully qualifying the nature and extent of their visual loss. The report seems to suggest there is a need for the development of more effective means of securing current and precise eye reports if such information is to be of use to teachers and administrators planning special programs. The multitude of questions suggested by these and other findings stress the need for comprehensive research programs which will assist educators in the development of the most effective methods and procedures for meeting the needs of the visually handicapped children they serve.

More children with impaired vision are enrolled in the nation's schools than ever before. Others will follow. The opportunity and necessity for study and improvement of methods and practices are at hand.

Appendix

Table I.—Levels of vision and modes of reading in residential schools, local schools, and combined

Vision level	Number of children	Approximate percent of total number	Print readers		Braille readers		Readers of both		Degree of vision
			Number	Percent of column 2	Number	Percent of column 2	Number	Percent of column 2	
1	2	3	4	5	6	7	8	9	10
COMBINED									
I	4, 365	31. 0	3, 572	82. 0	522	12. 0	271	6. 0	20/200.
II	589	4. 0	398	68. 0	157	26. 0	34	6. 0	15/200 and 20/300.
III	1, 258	9. 0	744	59. 0	404	32. 0	110	9. 0	10/200–15/400.
IV	647	4. 0	300	46. 0	291	45. 0	56	9. 0	20/600–10/500.
V	237	2. 0	74	31. 0	152	64. 0	11	5. 0	5/400–2/400.
VI	862	6. 0	207	24. 0	608	71. 0	47	5. 0	Counts fingers.
VII	488	3. 0	32	7. 0	445	91. 0	11	2. 0	Hand movement.
VIII	2, 274	16. 0	13	. 6	2, 256	99. 0	5	. 2	Light perception.
IX	3, 331	24. 0	-------	-------	3, 331	100. 0	-------	-------	Totally blind.
Restricted field	74	. 5	60	81. 0	9	12. 0	5	7. 0	Restricted field.
TOTAL	14, 125	----------	5, 400	38. 0	8, 175	58. 0	550	4. 0	----------

RESIDENTIAL

I	1,062	17.0	535	50.0	370	35.0	157	15.0	20/200.
II	167	3.0	48	29.0	103	62.0	16	9.0	15/200 and 20/300.
III	484	8.0	147	30.0	280	58.0	57	12.0	10/200–15/400.
IV	269	4.0	55	20.0	186	69.0	28	11.0	20/600–10/500.
V	123	2.0	17	14.0	104	84.0	2	2.0	5/400–2/400.
VI	574	9.0	79	14.0	459	80.0	36	6.0	Counts fingers.
VII	341	5.0	5	1.5	331	97.0	5	1.5	Hand movement.
VIII	1,419	22.0	4	.3	1,411	99.4	4	.3	Light perception.
IX	1,936	30.0	-------	-------	1,936	100.0	-------	-------	Totally blind.
Restricted field	32	.5	22	68.7	6	18.8	4	12.5	Restricted field.
TOTAL	6,407	----------	912	14.0	5,186	81.0	309	5.0	----------

LOCAL

I	3,303	43.0	3,037	92.0	152	5.0	114	3.0	20/200.
II	422	5.0	350	83.0	54	13.0	18	4.0	15/200 and 20/300.
III	774	10.0	597	77.0	124	16.0	53	7.0	10/200–15/400.
IV	378	5.0	245	65.0	105	28.0	28	7.0	20/600–10/500.
V	114	1.0	57	50.0	48	42.0	9	8.0	5/400–2/400.
VI	288	4.0	128	44.0	149	52.0	11	4.0	Counts fingers.
VII	147	2.0	27	18.0	114	78.0	6	4.0	Hand movement.
VIII	855	11.0	9	1.0	845	99.0	1	.1	Light perception.
IX	1,395	18.0	-------	-------	1,395	100.0	-------	-------	Totally blind.
Restricted field	42	.5	38	91.0	3	7.0	1	2.0	Restricted field.
TOTAL	7,718	----------	4,488	58.0	2,989	39.0	241	3.0	

Table II.—Levels of vision and modes of reading for total local registrants, local selected sample, and total local registrants with sample removed

Vision level	Number of children	Approximate percent of total number	Print readers		Braille readers		Readers of both		Degree of vision
			Number	Percent of column 2	Number	Percent of column 2	Number	Percent of column 2	
1	2	3	4	5	6	7	8	9	10
TOTAL LOCAL SCHOOL REGISTRANTS									
I	3,303	43.0	3,037	92.0	152	5.0	114	3.0	20/200.
II	422	5.0	350	83.0	54	13.0	18	4.0	15/200 and 20/300.
III	774	10.0	597	77.0	124	16.0	53	7.0	10/200–15/400.
IV	378	5.0	245	65.0	105	28.0	28	7.0	20/600–10/500.
V	114	1.0	57	50.0	48	42.0	9	8.0	5/400–2/400.
VI	288	4.0	128	44.0	149	52.0	11	4.0	Counts fingers.
VII	147	2.0	27	18.0	114	78.0	6	4.0	Hand movement.
VIII	855	11.0	9	1.0	845	99.0	1	.1	Light perception.
IX	1,395	18.0	-------	-------	1,395	100.0	-------	-------	Totally blind.
Restricted field	42	.5	38	91.0	3	7.0	1	2.0	Restricted field.
TOTAL	7,718	----------	4,488	58.0	2,989	39.0	241	3.0	----------

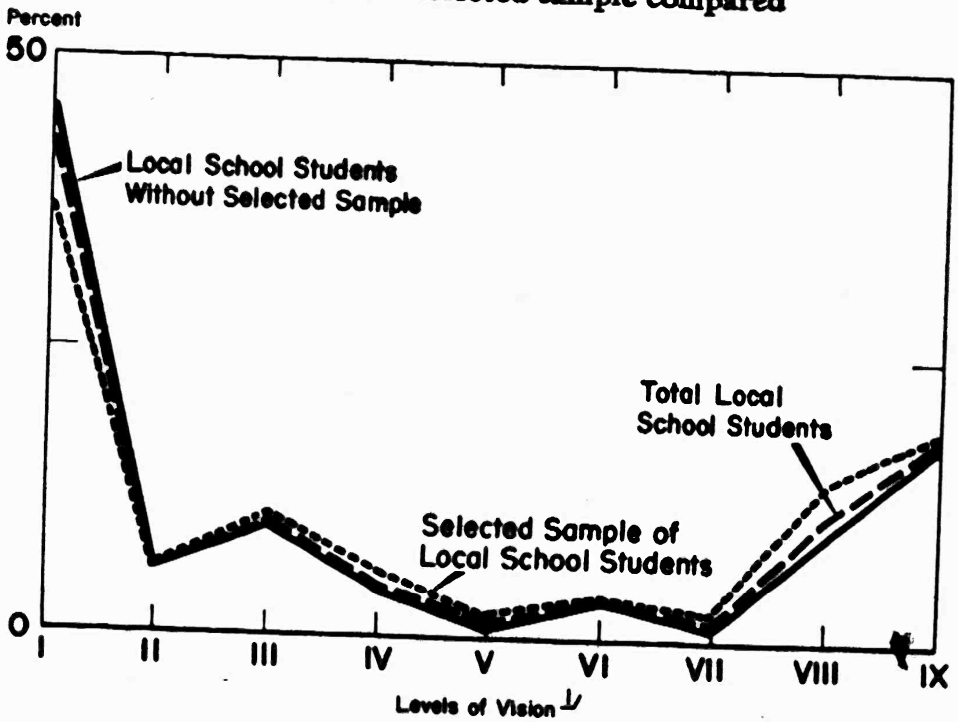
Local Selected Sample

I	948	37.0	870	92.0	60	6.0	18	2.0	20/200.
II	140	6.0	107	76.0	26	19.0	7	5.0	15/200 and 20/300.
III	262	10.0	199	76.0	51	19.0	12	5.0	10/200–15/400.
IV	154	6.0	97	63.0	45	29.0	12	8.0	20/600–10/500.
V	55	2.0	33	60.0	18	33.0	4	7.0	5/400–2/400.
VI	95	4.0	43	45.0	50	53.0	2	2.0	Counts fingers.
VII	61	2.0	15	25.0	44	72.0	2	3.0	Hand movement.
VIII	356	14.0	3	1.0	353	99.0	-------	-------	Light perception.
IX	474	18.0	-------	-------	474	100.0	-------	-------	Totally blind.
Restricted field	10	.5	10	100.00	-------	-------	-------	-------	Restricted field.
Total	2,555	----------	1,377	53.9	1,121	43.9	57	2.2	----------

Total Local With Sample Removed

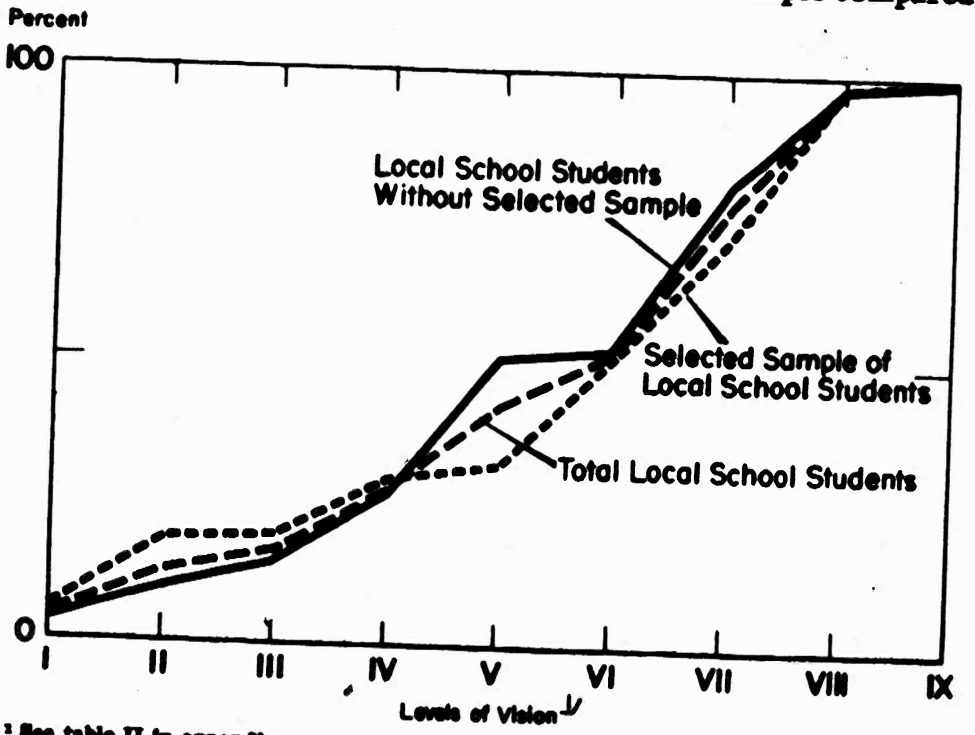
I	2,355	46.0	2,167	92.0	92	4.0	96	4.0	20/200.
II	282	5.0	243	86.0	28	10.0	11	4.0	5/200 and 20/300.
III	512	10.0	398	78.0	73	14.0	41	8.0	10/200–15/400.
IV	224	4.0	148	66.0	60	27.0	16	7.0	20/600–10/500.
V	59	1.0	24	41.0	30	51.0	5	8.0	5/200–2/400.
VI	193	4.0	85	44.0	99	51.0	9	5.0	Counts fingers.
VII	86	2.0	12	14.0	70	81.0	4	5.0	Hand movement.
VIII	499	10.0	6	1.0	492	99.0	1	.2	Light perception.
IX	921	18.0	-------	-------	921	100.0	-------	-------	Totally blind.
Restricted field	32	.5	28	88.0	3	9.0	1	3.0	Restricted field.
Total	5,163	----------	3,111	60.0	1,868	36.0	184	4.0	----------

Graph A.—Degree of vision: total local, local selected sample, and local without selected sample compared



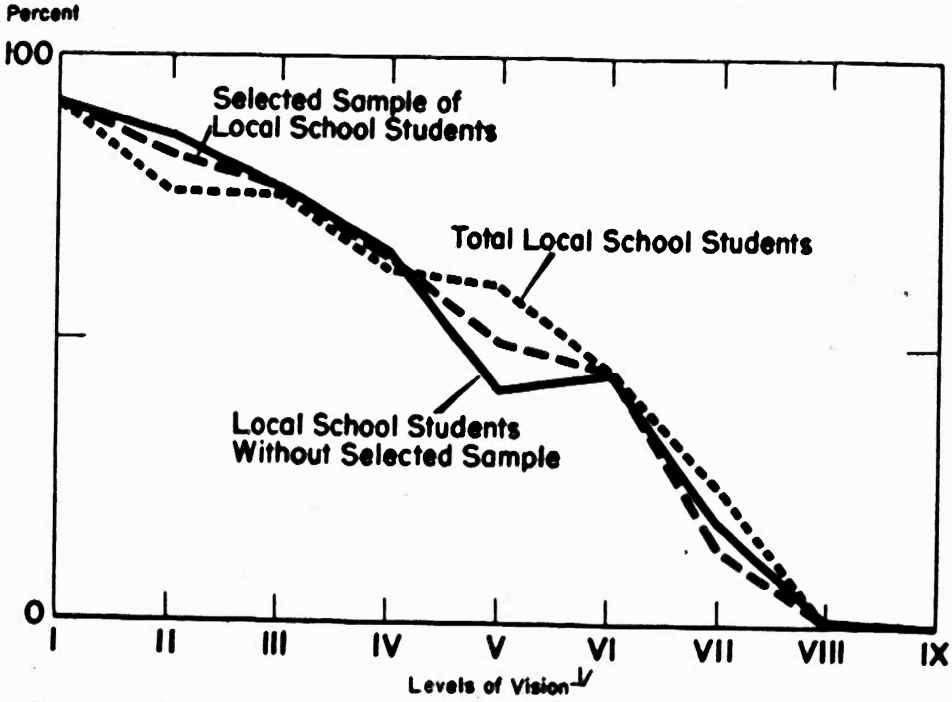
[1] Populations of subgroups vary greatly. See table II for details.

Graph B.—Students registered as readers of braille only: total local, local selected sample, and local without selected sample compared



[1] See table II in appendix.

Graph C.—Students registered as readers of print only: total local, local selected sample, and local without selected sample compared



[1] See table II in appendix.

REGISTRATION FORM

Used by

American Printing House for the Blind

(Replica of Portion Used to Tabulate Data)

Registration of Blind Pupils, as of January 4, 1960,
For the Purposes of the "Act to Promote the Education of the Blind"
(Through State Departments of Education)

(Children registered for these purposes must have "central visual acuity of 20/200 in the better eye with correcting glasses, or a peripheral field so contracted that such field subtends an angular distance no greater than 20 degrees.")

Name of city or county public school system pupil attends	Pupil's school grade	Eye specialist's report on degree of vision (each eye separately) WITH CORRECTION	Is primarily a reader of braille, large type, or both (indicate which)		
			Braille	Large type	Both

O