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# A study of the effect of shift classes on reading age

Joseph Lawson Hendrick

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A STUDY OF THE EFFECT OF SHIFT CLASSES  
ON READING AGE

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A Thesis  
Presented to  
The Graduate Faculty of the  
University of Richmond, Virginia

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science in Education

LIBRARY  
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VIRGINIA

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by  
Joseph Lawson Hendrick  
August 1954

*Approved  
8/20/54  
E. F. Overton*

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Jos. L. Hendrick

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION . . . . .	1
The Problem . . . . .	1
Definite statement of the problem. . .	4
Review of what has been done . . . . .	5
Contribution of the present study. . .	9
Availability of the data . . . . .	10
Procedure_s and technique . . . . .	11
Definition of "Shifts" in the system under study. . . . .	17
Statistical treatment . . . . .	18
Brief Summary of findings . . . . .	20
II. READING AGE RELATED TO OCCUPATION OF FATHER; AND THE SUB-STUDY . . . . .	23
Percentage-distribution of occupations. .	23
Computation of mean reading ages. . . . .	25
Calculation of chi-squared and the coefficient of mean-square contingency . . . . .	32
Procedural discussion. . . . .	33
Summary of findings . . . . .	35
Support from other studies . . . . .	35
Implications of the findings . . . . .	37



CHAPTER	PAGE
The sub-study . . . . .	39
Procedures and technique . . . . .	39
Interpretations. . . . .	41
Summary of findings. . . . .	41
IV. SUMMARY AND CONCLUSIONS . . . . .	42
An evaluation of the thesis . . . . .	42
Limitations to the study . . . . .	43
Conclusions and recommendations . . . . .	47
Need for further research . . . . .	47
What effect do shifts have upon other	48
areas of learning and growth? . .	48
Which grade level suffers the least	
from shifts?. . . . .	48
Should shift classes be interchanged	
at mid-session? . . . . .	49
What do pupils think of shifts?. . .	49
What value have the fatigue factors?	50
What administrative problems are	
characteristic of shift schools?.	50
BIBLIOGRAPHY. . . . .	53
APPENDICES	
A. Test and Study Form samples. . . . .	55
B. Schedule of test appointments. . . . .	60
C. Formulae and calculations. . . . .	61
D. Worksheet summary of data by class.. . . .	65
E. Sum of the months--Reading Age . . . . .	87

## CHAPTER

## PAGE

## APPENDIXES (continued)

F. Subjective discussion of opinions gathered from the literature concerning morning and afternoon shift classes.. . . .	88
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## LIST OF TABLES

TABLE	PAGE
I. Statistical Summary Sheet of Experimental Findings . . . . .	22
II. Mean Reading Age by Occupation of Parent, With Percentage-Distribution . . . . .	28
III. Sum of the Months (R.A.) According to Occupation, By Shift and Non-Shift Groups . . . . .	87
IV. Frequency Distribution of Reading Age by Occupation (Cell-Table). . . . .	30
V. Calculation of Probability and Coefficient of Mean-Square Contingency for Occupation Of Parents vs. Reading Age. . . . .	62

## GRAPHS AND CHARTS

FIGURE	PAGE
1. Percentage-Distribution of Household Heads by Employment . . . . .	26
1-a. Percentage-Distribution of Household Heads by Employment - Polygon . . . . .	27
2. Mean Reading Age by Occupation of Parent. . . . .	29
3. Reading-Age-Group Concentration by Occupation. . . . .	31
4. Distribution of Teaching Experience. . . . .	45

## CHAPTER I.

### INTRODUCTION

#### The Problem

The effect of shifts upon learning has for some time been the subject of debate among school administrators, teachers, parents, and others concerned with the education of children. This study was developed because of the need of objective information bearing on the total problem of shifts in the elementary school. Each area of learning needs to be investigated to determine the merits, if any, as well as the shortcomings of partial-day or shift programs of instruction.

School administrators, supposedly, resort to shifting (usually first and second, occasionally third and higher grades) only as an emergency measure. When the number of classes anticipated for a given school session is larger than the number of rooms available for housing these classes, obviously something must be done. At this stage of the problem, several possible answers may present themselves.

All too frequently, the "solution" to the dilemma is to bring a certain segment of the pupil population into classes earlier than the normal school day, dismissing them earlier than would normally be the case. Then a second "shift" of children is brought in as soon as the classrooms are

vacated by the first shift. The time for their school day is extended beyond the normal school day.

Another possible solution lies in the re-organization of the school plant itself. The school auditorium, library, teachers' lounge, cafeteria, playroom or other area of the school plant may be remodeled or otherwise modified and adapted for classroom space. The merits and shortcomings of this type solution cannot be treated fully in this study. Suffice it to say that to the extent that these or other areas of a given school have been wisely planned to provide an environment which will promote learning and facilitate the many functions and activities of a community-centered school--then to that extent is it improper and ill-conceived to cut to pieces an orderly and well-planned school plant. It is quite possible that, in a given school, a teachers' lounge may be as important as any other single factor in the teacher-pupil-learning situation. The same possibility exists with respect to other areas of a building. Only the building principal or supervisor in a given situation would be in a position to determine the relative value of any one facility or area in his school. One may suppose that a playroom, for example, has been developed and planned only after its purposes and values have been reasonably established. If such is the case, a conscientious administrator will not

feel kindly disposed toward cutting the heart out of his physical education program in order to accommodate an additional first grade section.

School superintendents, principals, teachers, and others are constantly bombarded with just such problems and decisions. Small wonder that so often the "solution" is shifts. "After all," a principal might reason, "I know what our library means to the school program. But there are many conflicting opinions as to whether a child can learn arithmetic as well in the afternoon as in the morning." Of course, this is only one of the many problem areas inherent in shift programs of instruction.

Nonetheless, in many city and county systems, particularly in large metropolitan areas, the shift is being resorted to more and more frequently. The writer shares the concern of many educators that what was originally conceived of as an emergency measure, i.e., "shifts", will eventually come to be accepted by many as normal school organization---even desirable. And all of this without adequate information relative to the effects of shifts on learning. It was with this general background of thought and need that the current problem was inspired and developed. The investigator could have attacked the problem from the standpoint of the effect of shifts on other skill areas,

or on the enrichment areas, such as art, music, etc. However, the study was limited to one area because of the limitations of time and finances. The decision to apply the experimental approach to the area of language development and reading skills was prompted in no small measure by the interest shown recently in the national problem of reading disabilities.

Definite statement of the problem. Hence, this study attempts to determine whether there is a difference between the reading achievement of second grade children "on shifts" and those on regular-day programs of instruction in the public schools. Further, assuming that a difference is found, to determine whether the difference is statistically significant. Also, to determine whether a discovered difference is due to some factor or factors inherent in shifts, or due to factors unrelated to shifts. Then, to make the same investigations and comparisons between morning and afternoon classes.

Obviously, the area of language development and reading skills has been the object of untold investigations and studies, some experimental, some philosophical, and others strictly curriculum-building in nature. However, few studies have attempted to isolate one area of learning (such as reading skills) and compare near-equivalent groups



for effect of shifts.

Review of what has been done. One investigator, Louise L. Smith,<sup>1</sup> has attempted to show the waste and loss of learning in half-day sessions, as compared to full-day sessions. This was done by testing differences between mean gains of full and half-day sessions of second and third grades, and comparing the differences with the time allotted for each of the areas tested. It was found that despite the fact that more class time was spent on the basic academic subjects by the half-day classes, ----full-day classes showed a greater mean gain in word meaning and average achievement than the half-day classes.<sup>1</sup> The differences were tested and found to be statistically significant for the second grades. However, only average achievement registered a statistically significant gain for the full-day classes in the second grades. In reading, arithmetic fundamentals, arithmetic problems, spelling and average achievement the differences between full- and half-day mean gains were not statistically significant.<sup>2</sup> In several of those areas there was practically no difference noted at all. However, it should be acknowledged that for

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<sup>1</sup>Louise L. Smith and Thomas D. Horn, "Is The  $\frac{1}{2}$ -Day Session Full Measure?," Childhood Education, 30:373-74, April, 1954.

<sup>2</sup>Louis e L. Smith, "A Study of the Effect of Half-Day Classes in the Austin Public Schools," an unpublished Master's thesis, The University of Texas, Austin, Texas, 1953, p. 86.

most areas tested, the half-day classes devoted more time to instruction than did the full-day classes.

In another school system,<sup>3</sup> it was found that academic achievement in first grade classes was as great as for regular-day first grade classes. This observation was confirmed by data taken from Progressive Achievement Tests. The reasons given by the authors for the success of the partial-day program all related to the fact that two teachers were instructing part of the class day together. It was felt during the course of this study that this is a substantial determinant of the success with which a shift or partial-day program might be expected to meet. Some of the advantages and compensations claimed as a result of the cooperation of an assistant and regular teacher in the above-mentioned study were: More time for adequate checking of pupils' work, more effective and prompt answering of questions, more effective grouping and more individual assistance. In that study, attendance percentages were higher than was customary for first grade classes! There was some evidence that there was less fatigue, sickness, and irritability on the part of the pupils, as a result of

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<sup>3</sup>W. M. Rasbrook, and others, "Two Teachers, One Classroom," Childhood Education, 29:171-4, December, 1952.

a shortened day with two instructors cooperating and assisting one another. In the Smith study, the majority of the teachers queried expressed the opinion that fatigue and discipline were no greater as problems to the half-day teacher than to the full-day teacher, and in the Austin Elementary Schools few teachers if any cooperate in the teaching of a single class. In the Rasbrook report<sup>4</sup> it was pointed out that there was always a teacher (the assistant) on hand in case of some emergency situation, those interruptions which normally result in the teacher absenting herself from her classroom. With two teachers, a sick child may properly be cared for or taken home, for example, without leaving the class unattended. The authors cautioned that the entire success of the two-teachers-one-classroom plan hinged upon a satisfactory personality adjustment of the assistant and regular teacher.

In the Alameda, California Public Schools a study was conducted in the third, fourth and fifth grades, involving 204 pupils.<sup>5</sup> Achievement of pupils in single- and double-session classes was compared over a period of seven months

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<sup>4</sup>Rasbrook, loc. cit.

<sup>5</sup> D. H. Russell, and H. J. Eifert, "Comparison of Achievement Of Pupils In Single- and Double-Session Schools," Education Digest, 15:47, May, 1950.

in reading, language, spelling, and arithmetic. It was noted that single-session pupils gained .68 of a grade; whereas, double-session pupils gained only .48 of a grade. Single-session pupils of fourth and fifth grades made better progress than double-session pupils in every ability tested. The authors concluded, 'Their (double-session pupils) achievement is not equal in certain subjects and they are denied the opportunity to participate in some of the more rewarding of the informal activities of the elementary school.'<sup>6</sup>

Another limited study was conducted in one school, including six classes.<sup>7</sup> It was found that when both full-day and half-day classes were taught by equally competent teachers, the full-time classes did as well as or better than the half-day classes in achievement in reading, arithmetic, language and spelling. Full-time classes did better than the split-sessions in physical, emotional and social growth and adjustment. This study drew the conclusion that split-sessions do not provide the same quality of education provided in full-time sessions.

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<sup>6</sup>Russell, loc. cit.

<sup>7</sup>C. M. Saunders, "Double Session, Good? Bad? Indifferent?," American School Board Journal, 123:49, October, 1951.

Contribution of the present study. It should be pointed out that the present study will deal only with the area of reading skills and the shift-classes are only approximately 20% shorter than the regular school day. There seems to be a greater difference between the half-day and full-day sessions dealt with in the aforementioned studies, one of which tested differences in mean gains between children in classes that varied 60% from one another in the length of the school day. That investigator concluded: '---the concentration on the "academic" subjects by half-day classes does not provide a satisfactory substitute for the enriched program of the full-day classes.'<sup>8</sup> This investigator would tend to agree with the findings of that study in the absence of experimental proof. However, as an administrator, he is called upon to answer the question: "Will my child learn to read as well on shifts as he will in regular classes?", or, "Will my child learn arithmetic concepts as well on shifts?", or, "Will my child learn reading as well in the afternoon as in the morning?" The point here, of course, is to demonstrate that generalizations and interpretations logically follow the objective

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<sup>8</sup>Smith and Horn, op. cit., p. 374.

solution of smaller problem areas. There are probably few educators, for example, who would not readily agree that to spend a full day in class time is superior, from the standpoint of enrichment, to spending only one-half day in class. But, how many could demonstrate just which areas suffer the most; which areas gain the most, possibly; how great are the gains or losses, etc. Perhaps it is sufficient to know that full-day classes are superior to half-day classes. However, problem-solving within given areas of weakness is not then feasible--at least it is not facilitated by general knowledge as to the superiority of full-day sessions. Hence, the felt need of the writer to attack the over-all problem by defining one relatively small area of the total problem first. Thus, the way may be somewhat prepared for a more general and comprehensive approach to the total problem.

Availability of the data. It was decided to conduct this study in the public <sup>white</sup> schools of Henrico County, Richmond, Virginia. This county encircles greater Richmond. Only three of its elementary schools found it necessary to hold shift classes in the second grade during the 1953-54 session. A number of them operated a shift program in the first grade. But only second grade classes were considered for the purposes of this study, it being felt that first grade children

have not generally progressed sufficiently in reading skills to make them a suitable group for this type study. Also, all second-grade children on shifts at the time of the study had already experienced shifts in the first grade; that is, all save those who had recently transferred from a system not employing shifts. Thus, the subjects in the shift schools (the experimental group) had experienced shifts for two consecutive years; whereas, only a relatively few subjects in the non-shift schools (the control group) had experienced shifts during the first grade. Of course, none of the subjects in the control group had experienced shifts in the second grade. This study, then, accepted the three shift schools and attempted to work toward matching their second grades with equivalent second grades from three other schools in the same county, each of which had not employed shifts in the second grade.

#### Procedures and Technique

In attempting to construct equivalent control and experimental groups, it was decided to do so on the basis of similarity of community life, as follows:

1. Is community predominantly rural or urban in nature?
2. Is community predominantly poor or privileged with respect to property values?

3. What is the proportion of apartments to homes?

4. What general types of business are characteristic of the community?

Since all of the shift schools occupied a westerly position with respect to the City of Richmond, and only one school was located in that general direction from Richmond that did not operate on a shift basis, it was apparent that the problem of matching the control and experimental schools closely on the matter of community character was to be difficult. However, within the framework of practicability the matching was planned and consummated.

The groups were constructed as nearly equivalent as was possible. The following factors (in addition to community make-up) were controlled: Proportion of boys to girls, mean mental ages, mean chronological ages, and percentage of the sample chosen from each class. Approximately 30% of each second-grade class was randomly selected, tested, and otherwise included in the experiment. The only departure from this procedure was in the case of one of the larger control schools. The investigator felt it would be wiser to select randomly about 23% from each of five classes, as opposed to the selection of 30% from only



three of the school's five eligible second-grade sections. It can be argued that thus there was less likelihood that one teacher's influence would be reflected too strongly in the results of the study. This deviation from the established procedure of selecting 30% from each class was necessitated by the discovery that the control schools had a combined total number of second grade classes greater than had the experimental schools.

After the schools to be included in the study group had been selected, (three control schools--three experimental schools) the cooperation of the school's principals and staff was solicited. Then each pupil in the second grade in the six schools was given Form I of the Gates Primary Reading Test, Advanced, Type 1, Word Recognition.<sup>9</sup> All of the tests were administered, scored and recorded by the writer. The differences in the conditions under which the tests were administered were held to an absolute minimum. Exactly the same directions were given each class; the very same rapport-building introduction was used; the same time intervals were observed, etc. All of these and other principles of equality were rigidly adhered to by the investigator, lest the test results be appreciably affected,

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<sup>9</sup>See Appendix A, p.55.

either adversely or beneficially. In-so-far as was possible to arrange, the tests were given under identical conditions, at approximately the same time of day, etc. The classroom teachers had little or no part in the actual administration of the tests, although they were kept informed as to the steps and procedures of the test program all throughout the experiment. To repeat, all of the pupils of these twenty-two classrooms were tested, for each of the schools requested that this be done, and for which service they agreed to defray the cost of the reading tests. All reading scores were reported to the principal of each school, along with explanatory manuals for each second-grade teacher.<sup>10</sup> As was pointed out earlier, it had been decided to include only a 30% random selection of the pupils in the actual study. This was accomplished by ignoring the test data for all but six boys and six girls from each classroom. The actual selection of the subjects was made on the basis of the following series of numbers, obtained by the tossing of dice: 2, 3, 6, 7, 12, and 14. The teachers' roll books were examined, and the male pupil whose name appeared second, third, sixth, etc., was noted, and his reading test score recorded. If the appointed child was absent when the reading test was administered, the next lower-numbered child was chosen. The same procedure was observed in the construction of the female sample

<sup>10</sup>See Appendix A.

After proper record was made of the reading scores, they were converted to reading age equivalents for ready comparisons with mental and chronological ages to be determined in another phase of the study. The tests were administered in the fifth month of 1954--or the eighth month of the school year. The test form used is for application in the second half of grade two. All of the reading tests were administered during the week of May 11 to May 14, 1954.<sup>11</sup>

At this point, since all of the subjects had been selected, Study Form I was mailed or delivered personally to each classroom teacher.<sup>12</sup> On this form, the teacher copied from the pupils' cumulative records, the date of birth and the household head's occupation.

During the week of May 17 through May 25, each pupil selected for the purpose of the study was given the Revised Beta Mental Examination.<sup>13</sup> Once again, the most rigid standards were maintained by the investigator in controlling the conditions under which the tests were administered, taking all possible precautions to give the same instructions, introduction, use the same procedures,

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<sup>11</sup>See Appendix B, p. 60.

<sup>12</sup>See Appendix A, p. 58.

<sup>13</sup>See Appendix A, p. 57.

explanations and of course, precisely the same time interval for each of the Beta sub-tests. To the extent that it was practicable, and the schedule of tests appointments will demonstrate this, the same order was observed in planning for the test date for the Beta as was observed for the Gates Reading Test. For example, if Schools A, B, and C appeared in that order on the schedule of test appointments for the reading tests, every effort was made to administer the Beta in the same order. All tests were administered within two weeks of the commencement of the study--May 11. As was the case with the reading tests, all mental tests were given, scored, and recorded by the investigator. (Note: All mental tests and other data too bulky to be filed with this report are on file at the following address: Box 15R, Route #1, Ellerson, Virginia.)

Study Form II was used as a worksheet on which to consolidate by class all the data thus far collected.<sup>14</sup> These data included: Subjects' names, sex, chronological age, reading age, mental age, fathers' occupation, name of school, teachers' name, shift or non-shift, and the dates on which the tests were administered.

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<sup>14</sup> See Appendix A, p. 59.

At this point, a personal or telephone interview was arranged with each principal to determine the extent of the elementary teaching experience of each teacher. This information was then recorded on each Study Form II, there being one such form for each class in the study.

Definition Of "Shifts" In the County Under Study

It should be explained at this point that within the county under study, in the shift schools, there is a separate teacher appointed for each shift class, i.e., at 8:30 a.m. Miss A takes over the second grade, first shift class. She has an alternate or assistant teacher, Mrs. B from about 10:30 a.m. until 12:00 noon. The assistant teacher may handle some designated reading group, or relieve the major teacher by instructing a small remedial group from the class in arithmetic, or she may spend a portion of the overlapping hours in preparation for her own class which begins at 12:00 noon. Most often, however, she will assist in whatever area the major teacher feels is in greatest need of assistance. There is almost always a mutual decision as to which area will receive the extra assistance, and most often this area is the language arts program. At 12:00 noon the situation changes. The first shift is dismissed, and the second shift arrives. The position of major and assistant teacher is reversed, Mrs. B

assumes the leadership of her second shift class and Miss A becomes her assistant. Likewise, she works with the major teacher for about one and one-half hours. On the basis of this procedure some administrators claim advantages for their reading programs, especially. Thus, they claim, the combined efforts of two teachers for one and one-half hours more than equalizes the advantages of the non-shift regular day program, so far as reading is concerned.

### Statistical Treatment

To return to the procedures, the Study Form II records were arranged in four groupings, total control, total experimental, morning shift and afternoon shift within the experimental group. Then a statistical approach was planned and executed, first treatment being a comparison between the total control and the total experimental groups.

The first step in the statistical analysis was to convert all chronological ages, mental ages, and reading ages into months, to facilitate a work-up of the data, and to put the data into a form suitable for the formulae that were used.<sup>15</sup> The sum of the months for each class for C.A. and for M.A. was computed. The Study Form II sub-totals

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<sup>15</sup>See Appendix C, p. 61.

were then added for each of the two groups. The total sum-of-the-months for each group was divided by the number (N) of subjects in the group. Then the first trial Mean C.A. and Mean M.A. was computed. Despite the random sampling technique, too large a difference in means obtained. Since chronological and mental age are such important indices of reading ability, and thus reading age, the investigator felt it necessary to bring the means of the groups within closer equivalence. This was done first for chronological age, all the data for several subjects being thrown out of the study completely. The same procedure was repeated for mental age. All of these eliminations were made on a purely trial basis with no regard for reading age. A second trial total was computed after several subjects were dropped from each group, there being an unequal number of subjects in the groups. New means for chronological and mental age were computed. These measures appear in Table #I. It should be noted that the Mean C.A. of the two groups were within .2 of a month of one another, and the Mean M.A. of the two groups are within .1 of a month of one another. This appears to satisfy the original intent of constructing two groups as nearly equivalent in the controlled-for areas as was practicable.

### Brief Summary of Findings

Once the groups had been constructed according to these procedures, the data were then ready for a critical analysis of the differences in Mean Reading Ages between the two groups. Table #I shows the two groups to be 1.9 months apart in Mean R.A. Following approved statistical procedures, the following measures were derived: First, the Standard Deviation of the two distributions for each of the three ages; next, the Sigma M or the Standard Deviation of the Error was computed; then, the Sigma of the Difference and the Arithmetical Difference between the means was computed. By testing these residual measures in the 't' or Critical Ratio formula for significance, the following results were ascertained: No appreciable difference between the chronological ages of the two groups; an even slighter difference between the mental ages of the two groups; and a rather large difference in reading ages. While the difference is not great enough to satisfy the criteria for a significant difference, i.e.,  $1.96 \cong .05$  level of confidence, it is nonetheless, a considerable difference and one which bears further scrutiny. On the basis of the data thus far examined, the evidence is that the pupils on shift in the second grades in the group of experimental schools were reading at a considerably higher level at the close of the 1953-54 school



session than were the pupils on regular-day programs of instruction. One sizeable factor remained which the random sampling technique had failed to control for adequately--the occupational background of the parents.

TABLE #I  
STATISTICAL SUMMARY SHEET OF EXPERIMENTAL FINDINGS  
( WITH DEFINITION OF TERMS )

AREA	ITEM	Measurement	C O L U M N A		C O L U M N B	
			Control Group	Experimental Group	Experimental Group	
			N=107	N=107	Morning	Afternoon
			N=52	N=52		
I	A	Mean C.A.	97.2	97.4	96.88	97.15
	B	Mean M.A.	91.5	91.4	91.26	91.25
	C	Mean R.A.	98.4	100.3	100.86	100.36
II	A	C.A.	4.7	4.7	4.0	4.23
	B	M.A.	11.0	10.2	9.38	10.67
	C	R.A.	10.94	9.3	8.7	10.64
II	A	C.A.	5.8	.58	.59	.56
	B	M.A.	1.07	.99	1.31	1.49
	C	R.A.	1.06	.90	1.21	1.49
IV	A	C.A.	1.9	1.9	.81	.81
	B	M.A.	1.42	1.42	2.0	2.0
	C	R.A.	1.4	1.4	1.9	1.9
V	A	D C.A.	.2	.2	.23	.23
	B	D. M.A.	.1	.1	.01	.01
	C	D. R.A.	1.9	1.9	.50	.50
VI	A	CR C.A.	.1	.1	.28	.28
	B	CR M.A.	.07	.07	.005	.005
	C	CR R.A.	1.36	1.36	.28	.28

#### DEFINITIONS:

$\sigma$  or Sigma is the Standard Deviation of the Distribution.

$\sigma_M$  is the Standard Deviation of the Error (Standard Error).

$\sigma_{diff}$  is the Standard Deviation of the Difference.

D is the Arithmetical Difference between the means.

CR is the Critical Ratio or 't' Ratio.

The criteria for a statistically significant difference is  $1.96 \approx 5\%$  level of confidence.

SOURCE: STUDY FORMS II

## CHAPTER II

READING AGE RELATED TO OCCUPATION OF FATHER;  
THE SUB-STUDYPercentage-Distribution of Occupations

In noting the differences in reading achievement between control and experimental groups, the socio-economic gap between them loomed large. There was slight possibility of controlling adequately for this major factor, for the experimental schools occupy the most westerly portion of the county. The significance of this follows: The City of Richmond, located on the James River, is naturally growing westward. This means that the overcrowding of schools could most logically have been anticipated for the schools in that vicinity. Experience has borne out this logic. The extra burden of children in those schools has resulted in part from large and rapid population shifts. One of the suburbs of that area is only a few years old, yet it ranked twentieth place in a table of the largest cities in Virginia during a recent year. The major point to be made here is that there is a heavy concentration of professional, executive and managerial workers represented in the experimental schools' communities; whereas, only a sprinkling are to be found in most of the remaining schools in the county. It appeared to the investigator that here was an important factor which needed further definition as to scope and implications.

The last column of the Study Form II record sheets supplied the answer to the question, "What is the occupation of the father?" A tally was made of all subjects by study group to determine the number of parents in each group who were represented in each of the six occupational categories: Professional, Executive-managerial, Clerical, Skilled, Semi-skilled, and Unskilled.<sup>1</sup> In order to demonstrate graphically the uneven distribution of parental occupations between the two groups, Figure #1 was constructed, utilizing a bar chart. Figure#1-a shows the same distribution, utilizing a polygon for the purpose of emphasizing the difference in occupational background of the two groups. A cursory glance at either of these charts serves to emphasize the preponderance of parents in the Professional-managerial classification from the experimental schools. Reference to Table #II, Column D reveals that while the experimental group had a total of 22% of the sample represented in the professional and managerial classification, only 8% of the control group were found in those categories, almost a 3:1 ratio, favoring the experimental group. By actual count, there are 48 children in the experimental group whose fathers are employed in the Professional-managerial categories compared to only 17 in the control group.

On the other hand, the above-referenced table and

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<sup>1</sup>See Table #II, p. 28.

column show a total of almost 30% of the control group found in the Skilled, Semi-skilled, Unskilled categories. In these same categories, interestingly enough, only about 13% of the experimental group are represented. Once again, the ratio favoring the experimental group is almost 3:1. By actual count, there are 28 children in the experimental group whose fathers are employed in the afore-mentioned categories as compared to sixty-three in the control group.

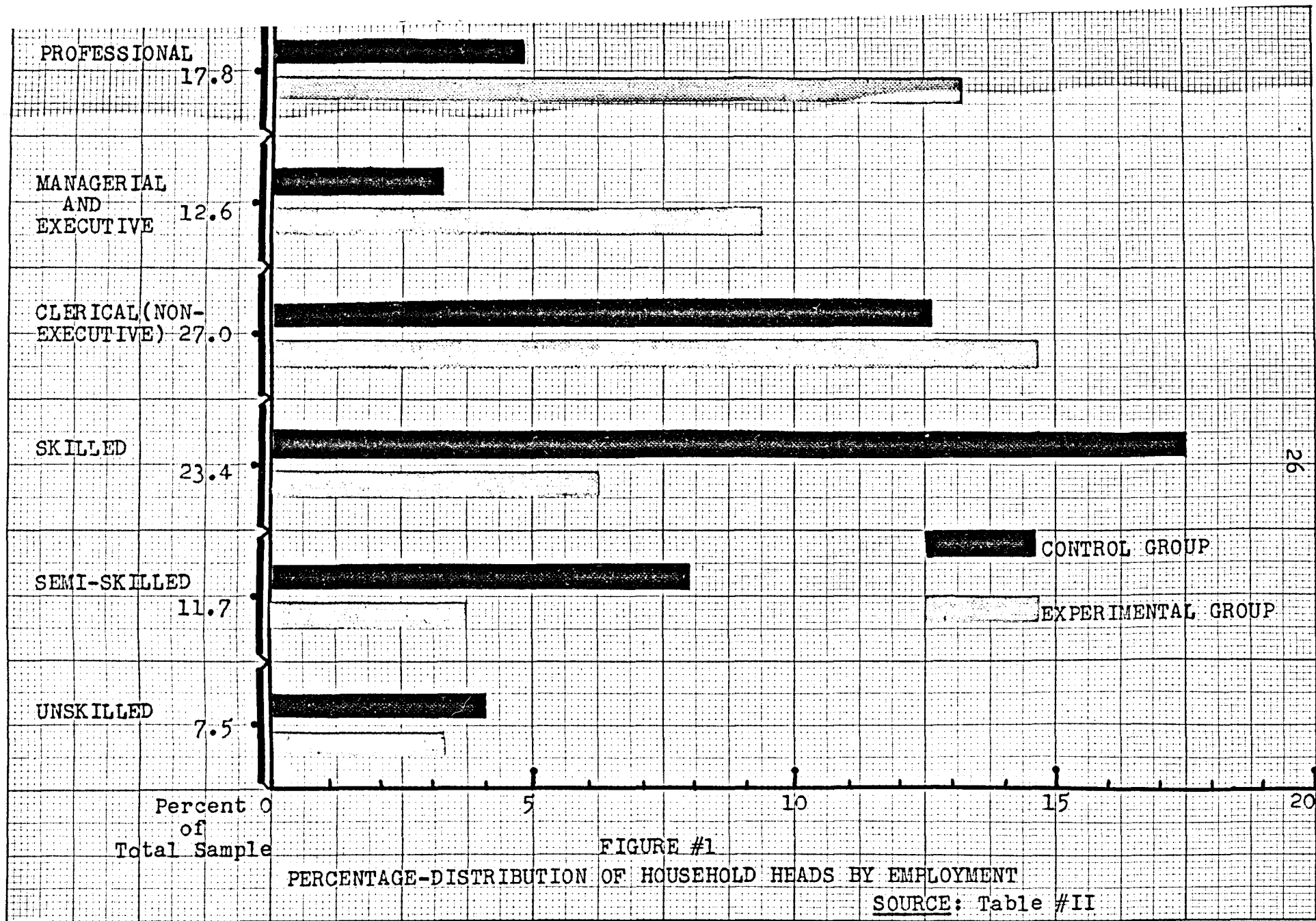
The investigator was faced with the proposal at this phase of the experiment of demonstrating that the reading ages of the study groups were in some significant manner a product or result of this fact, as opposed to chance being the greater factor, since the occupations were so unequally distributed.

#### Computation of Mean Reading Ages

The first step in this direction was to discover the mean reading ages of the subjects in the various occupational groups. Table #III, shows the sum of the months for each group (in sub-totals) as well as the total sum of the months for each occupational category for both study groups.<sup>2</sup> A summary of this information appears in Column B of Table #II. Column C of Table #II shows the actual reading age means by

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<sup>2</sup>See Appendix E, p. 87, Table #III.



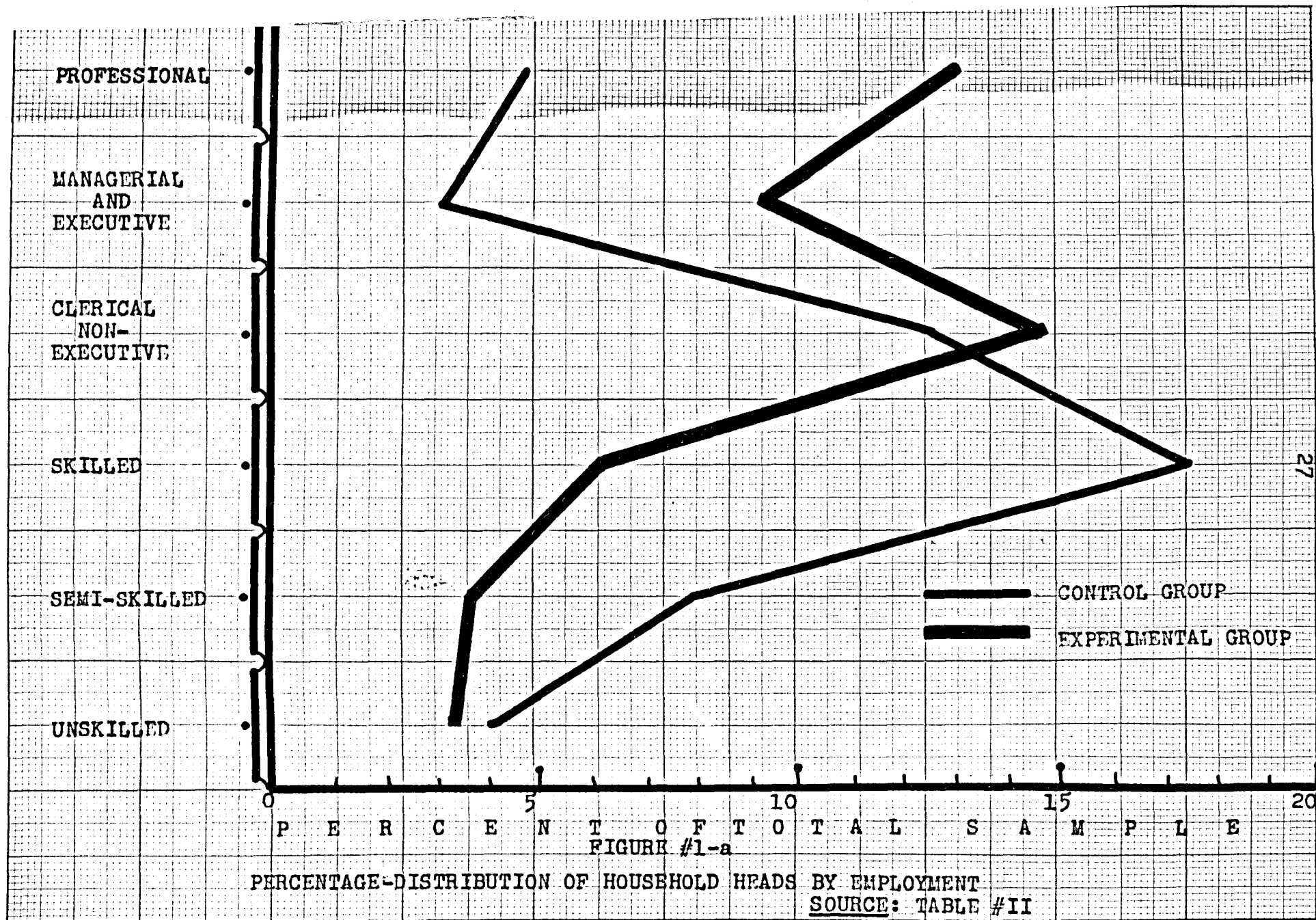


TABLE #II

READING AGE MEANS BY OCCUPATION OF PARENTS  
WITH PERCENTAGE-DISTRIBUTION

Occupational Class Of Parents	COL. A Number of Subjects			COL. B Sum of Months-R.A.			COL. C Reading Age Means			COL. D Percent of Total Sample		
	Exp.	Cont.	Total	Exp.	Cont.	Total	Exp.	Cont.	Total	Exp.	Cont.	Total
PROFESSIONAL	28	10	38	2910	1032	3942	104	103.2	103.7	13.1	4.7	17.8
EXEC.&MGR'L.	20	7	27	2010	676	2686	100.5	96.6	99.5	9.3	3.3	12.6
CLERICAL	31	27	58	3117	2722	5839	100.5	102.3	100.7	14.5	12.5	27.0
SKILLED	13	37	50	1268	3564	4832	97.5	96.0	96.6	6.1	17.3	23.4
SEMI-SKILLED	8	17	25	782	1661	2443	97.8	97.7	97.7	3.8	7.9	11.7
UNSKILLED	7	9	16	639	876	1515	91.3	97.3	94.7	3.3	4.2	7.5
TOTALS	107	107	214	10,726	10,531	21,257	100.3	98.4	99.3	50.0	50.0	100.0

SOURCE: STUDY FORMS II



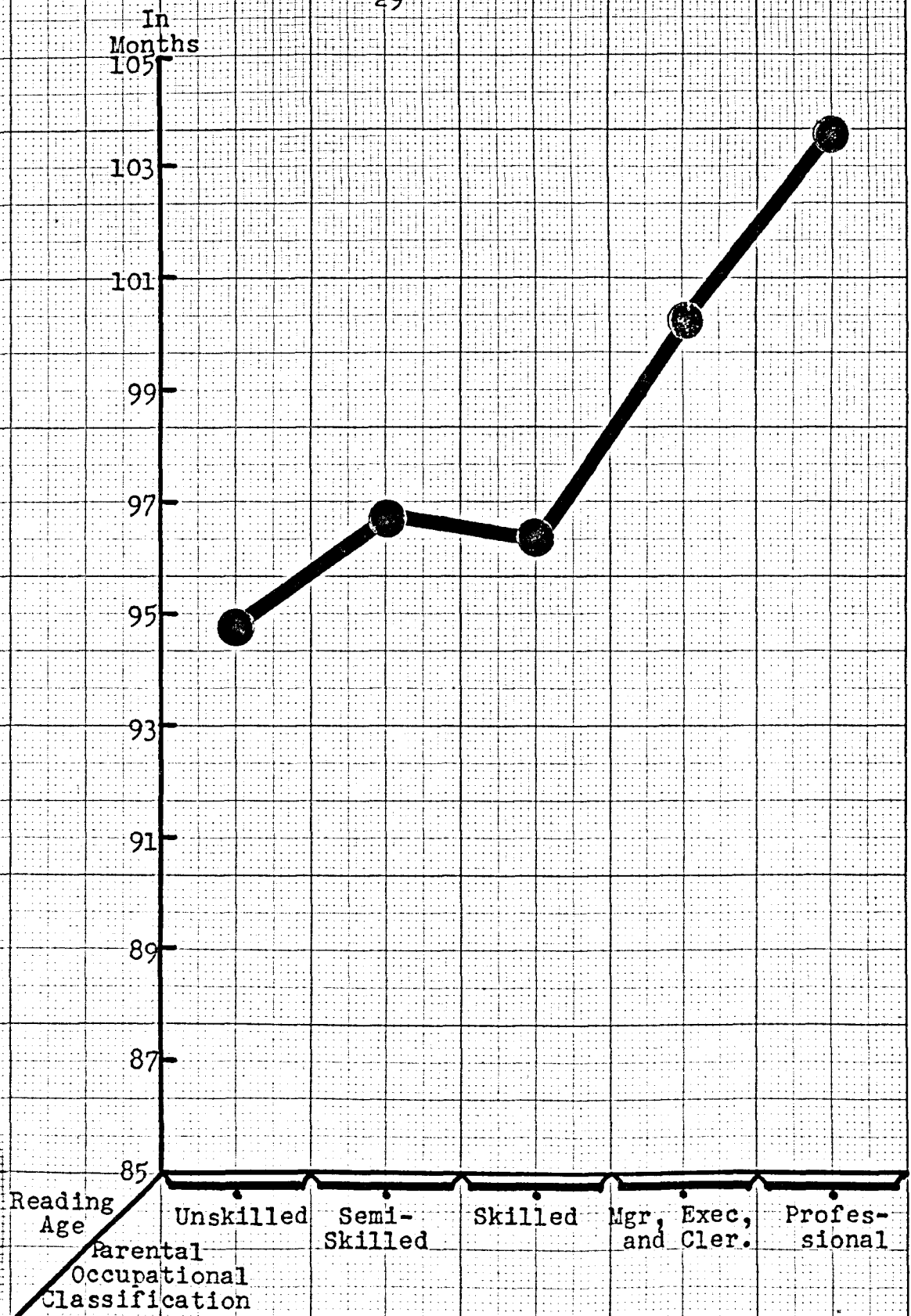


FIGURE #2

GRAPHIC PRESENTATION OF MEAN READING AGE BY OCCUPATION OF PARENTS

SOURCE: Table #II

TABLE # IV

30

FREQUENCY DISTRIBUTION OF READING AGE  
BY OCCUPATION  
(Cell-Table)

Occupation of Parents Reading Age in months	UNSKILLED	SEMI-SKILLED	SKILLED	EXECUTIVE, MANAGERIAL, & CLERICAL	PROFESSIONAL	ROW TOTALS
10-plus	0	4	4	11	9	28
05-109	2	1	5	10	7	25
00-104	4	4	9	16	10	43
05-99	1	1	8	23	9	42
10-94	4	7	4	19	3	37
5-89	5	8	20	6	0	39
COLUMN TOTALS	16	25	50	85	38	214

SOURCE: Tally of Data from  
Study Forms II

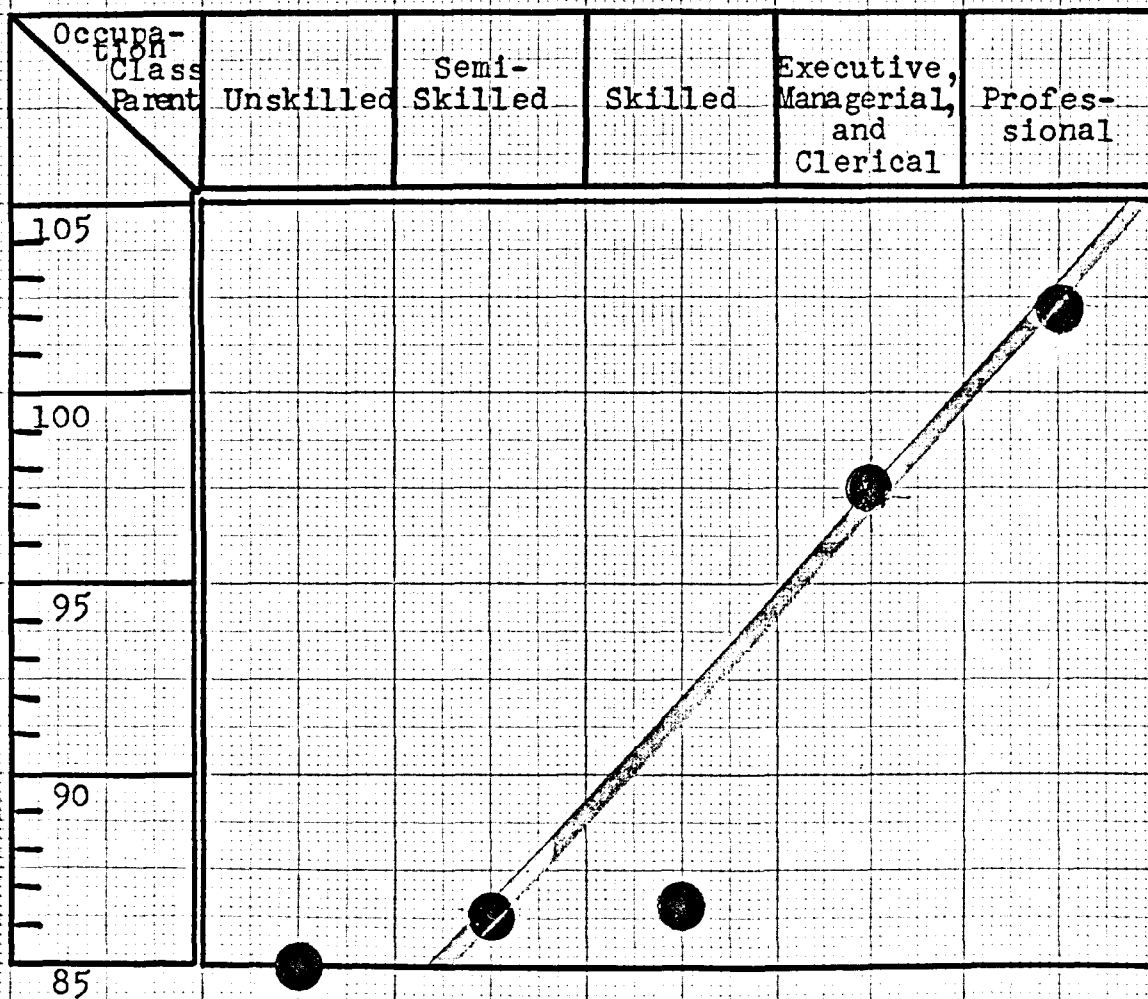


FIGURE #3

READING AGE GROUP CONCENTRATION  
BY OCCUPATIONAL CLASS CELL  
( With fitted straight line curve )

NOTE: Intersection points shown  
at the cell mean.

SOURCE: Table #IV

occupational classification by study groups and for the total group. These data lend themselves very well to graphic presentation, as demonstrated in Figure #2. It should be noted that Executive-Managerial and Clerical categories were merged to form one group, since the reading age means for these classes were quite similar, considering the size of the sample represented in each. Figure #2 shows a nearly straight line relationship between occupation of parent and reading age of pupil. As might be expected, the trend is rather highly in favor of the Professional-Managerial and Clerical group, whereas, the lowest means were evident among the Skilled, Semi-skilled and Unskilled classes. When the individual reading ages were tallied according to occupational classification, it was noted that clusters appeared on the resulting chart. (See Table #IV) Figure #3, based on the afore-mentioned table, shows this information in a fitted-straight line curve cluster-graph. It was constructed by using the heaviest Reading Age-Group concentration or cluster observed in each occupational class cell. Once again, the results in general substantiate the relationships observed in Figure #2.

Calculation of "Chi-squared" and the Coefficient of Mean-Square Contingency

As interesting as these relationships may be, and

despite their implications, the obligation is upon the investigator to test the data and rule out chance as a determinant of the results, if at all possible to do so. The methods decided upon are the so-called "chi-squared" formula referred to probability tables, and the Coefficient of Mean-Square Contingency.

Procedural discussion. The first step in testing the significance of the relationship between occupation of parents and reading age is to construct a cell table plotting the two observed characteristics against one another. Each cell reflects the actual number of subjects or the frequency for each occupation-reading age cell. Here the scores are ignored except as to placement of the frequencies in the proper score-cell. Table #IV shows the resulting formation, and of course, it was from this table that the cluster graph was constructed. It is, however, only a very rough indication of the trend in this data, whereas, the following test for significance through the calculation of Probability should be fairly reliable. As Garrett, quoting Yule, points out<sup>3</sup>, the Coefficient of Contingency is more reliable when the observed characteristics fall into a 5x5-fold table or finer.

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<sup>3</sup>Henry E. Garrett, Statistics In Psychology and Education. New York: Longmans, Green and Company, July, 1935, p. 200.

The table constructed for this study is 5x6-fold. The data shown in the above-reference table were then ready for calculation of the Probability. Conventional statistical procedure was observed by the investigator, formulae and work-up of the data being shown in full in Table #V, Appendix C. The explanation of these procedures will not be repeated here, except to repeat the formulae used:  $P = \text{Reciprocal of the Column Total} \times \frac{\text{Sum of all Cell } f^2}{\text{Row total}}$ . The Probability arrived at is 1.262. The value for Probability was then substituted in the "chi-squared" formula:  $X^2 = N (P-1)$ , N representing the total number of subjects in the experiment. The value of  $X^2$  or chi-squared was found to be 56.068. In order to refer this value for chi-squared to the 't' tables, it was necessary first to determine the degrees of freedom allowed, for any given table of values. These were found by using the following formula:  $df = (r-1)(c-1)$ , r being the number of rows and c representing the number of columns. In this case, degrees of freedom are twenty. Chi-squared should then be interpreted for significance by locating it in the row marked: 20 df. However, the nearest value to 56.068 appearing in the appropriate row in the tables is 37.566. The tables merely do not extend far enough to accommodate the large probability factor of 56.068. Since 56.068 is substantially larger than 37.566 which corresponds to a probability of .01, it may be concluded that the relationship

between occupations of parents and reading ability is of extremely high significance.

### Summary of Findings

Hence, the investigator feels justified in concluding that the difference in reading age between the shift and non-shift schools resulted largely from the fact that the shift schools, who were favored in the comparison, had a much larger number of parents represented in the Professional-Managerial classification. Further, this study seems to have demonstrated rather decidedly that the pupils whose parents are found in Professional-Managerial categories of employment are much more likely to read well than are pupils whose fathers hold skilled or unskilled jobs. (There appears to be little or no justification for assuming that the reason for the difference is to be found inherent in shifts as opposed to non-shift classes.)

It is felt by the writer that this is such a strong determinant of reading ability that the entire difference in reading age between the control and experimental groups, which was demonstrated to be less than statistically significant, can be explained on the basis of occupational background of the household head.

Support from other studies. These findings are corroborated by the results of another study which found that

children who were good readers had fathers in professional and managerial occupations 55% of the time.<sup>4</sup> Whereas, children who were average and poor readers had fathers in these classifications only 25 and 27% of the time. Little difference was found among clerical, sales and services groups. Less than 5% of the good readers came from families in which the fathers were employed in skilled, semi-skilled or unskilled occupations, while 25 and 16% were in those classifications for average and poor readers. In the conclusions drawn by those investigators, it was pointed out that good readers come most often from homes in which the fathers are employed in professional and managerial occupations. Average readers come from homes in which the fathers are employed in skilled or semi-skilled work. And poor readers come from homes whose household heads are employed in agriculture, skilled, or semi-skilled occupations.

In-as-much as educational level is closely associated with occupational status--as numerous studies have shown--it might be well also to examine briefly Table #II taken from the same study:<sup>5</sup>

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<sup>4</sup>W. D. Sheldon and L. W. Carrillo, "Relation of Parents, Home, and Certain Developmental Characteristics to Children's Reading Ability," Elementary School Journal, 52:267-69, January, 1952.

<sup>5</sup>Ibid., p. 26 7.



TABLE #II  
RELATION OF PARENTS' EDUCATION LEVEL  
TO READING ABILITY OF THEIR CHILDREN

Reading status of children	No.	FATHER Highest grade reached		No.	MOTHER Highest grade reached	
		Range	Mean		Range	Mean
GOOD READERS	181	6-19	13.3	182	7-17	12.6
AVERAGE READERS	72	0-17	10.3	67	6-16	11.6
POOR READERS	50	0-17	10.6	47	5-16	11.8

Thirty-five percent of parents of good readers completed college, as contrasted with only 5% of parents of average readers. Ten percent of parents of poor readers completed college.

Implications of the findings. To summarize, the results of this study and others tend to support the belief that reading ability is a product not only of innate ability, training, maturation, etc., but is significantly affected by the occupation of the reader's parents. To what extent this merely reflects the greater ability and/or desire of parents of professional-managerial occupations to provide an environment rich in diverse experiences, including trips, books, etc., may only be surmised. To what extent parental

occupation is an index in gauging the probable social maturity of a child is not known by this investigator. There may have been some meaningful studies in this area. If not, it might prove to be a fruitful line of investigation, from the standpoint of learning more about the nature of reading maturity. Another investigator, who recently reviewed the research concerning retardation in reading, states that "--reading problems stem from emotional, social or physical immaturity. They are symptoms of unmet needs."<sup>6</sup> That writer emphasized the role that social maturity plays in reading growth. It might well be that the current study, in showing that parental occupation relates to reading ability of children, has in reality demonstrated the relationship between family occupational background and social security or insecurity in the attainment of desired status. It might be inferred from the foregoing that in certain occupations, such as the professions, there is such a marked socio-economic advantage as to promote rapid social maturity of the children in these homes, regardless of sex, mental ability, etc. The converse of this inference may also be taken.

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<sup>6</sup>W. S. Gray, "Summary of Reading Investigations, July, 1, 1951 to June 30, 1952," Journal of Educational Research, 46:415, February, 1953. (Quoting Helena H. Zolkos, "What Research Says About Emotional Factors in Retardation in Reading")

### The Sub-Study

Aside from feelings on the part of many parents and teachers that a curtailed day reduces the effectiveness of instruction, there appear to be as many or more persons who believe or express the belief that the afternoon shift is unsuited for learning, especially the learning of skills. The complaint is heard all too frequently by teachers that pupils are tired, lethargic, listless, and in general in poor condition indeed for instruction after the noon hour. Besides, the complaints run, anyone knows that you can't learn arithmetic, reading, etc., as well in the afternoon as you can in the morning! That does seem to be a general feeling among teachers, too. <sup>7</sup>

Procedures and technique. The current study also undertook an objective comparison of reading achievement between equivalent groups of morning and afternoon shifts. For the purpose of this sub-study, only the data for the pupils in the experimental group schools were considered.

The worksheets (Study Forms II) were arranged in two distinct groups, morning and afternoon classes,

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<sup>7</sup>The reader is referred to Appendix F for an admittedly subjective discussion of opinions gathered from the literature concerning morning and afternoon classes.

irrespective of school. Since there was a disproportionate number of children in the two groups, they had to be balanced with respect to chronological age, mental age, sex, etc. The morning group was considered the control and the afternoon the experimental group. The control group was composed of 52 children, randomly selected, representing five classes in three schools. These groups were constructed according to the same procedures as had been practiced in constructing the original control and total experimental groups described in Chapter I. The experimental group was composed of 52 children, randomly selected, representing five classes, in the same three schools, of course. Table #I, Column B (p.22) shows the results of the statistical comparisons made. The mean chronological ages were within .23 of a month apart, the mean mental ages almost identical with .01 of a month separating them, and the mean reading ages fell within .5 of a month of one another. After calculation of the Standard Deviation, Standard Error, Sigma of the Difference and the Arithmetical Difference, the residual measures were tested in the Critical Ratio formula for significance. The following results were ascertained: No appreciable difference noted between either the chronological, mental or reading ages. The slight difference between mean reading ages favored the morning group but is not statistically significant.

Interpretations. It should be noted that the more experienced teachers were used on the afternoon shifts. However, there was only one first-year teacher in the two groups, so this may have little bearing on the comparison. The factor of socio-economic background which the study proper had failed adequately to control using random sampling technique, was controlled very nicely in this sub-study, since all the subjects were from the same schools--and thus from the same communities.

Also, in the county in which these observations were made, the majority of both morning and afternoon classes receive at least part of their instruction from the same teachers. And even if not actually instructed by the same teachers, the fact that two teachers work closely together probably means that their teaching methods and technique are not too dissimilar. This factor would tend to produce some similarity in achievement between morning and afternoon classes.

Summary of findings. On the basis of the evidence at hand the study must conclude that apparently there is no significant difference between the reading age of children in morning cla sses and those in afternoon classes, providing the quality of instruction is the same. And further, that the opinions of parents and teachers--possibly pupils, also--are contrary to this finding and are formidable.

## CHAPTER III.

### SUMMARY AND CONCLUSIONS

#### An Evaluation Of The Thesis.

It should be of some interest to the reader to know the situation under which this problem was defined, explored, and of which this is the final report. In evaluating any piece of work, the motive should come under consideration. While it is quite possible to find a poor piece of work based on a good motive, and a good piece of work based upon a poor motive, there is greater likelihood that a bit of truth will be uncovered if one's motives are defensible. In the case of the current study, the investigator realizes that this work is by no means comprehensive. Further, there were several variables for which the experiment had no controls. Nevertheless, an effort has been made to throw some light upon the perplexing and widespread practice of double-session classes in schools. As a public school administrator, the investigator will, in the 1954-55 session, have to find for the first time, convenient and hasty solutions to the very same problems with which this study has dealt. Whether the results of this study will substantially guide him in the solution of the many problems surrounding double-session classes is doubtful. It is hoped that some clarity will

prevail, however.

In the collection of data for this experiment, objectivity has been the constant guide. Every known precaution was taken by the author to remain un-prejudiced in the selection of schools and subjects; in the administration of the reading and mental tests; in the recording and statistical analyses of data; and in the interpretations of the results.

Limitations to the study. Despite these attitudes, the study was limited in scope to that of a representative sample of one large county school system. Serious lack of time and resources prevented a more extensive experiment. However, the findings for the sampled area are based upon entirely legitimate and accepted statistical procedures, conservative in their applications.

The major procedural problem experienced by the investigator was the difficulty of controlling the study for occupational background of the homes of the subjects. As was explained earlier, in order to study the problem schools, it was necessary to accept them as they were and attempt to match them with schools from other areas of the county. This proved only partially practicable, as has already been demonstrated. It is felt, however, that this is not as severe a limitation as it appears, for the magnitude of the effect of occupations upon reading ability demonstrated was considerably more than suggestive. And,

in light of the findings of other investigations into this area of learning, the present findings appear valid.

The practice of alternating shifts in mid-session makes it extremely difficult to gauge accurately the relative effects of Morning vs. Afternoon classes. It must be understood that the findings in this area of the study are subject to this limitation. Only the fact that second grade children mature so rapidly, even within a half session, lends some measure of reliability to the findings that there is no significant difference between the effects of Morning and Afternoon classes.

Little space has been devoted throughout this study to the very important matter of teaching methods, especially in-so-far as they relate to the learning of reading skills. In answer to any forthcoming criticism concerning this apparent omission, the writer draws attention to the following factors which he feels obviate the necessity of controlling for teaching methodology in this experiment. Six schools were chosen from three sections of the same county; west, northwest, and east. Samples were taken from twenty-two classrooms, all of the second grade sections in the study schools. This means, of course, that the effects of twenty-two different teachers are reflected in the sample of subjects. These teachers had experience in elementary teaching ranging all the way from one to thirty years. Figure #4 shows



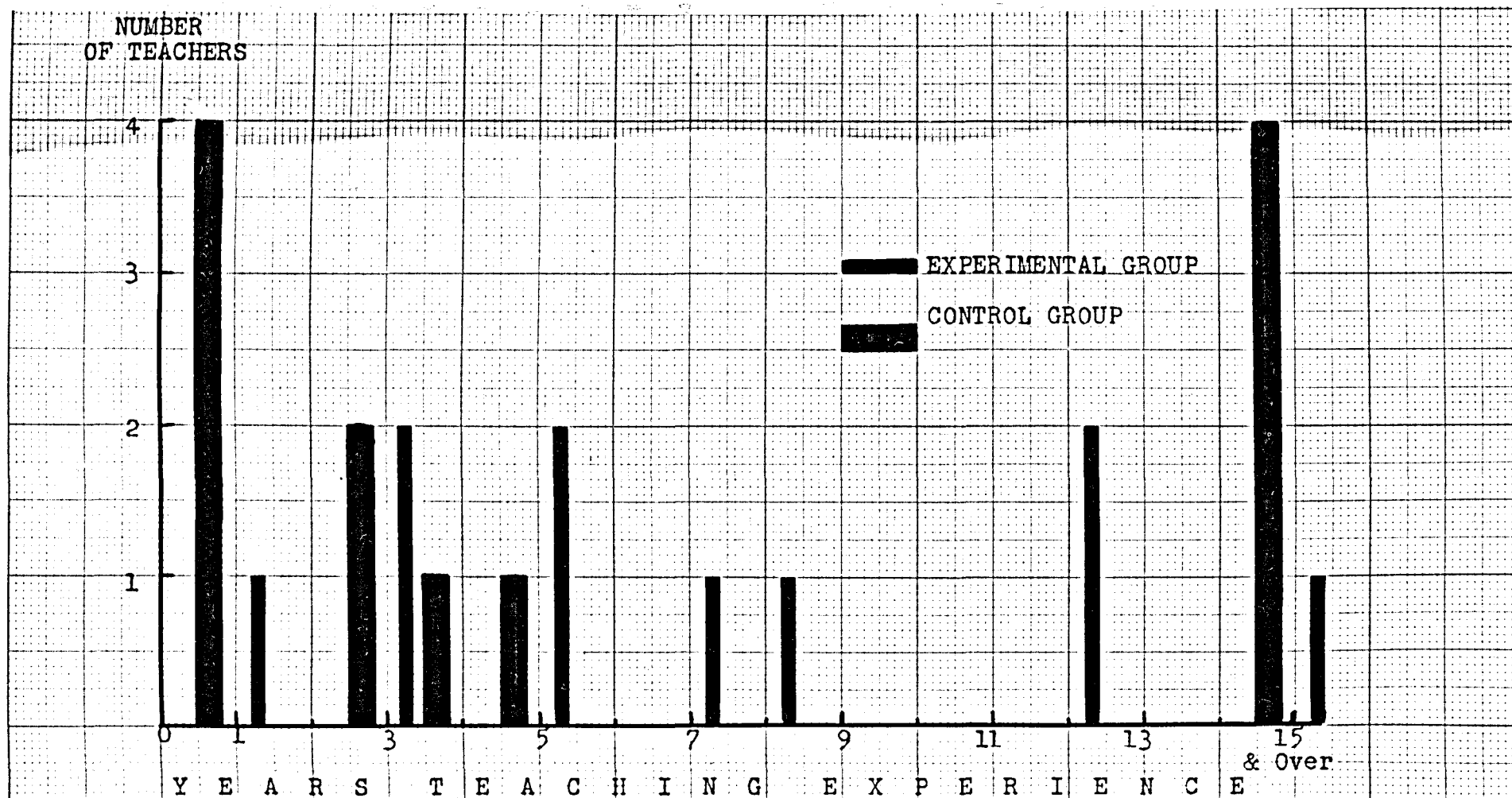


FIGURE #4

DISTRIBUTION OF TEACHING EXPERIENCE

OF 22 SECOND GRADE TEACHERS

1954

HENRICO COUNTY

SOURCE: Study Form II

a comparison of experience between shift and non-shift teachers. One noteworthy feature of this chart is that four second-grade teachers in their first year of teaching were employed by the control schools compared to only one teacher in her first year of experience in the experimental schools. On the other hand, four control school teachers were in their fifteenth or higher year of experience. Both extremes were characteristic of the control school; whereas, teaching experience was more evenly distributed over the fifteen-year range for the experimental school teachers.

The county in which the study was conducted has a training program for its teacher, including pre-session and mid-session conferences and workshops, as well as dynamic in-service training programs within each school. Great emphasis has been placed upon the teaching of reading. Reading materials have been developed in many of the schools, with the assistance of a reading consultant. The policy of distribution of a wide variety of reading materials in each classroom has been partially realized in recent years. The total program, with emphasis upon language arts, has been under the immediate supervision of a coordinator of instruction who is qualified as a reading consultant.

For these reasons, the study was organized without controls for teaching methods.

### Conclusions and Recommendations.

This study has demonstrated that there is no significant difference in achievement in reading between shift and non-shift schools in the county under study. Further, there was no appreciable difference found in reading age between morning and afternoon shifts. In view of the evidence, the writer urges that extreme caution and objectivity be the guide in any evaluation of shift programs of instruction. The shift is likely to be in evidence for some years--at least until school systems have the funds available to provide for rapidly swelling numbers of enrolling pupils. It behooves educators to search constantly for more evidence relative to double-session programs of instruction.

### Need For Further Research.

In the planning stages of this study, it was decided to limit the investigation to one relatively small area. The reasons for this decision were twofold, as was mentioned earlier. In addition to the limitations of time and financial resources, the writer felt that a limited area could be more thoroughly investigated. Partly as a result of this de-limiting of the area of investigation, there were several problems and needs that appeared during the course of this study. Any one, or more of them might well furnish the basis for more en-

lightening studies relative to shift programs of instruction.

What effect do shifts have upon other areas of learning and growth? While this study has attempted to clarify the effects of shifts on the learning of reading skills, the same general approach could and needs to be made to establish the effect of shifts upon learning in the areas of arithmetic, writing, speaking, social growth, etc. The following suggestions might be helpful to one making such a study or studies:

Compare pupil achievement records of children who have experienced both shift and non-shift years of instruction.

Make a comparison of pupils' achievement records over a period of years between shift and non-shift pupils.

Interview parents of children in shift classes for their views.

So control for occupation of parents that this factor will not cloud the findings.

Which grade level suffers the least from shifts?

If shifts there must be, which grade level suffers the least as a result of them? The tendency seems to be for first grades to be placed on a double-session basis first, the follows second grades, next third, and so on. This

arbitrary priority system seems indefensible to the writer. Some educators are of the opinion that the attitudes and concepts learned during the first years of school set the pace for the school years that follow. Also, from a public relations standpoint it seems poor policy indeed to introduce shifts to first year pupils. Might it not be better to delay shifts, where possible, until the second or third grade?

Should shift classes be interchanged at mid-session?

In an effort to please parents and show no favoritism, many schools rotate the shift classes. That is, at the mid-session point the morning shift exchanges classtime with the afternoon group, teachers generally shifting with their classes. This necessitates a re-adjustment in routine for everyone concerned. Obviously, there are some advantages to the alternation of shifts. On the other hand, the disadvantages appear to be formidable. Is there not greater confusion and disruption occasioned by the "shifting" of shifts than would be the case if the shift were scheduled to run a school session?

What do pupils think of shifts? Little evidence has been found by the writer concerning the personal reactions of children to the shift. Since the major subject in the shift class is the child, might it not be reasonable to

determine his feelings about the matter?

What value have the fatigue factors? It would be interesting as well as useful to examine the results of a study of fatigue factors of both teachers and pupils in shift classes. As pointed out earlier, teachers complain of tiring more under a shift program than regular-day teachers, although the actual hours of instruction are either the same or less. Teachers also report signs of fatigue among the pupils, especially in the afternoon classes. Such a study might well demonstrate the suspected cumulative effects of fatigue in both teachers and pupils.

What administrative problems are characteristic of shift schools? A study might well deal with the many administrative problems which characterize shift schools, such as the following, possibly: double transportation, personality conflicts between major and assistant teachers, additional storage facilities for shift classrooms, poor articulation of morning and afternoon classes, conflicts in scheduling of activities, public relations handicap of shifts, etc.

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In concluding this study, the writer urges that any future consideration or study of shifts and their causes should be approached with great sincerity of pur-

pose. For a clear definition of this problem area in school administration and instruction might well be one of the important factors upon which the future of elementary education may hinge.

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A P P E N D I X A

*Manual of Directions*

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Gates Advanced  
Primary Reading Tests

GRADE 2 (SECOND HALF) AND GRADE 3

---

INCLUDING DIRECTIONS FOR GIVING AND SCOR-  
ING THE TESTS, DIAGNOSING DIFFICULTIES, AND  
APPLYING REMEDIAL INSTRUCTION

---

BY

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TEACHERS COLLEGE, COLUMBIA UNIVERSITY

NEW YORK

# *Manual of Directions* *for* Gates Advanced Primary Reading Tests

## PLACE OF THE ADVANCED PRIMARY READING TESTS IN A TESTING PROGRAM FOR GRADES ONE TO EIGHT

THE Gates Advanced Primary Reading Tests, for which this manual was written, are part of a program for testing reading in the grades. Following is a brief description of the entire program.

**Tests for Kindergarten and First Term of Grade One.** The Gates Reading Readiness Tests are designed to test the degree to which a child is ready to learn to read and also to determine his strength and weakness in each of several important abilities involved in learning to read. These tests are usually given in the early part of the first grade, but they occasionally are given near the end of the kindergarten period. Some or all of the tests are sometimes repeated, especially in the case of the less mature pupils, in the middle or latter part of the first grade. The Gates Reading Readiness Tests consist of an eight-page booklet in which are printed materials for the following tests: (1) Picture Directions; (2) Word Matching; (3) Word-Card Matching; (4) Rhyming; (5) Letters and Numbers. One set of flash cards is needed to give the word matching test. A teacher's manual gives full directions and norms for using the test near the end of the kindergarten period and early in the first grade.

**Tests for Grade One and the First Term of Grade Two.** For testing reading in Grade One and the early part of Grade Two—for example, at the beginning or middle of the first term in Grade Two—the Gates Primary Reading Tests are provided. There are three types of tests in this series, and three equivalent forms of each type:

Type 1. Word Recognition	Time 15 minutes
Type 2. Sentence Reading	Time 15 minutes
Type 3. Paragraph Reading	Time 20 minutes

These tests measure the level and range of ability in the most important aspects of reading at the early primary stage. The team of tests was revised, and new illustrations were provided, in 1942. Since this series is too easy for the best readers at the middle of the second grade and later, another series (described below) was presented in 1942 for this advanced primary period.

**Tests for the Middle of Grade Two through Grade Three.** The Gates Advanced Primary Reading Tests were published in 1942 for use in average classes at mid-term and later in Grade Two, and at any time in Grade Three, including the end-of-the-year period. They are of two types, with three equivalent forms for each, as follows:

Type 1. Word Recognition.	Time 15 minutes
Type 2. Paragraph Reading.	Time 25 minutes

Type 1 of the Advanced Primary series is similar to Type 1 of the Primary series except that it reaches to considerably higher levels of difficulty and will be adequate for the ablest pupils in Grades Two and Three. Type 2 of the Advanced Primary series measures the same kind of reading ability as does the Paragraph Reading (Type 2) test of the Primary series except that it also goes to much higher levels of difficulty in order to measure the ablest pupils in Grades Two and Three.

**Tests for Grade Three.** As stated above, the new Advanced Primary Tests were developed for use at any time during Grade Three. The tests measure range and level of reading vocabulary (Type 1) and range and level of paragraph comprehension (Type 2). They do *not* measure speed of reading.

In the average class, it is advisable to measure *speed* and *accuracy* of reading simple materials at about the middle of the third grade or at some time during the second half of this grade. For this purpose, the Gates Basic Reading Tests, Types A, B, C, and D, described in the next section, may be used. These tests represent a thorough revision of the original Gates Silent Reading Tests. New norms have been developed for giving a longer testing time for each type of test in Grade Three than was previously possible. The increased testing time (8 minutes instead of 6, and 10 instead of 8) makes the tests more satisfactory for the latter half of Grade Three than the earlier tests.

It is recommended, therefore, that at the mid-term (or any later testing period in Grade Three, the Gates Advanced Primary Tests

below, would make an excellent addition to the Advanced Primary Tests.

**Tests for Grades Four to Eight.** For Grades Four to Eight, the Gates Basic Reading Tests are provided. This series includes tests of four types.

- Type A. Reading to Appreciate the General Significance of a Paragraph  
Time 6 or 8 minutes
- Type B. Reading to Predict the Outcome of Given Events  
Time 8 or 10 minutes
- Type C. Reading to Understand Precise Directions  
Time 8 or 10 minutes
- Type D. Reading to Note Details  
Time 8 or 10 minutes

The longer testing times are advised for typical third and fourth grade classes; the shorter for typical fifth or higher grades. Either time may be used for any class for special reasons, such as exceptionally high or low abilities, or the need to fit the testing time into the school schedule, etc. Norms are provided for each testing time.

These tests were revised, restandardized, and variously improved in 1942. They include a more representative sampling of various types of reading matter. The vocabulary is confined to words either in the Gates Vocabulary for the Primary Grades or in the first 3000 words of the Thorndike Word Book. This means that for typical children these tests measure reading ability unhampered by unusual words.

The Gates Basic Reading Tests measure (1) *speed* of reading easy material for four different specified purposes, and (2) *accuracy* of comprehension. *Speed* and *accuracy* are measured independently. These tests do *not* measure power or level of comprehension, that is, how difficult or complex a passage can be comprehended. Nor do they include a test of reading vocabulary. In the fourth and higher grades, a measure of level of comprehension and of reading vocabulary is desirable at intervals. Tests of these abilities for these grades are provided in the Gates Reading Survey.

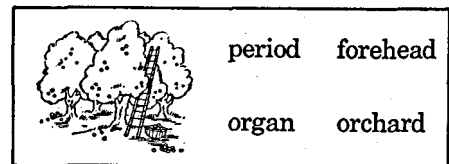
**Gates Reading Survey.** This test is a sixteen-page booklet containing the following tests. There are two forms.

- 1. Reading Vocabulary                      Time 20-30 minutes
- 2. Level of Comprehension                Time 30 minutes
- 3. Speed and Accuracy of Reading        Time 7 or 10 minutes

This Reading Survey is an excellent companion for the Basic Reading Tests in Grades Four and above. The two tests may be given at the same time or they may be used alternately, or the Reading Survey may be given once a year and the Basic Reading Tests twice a year when reading is measured three times a year. In the latter two cases although the Vocabulary and Level of Comprehension tests measure entirely different aspects of reading, the single, short *speed and accuracy* test included in the Reading Survey serves as a measure of progress in these phases of reading. It yields less thorough and diagnostic results than those obtained from the four tests (Types A, B, C, and D) of the Gates Basic Reading Tests, but it provides a fair appraisal of *speed and accuracy*. The Gates Reading Survey was restandardized in 1942.

#### DESCRIPTION OF THE TWO TYPES OF TESTS IN THE GATES ADVANCED PRIMARY TESTS

**Type 1. Word Recognition.** This test is designed to sample the ability to read words representative of the primary vocabulary. It consists of test units of the following type:



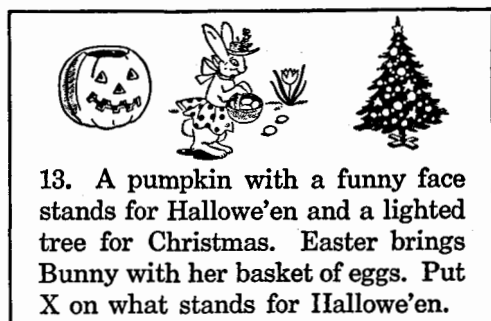
The task is to encircle the word that tells the most about the picture. There are 48 exercises of this type in the test. The first exercises are composed of easy and most commonly used words, grouped with words selected to be but slightly similar or confusing, such as *plant*, *person*, *front*, *come*, etc. Gradually the words become less easy and common (of higher rank in the Thorndike word list) and are presented with words more similar in details and general configuration. The arrangement is based on the assumption that as the child's vocabulary and reading experience widen, the more frequently will he encounter "confusing words" and that he should be able to identify words more precisely and to avoid more successfully misrecognitions due to similarities of elements and general configuration. This test measures the degree to which a pupil can identify with reasonable accuracy representative words. The fewer he can recognize without error, the less ready he is to do independent reading. All the words in this test are taken from



the Thorndike word list, a compilation based on frequency of appearance in representative reading material.

In the latter part of the tests appear rather difficult words. It was necessary to cover practically the whole range of words in the Thorndike list in order to make the upper end of the test hard enough to provide a real measure of word recognition of the ablest pupils in Grades Two and Three. It is a rare pupil who will get a perfect score on this test as it now appears. Such a pupil would have a reading vocabulary which was sufficient to enable him to read practically all popular adult literature such as that appearing in newspapers, magazines, books, etc.

*Type 2. Paragraph Reading.* The second test requires the reading of paragraphs, except the first exercises which are single sentences. Vocabulary, sentence structure, and length of passages of the test units increase gradually in complexity and difficulty. Following is an example:



This test measures ability to read thought units with full and exact understanding of the whole. To get only a word or phrase here and there, or to get only a whole sentence or two, is insufficient. The pupil must grasp clearly and exactly the total thought if he is to execute the directions successfully. Type 2, then, measures the pupil's ability to do independent reading of a rigorous sort. There are 24 items in this test.

All the words in paragraphs 1 to 21 inclusive are with a few exceptions found either in the Gates Primary Reading Vocabulary or in the first 3000 words in the Thorndike Word Book. The exceptions are proper nouns and a very few other words found to be frequently used in readers for the first three grades. In the last three paragraphs, paragraphs 22 to 24, any words in the first 5000 of the Thorndike list were allowed. It was necessary to make these paragraphs quite difficult in

order really to test the best readers in the second and third grades. A few children will get nearly perfect scores on these items. These children will have paragraph comprehension equal to the average pupil entering the eighth grade. They are able to read practically any popular adult material in newspapers, magazines, books, etc.

The Advanced Primary tests are designed to measure general competence or power in each of two aspects of reading. The time allowed for each test is generous and the tests are not, therefore, primarily tests of *speed*. They are designed rather to measure the range, accuracy, and level or power of reading ability. Since speed is correlated positively with accuracy, range, and power of reading, the tests tend to measure speed in some degree, but not primarily or exclusively. In general, the tests measure all-round reading competence with more emphasis on *accuracy, range, and level* of comprehension than on sheer *rate*. This fact should be kept in mind if the results of these tests are compared with those obtained for tests designed primarily to measure speed.

#### USES TO BE MADE OF THE GATES ADVANCED PRIMARY TESTS

This team of tests may be used for many purposes, such as (1) to determine which pupils in a class need special help in reading; (2) to ascertain to what grade each pupil's ability corresponds; (3) to find out how well each child is reading in relation to his intelligence; (4) to compare the average attainments of a class with the national norms with other classes; (5) to determine the particular kind of instruction needed by an individual pupil of any level of ability; (6) to measure results obtained from a special experimental program of instruction and so on. In this manual brief suggestions are given concerning the more frequent uses to which such tests are and can be put.

***Using the Tests to Determine Which Pupils Need Special Help.*** One of the most frequent uses of the tests is that of determining which of the pupils in a class are most retarded and what their special needs are. The procedure is to give the tests to all the pupils in a class and then to study, with particular care, the pupils who show the lowest scores. The teacher may then provide special remedial instruction for as many of these retarded pupils as she can. Later in this manual several types of difficulties revealed by the tests are described. Pupils showing each of these types of difficulties may be instructed together. Now and then, of course, a class will be found in which all or nearly all the pupils are retarded in a particular respect and may be given similar treatment. Classes vary greatly, but in general the plan of finding

giving attention to those pupils who are most seriously below the age or grade norm is a good one.

***Using the Tests to Determine Grade Placement of Individual Pupils.*** The raw scores from these tests can be converted into grade scores to determine to what grade position a pupil's score corresponds. The raw scores can also be converted into age scores, or Reading Ages. Methods of obtaining and interpreting these scores will be discussed in the next section.

***Using the Tests to Compare Reading Ability with Mental Ability.*** Children of high mental ability should, and usually do, learn to read better than do children of lower mental ability. The Mental Age of a pupil or class may therefore be taken as a standard with which to compare reading ability. To make such comparisons, the reading scores should be converted into Reading Ages and the intelligence test scores into Mental Ages. Since most verbal tests depend greatly upon reading, the Stanford-Binet Test or a non-verbal test is more suitable as a standard of comparison. When the Stanford-Binet or a non-verbal test is used, one may obtain a rough but useful indication of how well a pupil should be expected to do in reading. Pupils whose Reading Ages fall farthest below their Mental Ages are usually in greatest need of special help. By using the methods outlined later in this manual, it is usually possible to enable such pupils greatly to improve their reading ability.

***Using the Tests to Compare Attainments of Groups with National Norms.*** By means of Tables I and II, pages 35-36 the raw scores for any pupil or group of pupils may be converted into age or grade scores. When it is desired merely to compare the average of a class with the norms, the simplest method is to find the *median* raw score of the class on each test and convert it into an age or grade score. Thus, if the median score of a particular second grade class on Type I is 14, Table I, page 35, shows that this score gives a Reading Grade of 2.5. This means that the class has equaled the average attainment of American pupils at exactly the middle of Grade 2. If this class is only a quarter of the way through the second grade, it is a quarter school year above the norm; if it is at the middle of the grade, it equals the norm; if it is half way through the second term in the grade, it is a quarter of a grade below the norm.

When it is desirable for certain purposes to compare the *reading ability in general* of a class with the norm or average American attainment, the median raw score of the class in each test should first be converted into grade (or age) scores and then the average of these two grade

(or age) scores obtained. This final average grade (or age) score is a better indication of general reading ability than any one test score or any two tests which measure approximately the same aspect of reading ability.

Even if the average or composite score of reading ability is computed it is always desirable to compare the attainments of the class in each test with the norms for that test, since an individual class may be especially weak in one or the other of the abilities measured. For example, consider the scores for this class, measured shortly after the beginning of the third grade, or to be exact, at grade position 3.2.

Grade Score in Type 1. Word Recognition	3.7
Grade Score in Type 2. Paragraph Reading	2.9
Average Reading Grade	3.3

The average grade score of this class is a tenth of a grade ahead of the norm for its grade position. Scores for the two tests show that the class is relatively strong in word recognition, in comparison with attainment in the country at large. This indicates that recognition of isolated words is being stressed in this class at the expense of full-fledged reading of meaningful materials in paragraph form.

Additional study of the scores obtained from this class showed that the teacher was overemphasizing isolated word study and neglecting reading for the thought. The teacher immediately changed the emphasis in her teaching, with the result that the class rapidly improved both in ability and in interest in full-fledged reading. To reveal objectively such strengths and weaknesses in the two aspects of reading is a major purpose of these tests.

In appraising the ability of a class, it should be remembered that the norms represent the average attainments of pupils of average intelligence in typical or average American schools. The norms are no ideals; they represent average—and not superior—attainments of average—and not superior—pupils. The attainments of the class recorded above give an average Reading Grade slightly above the norm—that is, the average Reading Grade is slightly above the actual grade position of these pupils.

Aside from the fact that this class is relatively weak in paragraph reading and relatively strong in word recognition, is the average reading ability satisfactory? The answer depends upon certain other factors that should be considered. If the class is of inferior intelligence, the average reading score is high; if the intelligence is considerably above average, the reading ability is not so satisfactory. In classes that spend

more than average time on reading, better than average results should be expected, and vice versa. Other factors, such as the limitations of home environment, lack of experience in speaking English, dearth of reading material in the school, relatively short school day or year, the time of beginning instruction in reading, etc., should also be taken into account.

### DIAGNOSES OF INDIVIDUAL CASES

The two tests enable the teacher to diagnose the abilities of individual pupils and to direct instruction to meet individual needs. For this purpose the scores from the tests should be converted into age or grade scores by using Tables I and II, which are shown on pages 35-36. After the individual diagnoses have been made, the pupils may be arranged into groups according to individual needs. The following pages describe the types of difficulties most frequently found and suggest remedial treatment.

### DIAGNOSIS AND IMPROVEMENT OF PARAGRAPH READING

The actual records of several pupils who are better, relatively, in word recognition than they are in paragraph comprehension are shown below. The scores are the Reading Grades; that is, the grade position of the average child corresponding to the raw score. To have a Reading Grade of 3.5 is to have ability equal to the average child when he is halfway through the third grade.

PUPIL	ACTUAL GRADE	TYPE 1 READING GRADE	TYPE 2 READING GRADE	AVERAGE OF TYPE 1 AND TYPE 2
A .....	2.5	3.0	2.1	2.55
B .....	3.1	3.2	2.2	2.7
C .....	3.4	3.5	2.7	3.1
D .....	3.9	5.0	4.0	4.5

NOTE: 3.0 means the beginning of Grade 3; 3.5 the middle; 3.9 approximately the end of Grade 3.

Pupil A was tested at mid-term in Grade Two. For him, an average reading grade would be 2.5. The last column shows that the average of the grade scores for Type 1 and Type 2 is 2.55, or almost exactly the national average. However, he is not typical or average in one sense.

He has a Word Recognition Reading Grade of 3.0, which is a half grade above the norm and his own grade position, whereas his Paragraph Reading Grade is 2.1. This is four-tenths of a grade below the norm for his grade position and nine-tenths of a grade lower than his Reading Grade in Word Recognition. This is a significant difference. This pupil is considerably more advanced in word recognition than in real reading.

Pupil B, tested when one-tenth of the way through Grade Three, that is, near the beginning of the grade, has an average Reading Grade of 2.7, or four-tenths below his actual grade. Before saying he is not doing as well as Pupil A, we should want to know more about his intelligence, his health, his school attendance, his previous education, etc. Whatever these data may be, it is apparent that B is, like A, *relatively* poor in paragraph comprehension as compared with word recognition. The difference between the scores is a full grade. Pupil C is very similar to Pupil B.

Pupil D is above the average for his grade status. At the end of Grade 3 he has an average Reading Grade of 4.5, but, like the others, he is relatively poor in comprehension in comparison with word recognition. As in the case of Pupil B, the difference equals a full grade. Even if Pupil D is "up to grade" in Paragraph Reading, he probably could readily learn to do as well in reading comprehension as he does in word recognition.

This deficiency in comprehension, coupled with average or high abilities in word recognition, indicates in general a deficiency in getting the thought contained in bigger and more complex thought units. These pupils have not advanced sufficiently far through the several hierarchical or levels of analysis and comprehension in reading. They are word, perhaps phrase, or single sentence readers, or at best very simple paragraph readers. Their comprehension is insufficiently broad, precise, and sustained to grasp with clarity and fullness the paragraphs which an average pupil can interpret at this stage. They can recognize words much better than they can conduct full-fledged reading.

**Remedial Measures.** Such pupils as these need primarily not more instruction and practice in reading and word study in a general way but rather special types of experience to eliminate the specific weaknesses revealed. They need to be encouraged and assisted in every way possible to acquire the subtle skills which are essential to reading and understanding more exactly and fully reading units of greater size and complexity.

## CAUSES OF DIFFICULTIES IN COMPREHENSION

The causes of difficulties in comprehending phrases and higher reading units are many. Omitting such causes as inferior native intellectual capacity and nervous or organic defects resulting in inadequate management of attention, the following are frequent sources of difficulty:

1. Overemphasis on word study due to the mistaken idea that pupils must have a large vocabulary before they should read sentences. Excessive zeal in teaching, testing, and drilling on isolated words is a related cause.
2. Overemphasis on phonetic drill or other analytic exercises designed to help the pupil recognize new words. When excessive, this type of drill makes certain pupils "word-conscious"; they must, for example, see *cat* as made up of the sounds *ku-aa-tt*; and perhaps have a fleeting recollection of *rat*, *sat*, *bat*, *hat*, etc., during the act of perception. As a man giving too much attention to his steps is likely not only to see little else but also to stumble, so the word-conscious child not only is absorbed in the form of the word but also often fails, or fears he may fail, on a word that would come easily if perceived with less concern. Such pupils are likely to neglect the thought and be slow to grasp the larger units.
3. Overemphasis on formal oral reading. Whether phonetics are used or not, pupils may become word-conscious if the teacher places great emphasis on correct articulation and pronunciation in oral reading. Reading may become a motor rather than a thinking exercise.
4. Overemphasis on reading by large (sentence or story) units in the beginning stages. Paradoxical as it may seem, failure to comprehend the units may be the result of strenuous efforts on the part of the teacher to develop adequate comprehension of larger units from the start. The pupil, on the teacher's insistence that he do the impossible, may resort to memorizing difficult passages and to other subterfuges which later interfere with the necessarily gradual development of the hierarchies of comprehension.
5. Lack of training at some critical period as a result of illness, etc., after which the pupil, finding it impossible to bridge the gap to a higher level, may continue as a word-by-word reader.
6. Confusion caused by varied and conflicting methods.
7. Lack of training in the utilization of punctuation marks.
8. Lack of training in the identification of natural units—"phrasing" as it is often called.

9. Lack of encouragement in depending on the context—rather than on phonetics or other analysis—to recognize unfamiliar words.
10. Lack of reading primarily for the thought, inadequate use of practice material with comprehension exercises, of oral questions, and the like.
11. Lack of interesting material and challenging purposes for reading.

### SUGGESTIONS FOR IMPROVING COMPREHENSION

When the test reveals good word recognition coupled with deficiencies in comprehension, it is advisable first of all for the teacher to run over the eleven common causes of these deficiencies, just listed, to see whether one or more of them are now operating to the pupil's disadvantage. If so, the causes should be promptly removed and a type of instruction of a more favorable sort substituted. Particular methods of accomplishing these ends will be found in various books on reading that are now available.

In any grade, some children may be found whose comprehension of materials of a low level of difficulty is reasonably accurate and full but who are unable to read satisfactorily materials of a higher level. The problem of determining the degree of difficulty in material a particular child should be able to comprehend is, unfortunately, a very difficult one. Children of higher intellectual level or Mental Age and children who have enjoyed a richer range and variety of experience should be able to understand more advanced material than those of lower Mental Age and more limited experiences. If the teacher knows the pupil's Mental Age as measured by such a test as the Stanford-Binet she can secure some guidance. If a pupil's Mental Age is higher than the average Mental Age of pupils entering the third grade, he should be able to read, with enjoyment and profit, materials of higher grade level. If his experiences have been particularly rich, the teacher should expect somewhat more of him than if his past life has been meager in general experience. The teacher must study the needs and abilities of individual children and then use her best judgment in selecting materials which best meet these needs.

The child who reads very little beyond what he is required to read in school is likely to fall behind. Depth and accuracy of understanding are furthered by wide reading of many types and on many levels of difficulty. The remedy for this limitation is to increase the pupil's interest in and range of reading.

Occasionally the difficulty is due to the fact that the pupil's voluntary



reading at home or elsewhere has been mainly restricted to very difficult books. For example, if the pupil attempted prematurely to read the books in the home and found only rather advanced ones, he might have become discouraged and given up all reading except that required in the school.

For pupils whose limitation is due to the difficulties just mentioned, it is of great importance to determine at first a suitable beginning reading level. This level should be one on which he can read with rather full comprehension, but which includes some new words and concepts so that he may have something to grow on. Topics of special interest to the pupil should be sought, and encouragement and incentives provided for wide reading. As his power increases, materials of advancing complexity and difficulty should be provided so that he is able to move onward to higher levels.

In some instances, as stated above, the difficulty is due to the fact that the pupil has not learned how to make a thorough analysis of the content of a selection. His reading tends to remain on a superficial level. The remedy for this difficulty is to provide comprehension exercises, problems, and projects to guide his reading. Problems should be set up which call for rather thorough understanding and selection of the materials needed to solve it. The teacher should help the pupil to check his responses and find the correct solution when he is in error. It is important to give the pupil many problems and exercises *before* he reads the selection, and to provide many opportunities to discuss and otherwise use the substance of the material read.

The teacher will sometimes find a child whose main difficulty seems to be that he "is simply not interested in reading." This is a most abnormal situation. The lack of interest is almost always due to some definite deficiency, such as any one of those mentioned above. The real cure can therefore be made only by finding the cause and removing it. In many such cases, however, there still remains the problem of reviving what is apparently a nearly inactive interest. In such cases, the teacher should find the areas of special interest to the pupil. To find the suitable level of reading on which to begin and to find some purpose for reading are important. Setting up problems before the material is read is one effective way of accomplishing both of these objectives. Another is to find purposes to which the content may be put after it has been read. For example, it is desirable to give the pupil some unusual responsibility which enables him to command the attention and respect of other pupils. The class may plan to publish a newspaper and this particular pupil may be given an important assignment. He

may be asked to assume charge of the advertising or the sports or the book review section. In order to fulfill this responsibility, careful reading in several areas is as natural as it is necessary. The teacher should help him find suitable materials, give him assistance as it is needed, and make suggestions for newspaper stories which he might write. The pupil may be given editorial responsibility for articles or advertisements written by other pupils. The point is to give him a new purpose which appeals to him as important in order to stimulate his interest in reading.

The sagacious use of oral reading, beginning with easy reading with only the sympathetic and helpful teacher as the audience, is often very beneficial. Later, the pupil may be included in a group in which oral reading and discussion are combined. In such a group, the poor reader should be protected from embarrassment by letting him read only when he volunteers. The poor reader can then feel at ease, and profit by the oral reading and discussion of others. The teacher should help the poor reader rehearse in advance material to read to the group. She should assist him to participate fully in the discussion.

The judicious use of flash cards to encourage getting whole phrases and short sentences in a single span of comprehension, and of phrasing exercises to assist the pupil in detecting natural thought division; the explanation of punctuation marks; the use of oral reading followed by explanations by the pupil; the use of oral questioning following silent reading, etc., may all be employed to assist pupils deficient in comprehension. Since comprehension is not everywhere one and the same skill, there is merit in the use of a variety of exercise and test devices.

#### DIAGNOSIS AND IMPROVEMENT OF WORD RECOGNITION

The following table gives the data for certain pupils who are relatively poor in word recognition.

Pupil E is about average for his grade in paragraph reading but a half grade lower in word recognition. Pupil F is a shade low in com-

PUPIL	ACTUAL GRADE	TYPE 1 READING GRADE	TYPE 2 READING GRADE	AVERAGE TYPE 1 AND TYPE 2
E.....	2.4	1.9	2.4	2.15
F.....	3.1	2.0	2.9	2.45
G.....	3.5	2.7	3.5	3.1
H.....	3.9	4.0	4.9	4.45

prehension and over a grade retarded in reading vocabulary. Pupil G is very similar to E. Pupil H, although approximately at his grade level in word recognition, is almost a year higher in comprehension of paragraphs. He is relatively retarded in reading vocabulary.

These pupils depend, more than the more typical children, on context clues; on figuring out the meaning from such words and ideas as they can get. This use of context clues is fine, but these pupils would be better readers if their reading vocabulary and word recognition were more adequate. Their limitations in recognizing words are definite handicaps in reading.

**Causes of Inadequate Reading Vocabulary.** The major causes of deficient word recognition will be briefly described, and methods of identifying them and remedying them suggested.

1. *Inferior mental capacity.* Knowledge of word meanings and ease of acquiring a reading vocabulary and of comprehending sentences and paragraphs are found to be rather closely associated with general intelligence. In the typical classroom a wide range of intellects may be expected. The diagnosis of this source of deficiency in reading should be made by a specially trained psychological examiner. The remedial procedure consists both in adjusting expectations of achievement to the level of intellect found and in providing more extensive, varied, and explicit exercises for the duller pupils.

2. *Lack of general experience or of experience in using oral English.* The child whose earlier life has provided neither rich nor varied contacts with life or whose conversation has been limited in amount or variety or largely to a foreign tongue is handicapped in the task of learning to read. For such children, special types of word study are to be arranged. Some of those suggested later have been tried out on a group of children as limited in both general and language experience as it is possible for children to be—a group of congenitally deaf children from extremely poor families.

3. *Lack of reading "readiness."* If children are introduced to a particular reading program before they are "ready" for it, they may find it too difficult and become so confused, discouraged, frightened, or disinterested that they fail to make satisfactory progress or fail altogether. Since some reading readiness tests are now coming into wide use<sup>1</sup> and beginning reading is being better taught and better adjusted to individual needs than formerly, fewer of these cases are found.

4. *Study limited to unusual vocabulary.* Pupils have been found who did poorly on Type 1, although the teacher demonstrated the fact that

<sup>1</sup>For example, the Gates Reading Readiness Test, described on page 1.

they could recognize an average or a very large number of words for their grades. Examination of their achievements usually showed that they had been taught a surprisingly large number of unusual words unsuitable for the primary grades. Sometimes many of these words were dragged in to make up large phonetic families; sometimes they were the necessary result of some freakish scheme of teaching primary reading. There are in use a regrettably large number of such methods. Type 1, it will be remembered, consists of a representative sampling of a list of words that have been very carefully selected as the most suitable—all things considered—for the primary grades. No matter what words a pupil may know, if he cannot read such words as those in this list, he will be handicapped in his efforts to read the more representative and important children's material. The remedy for teaching less important words is obvious; the Primary Word List, referred to earlier, provides the source materials for remedial work.

5. *Lack of training in word recognition.* Pupils deficient in reading vocabulary, because of lack of amount of training or lack of application during study, should be assisted in developing this prerequisite to comprehension.

6. *Inappropriate methods of perceiving words and deficiencies in methods of learning to read new words.* Children of all levels of intelligence, bright as well as dull, despite abundant drill and close application sometimes fail to acquire the essential technique of learning and, consequently, develop inappropriate habits of word perception and word analysis. To identify these pupils requires certain special diagnoses; to remove these deficiencies requires special measures. Attention will be given later to both these problems.

#### VARIOUS TYPES OF WORD RECOGNITION

Pupils may acquire a reading vocabulary in three ways: (1) by recognizing words not known to them in print but used in speech or familiar as oral forms by deduction from the context; (2) by working out the pronunciation of the word by analysis, phonetic or other; (3) by word study conducted as a class exercise by the teacher or by the use of special printed exercises. These methods are not mutually exclusive, of course; the pupil, for example, may utilize his skill in phonetic analysis in all three exercises. Yet these three methods of approach have distinctive characteristics and they may result in the development of quite different techniques.

*Recognizing Words from the Context.* The method of trying to

recognize an unfamiliar word by deriving its probable meaning from the context, with or without special analysis of the word form itself, is a thoroughly desirable method. If used exclusively or excessively, however, it may result both in distortion of the thought and in the practice of errors in word recognition. Each pupil needs material graded to his ability, material that expresses a clear idea with one or a few unfamiliar words in the sentence. The exercises should, in other words, promise successful interpretation when the pupil makes a distinct effort to appraise the thought. As proficiency in the task increases, the material should offer greater scope to the pupil's ability. This procedure has the obvious merit of placing comprehension foremost. It works best, of course, with bright pupils whose oral language experience has been rich. For the others, the materials must be simplified and much encouragement and assistance must be provided by the teacher.

*The Value of Phonetic and Other Analytic Devices.* In American schools a favorite device for assisting the pupil to acquire a reading knowledge of new words is to train him to work out the pronunciation by phonetic methods. Some teachers utilize no other form of word study.

Recent investigations have provided the following significant facts about these methods:

1. Skill in recognizing the phonetic elements in unfamiliar words is helpful in recognizing the word as a whole.
2. Limiting the pupil's technique entirely to the phonetic attack is undesirable. Not only are other methods more effective in many instances but they are less likely to interfere with fluency and fullness of comprehension in ordinary reading. *The pupil should have several methods of attack and flexibility in applying them.* The other methods will be discussed presently.
3. Certain types of phonetic drill are largely futile and often injurious.
4. The phonetic elements most frequently found in the words commonly used by primary pupils should be taught first. Instead of utilizing one general type of phonograms, any type which appears with great frequency should be used.
5. It is not necessary to teach specifically all possible phonograms. What the pupil needs is the knack of identifying common word elements. Often only a little training is needed to develop this knack. Once the method of attack is acquired, the pupil will pick up by himself the really important word elements.

6. The use of phonetic analysis by a pupil in the course of ordinary reading should be combined with the method of "guessing" the word from the context. It is very important that the pupil does not develop the habit—as many do—of forgetting the thought and making a phonetic attack on an unfamiliar word found in reading. What the pupil should learn to do is to utilize the context to the utmost while observing the unfamiliar word sharply, in such a manner as to see and recognize its phonetic elements. By this combined attack, better results are obtained than by either method alone.

Other analytic devices are also used to assist in recognition of new words.

**The Spelling Method.** Some pupils on meeting an unfamiliar word will spell, letter-by-letter, either the entire word or part of it. While pupils often successfully recognize the word by this method, it is usually a slow process and often less effective than dealing with larger units. It is most serviceable in the case of non-phonetic words.

**The Syllable Method.** In this method the pupil attempts to break up the word into familiar syllables or parts of words. For example, he may break up the word *examination* into "ex-am-in-a-tion" or "exam-in-ation." This procedure may be distinguished from the phonetic analysis in which such elements as "th," "tr," "bl," or the individual letters are attacked separately. The syllable method has many advantages, although it is not applicable to all words, especially one-syllable words. The pupil should be encouraged to seek familiar word parts, so that such units as "inter," "oughly," "ation," and the like may be recognized as such without further analysis.

**The "Little Word" Method.** Current methods call children's attention to "little words" found in big ones. Thus 'play' is observed in *playing, playmate*; 'in' and 'to' in *into*, etc. These words are treated much as syllables in the method just described. Indeed, a big word may be seen as composed of a word and a syllable (e.g., 'rub' and 'ber' in *rubber*) or a phonogram and a word (e.g., 'br' and 'ink' in *brink*). This is a good method for larger words.

**The Configuration Method.** In this method the pupil appraises the word as a whole, recognizing it from its general shape. Used in connection with clues from the context, this is a good method when it can be applied without too many errors arising. Extreme dependence on such a method may be recognized by the type of errors made in reading difficult material. The pupil will then often pronounce not

the word itself but one more or less similar in general configuration. Thus *whence* may be called 'when', 'where', 'hence'; *ball* may be called 'bell', 'tell', 'tall', 'hall', 'call', etc. In dealing with long words such pupils will not utilize piecemeal methods but will appear to guess.

**Versatility of Attack Important.** Not one of these methods is entirely undesirable and futile, but rarely is any one altogether sufficient. The best equipment consists of ability to use them all, coupled with a good sense of their applicability to the special case. The best pupils are versatile, tending to try first to recognize the word as a whole from the context and general form. Failing in this, they will attempt to find familiar large units; then they may try to discover syllables or phonograms and finally study the letters or small letter combinations. The difficulties in word recognition come mainly from relying exclusively on one method, especially a method inappropriate to the pupil's general linguistic ability at the time.

**Diagnosing the Pupil's Method of Attack.** Where special difficulties in recognizing word forms not due to mere meagerness of word study appear, it is highly advisable to ascertain which types of attack the pupil uses and whether he shows any skill in varying the attack to suit different types of words. For this purpose two tests, both to be given individually, are serviceable. The Gates Graded Word Pronunciation Test, which consists of words graded in difficulty from such as *so, we, an, is*, etc., to such as *preparation, substantial, treacherous*, and chosen to represent all types of word forms, enables the teacher to test the various methods of word analysis. Since this test consists of isolated words, the factor of guessing the word from its context is eliminated and the other devices may be observed more readily.<sup>2</sup>

In order to ascertain to what extent the pupil can utilize the context as an aid in the recognition of words and to what extent the other methods of word recognition function in the actual process of continuous reading, Gray's Oral Reading Passages<sup>3</sup> or Gates Oral Context Test,<sup>4</sup> may profitably be used. Since these passages are graded in difficulty, it is possible to make the pupil attempt to read at any desired level. A comparison of the techniques utilized in the two tests is often very instructive. Pupils may be found, for example, who can do excel-

<sup>2</sup> Contained in the Gates Reading Diagnosis Tests, published by the Bureau of Publications, Teachers College, Columbia University, and described in Arthur I. Gates, *The Improvement of Reading* (Revised Edition, 1935), published by The Macmillan Company, New York.

<sup>3</sup> Published by the Public School Publishing Co., Bloomington, Ill.

<sup>4</sup> Published by the Bureau of Publications, Teachers College, Columbia University, New York.

lent phonetic analysis on the single words but in the process of actual reading fail almost wholly to utilize the method. The test results help the teacher to discover the pupil's weaknesses in the mechanics of word recognition and thus make possible more intelligent and fruitful instruction.

### SPECIAL METHODS OF DEVELOPING A READING VOCABULARY

The first group of suggestions are designed to make printed words interesting, vivid, and meaningful. Many pupils acquire a reading vocabulary slowly because words themselves are not presented in a meaningful, vivid manner. The child reacts to them passively, as he would to the name of a person who arouses no interest and has no significance for him. Sometimes all that is needed is to get the pupil to respond more vigorously to the word and its meaning—to reach out mentally and to grasp the word actively. Following are a few suggestions.

1. Arrange for interesting and challenging experiences in the course of which words are introduced. For example, arrange a trip to a store or plan for a holiday or a picnic or in-school party, and introduce words which are of importance in carrying out each project, such as the list of items needed for the picnic. Use these words in sentences written on the board and list them separately.

2. Conduct conversations and ask questions related to the meaning and use of the words. Refer to the words on the board (or elsewhere) during these activities.

3. Use each new word in several different contexts when it is first introduced and in later discussions to enrich the meanings.

4. While on visits to stores, offices, other classrooms, the cafeteria, etc., point out words which appear in printed form as labels, notices, and the like, or in advertisements, menus, signs, etc. Reproduce some of them on the bulletin board, classroom displays, etc. Locate them later in catalogues, newspaper advertisements, etc., in the schoolroom. List "important words" found on signs or labels, such as *Stop, Go, Entrance, Danger, Poison, Ice Cream, No Admittance, Drive Slow*.

5. Introduce various activities which involve the use of printed words. For example, put proper words on objects, pictures, and drawings, etc.; draw a picture or act a part or mimic the sound which illustrates the word's meaning; make signs for the school, such as *Paint, Crayons, Boys, Girls, Office, Quiet*, etc.

6. Make the presentation of words as vivid and dramatic as possible. For example, choose for a little drama such characters as Mr. Work,



Mr. Lazy, Dog Tiny, etc., to emphasize both form and meaning. Use a word as a label for a picture, or the answer to a question, or the title of a story. Let the pupils watch you write the word on the board. Have activities that lead them to find the word and draw a line under it. Show a word in different forms—printed on a card, written on the board, cut out of a newspaper advertisement, pointed out in a catalogue, and, occasionally, even projected with a classroom lantern or shown on flash cards.

7. Talk about words, compare one with others, point out special features such as similarities to and differences from other familiar words. Various suggestions along this line will be made in the next section.

8. Make "dictionary cards" or entries for words. For example, the

<div data-bbox="63 957 348 1088" style="border: 1px solid black; padding: 10px; text-align: center;">           Paste or draw picture here.         </div> <div data-bbox="63 1094 348 1124" style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>Airplane</span> <span>airplane</span> </div>	<p>This is an airplane. The airplane flies very fast. An airplane is faster than a train or a boat. Some day I will fly in an airplane.</p>
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card for *airplane* may be made upon a strip of oak tag by drawing the picture or finding one to paste above the words and writing in print-like letters or typing the "story," which should be composed of familiar words. These cards may be made into large or small "dictionaries" or grouped alphabetically in envelopes and reviewed for various purposes later. Words not readily recognized later should be given special attention and use.

Many other activities may be arranged to enrich the meaning and enliven the perception of words.

## PRINCIPLES OF WORD ANALYSIS

By "word analysis" is meant study of word-form and word-sound characteristics. The best program of word analysis includes training in phonetics, but it is much broader than the older types of phonetic drill. It should be guided by certain general principles as follows:

1. Help the pupil learn to react attentively to words and their characteristics. Try to elicit active, vivid response.

2. Help the pupil acquire the habit of comparing one word with others to note similarities and differences. He needs experience in comparing such words as *try, trying; horse, house; went, want; coming, going; etc.*

3. Help the pupil learn to find the parts of words which will be the most useful clues in recognition.

4. Help the pupil recognize the component *sounds* of words, such as common initial phonograms and syllables as in *thing, thank; beside, beware;* and final parts as in *thing, ring; beside, aside;* etc. Activities involving nursery rhymes and jingles are useful for the latter purpose.

5. When an unfamiliar word is encountered, the visual analysis of word forms must precede the sounding of the word parts. Before he can think of the sounds of phonograms, syllables, or letters, the pupil must see them in the word. It is therefore important to help him learn how to detect the parts that will be useful both for recognition and for sounding. Then, when he cannot recognize the word by visual study alone, he can see the word parts, which he then can sound and combine into the total word.

6. Visual analysis should, in general, be directed so as to isolate word parts which can readily be sounded. For example, it is better for the child to learn to see the word *away*, as composed of *a—way* than to see it as *aw—ay* or *awa—y*. The first division of the word gives parts that are more easily pronounced one at a time and more easily blended or combined.

7. The activities introduced to improve word perception and word analysis should be conducted with words which have already been introduced and whose meanings are familiar. The learning experiences, in other words, should consist of refining and improving the perception of words, previously introduced, by reviewing them frequently, studying them in various ways, and comparing them with one another. Special attention should be given to the comparison of words which are often confused with each other.

8. Word elements should be introduced by leading the pupils to discover them in words and not in isolation. To find the *br* and the *ing* in *bring* is a very different act from merely learning to look at *br* and *ing* when each is introduced by itself in some type of formal exercise.

9. In learning to work out the pronunciation and meaning of words that cannot be recognized at a glance, it is important that most of these activities be carried on when the word occurs in a context that gives it meaning. In other words, it is very important that children learn to use word-form clues and meaning or context clues at the same time.

10. The teacher should encourage pupils to try, by themselves, to find familiar parts in words. Whenever a pupil shows curiosity about word parts or asks to be told what a phonogram or syllable is, or how it sounds, the teacher should help him cheerfully. The most important thing of all is to get the pupil to look for features and parts of words himself and to conduct his own little studies in word analysis. Once the teacher succeeds in making this type of activity habitual and enjoyable, the battle for word recognition is largely won.

11. The teacher should encourage the pupil to make up groups of words which contain a common element, such as general shape (*in, is; an, an; if, it*) initial letter (*dog, doll*), initial phonogram (*bring, brought*), suffix (*coloring, talking*), etc.

12. The sounds of letters and of common phonograms, such as *br, th*, etc., are needed to unlock monosyllabic words and many syllables, such as *ed, ing, er, est, ly, ake, un*, etc., and some forms that are both syllables and words, such as *all, an, in, air, ill*, etc. may be pointed out early. Later as a larger proportion of polysyllabic words are introduced, the pupil should be guided to make less use of the individual letter sounds and non-syllabic phonograms, such as *br, bl*, etc., and more use of syllables and component words. Difficulties in word recognition in the late second and in the third and higher grades sometimes result from failure to make the transition from the primary to the more advanced forms of word analysis.

#### AN ILLUSTRATIVE WORD ANALYSIS LESSON

The following illustrations suggest a procedure for increasing efficiency in word analysis and word recognition suitable in general character for all levels and all pupils, even the most serious "disabilities." They give concrete expression to the principles outlined above.

**Comparison and Study of Words in Any Reading Matter.** Any passage in a reader, preparatory book, or other book, or a sentence or paragraph on the blackboard or bulletin board offers an opportunity to conduct a highly useful study of words. The following paragraph taken from a first reader workbook will be used to illustrate methods:

"In winter the weather is very cold. In summer the weather is very hot. In the spring and fall it is not too hot and it is not too cold."

1. *Reading the passage to get the thought.* The first step is normal reading and discussion of the material. This gives practice in using con-

text or meaning clues and word-form and word-sound clues simultaneously in working out recognition, pronunciation, and meaning of words. It also makes it certain that the children later will compare and study words whose meanings are known, and that they will not study isolated, meaningless word forms. For example, if *weather* and *summer* were merely listed on the board, some children might study them, observe the initial letters and the final phonogram *er*, without recognizing the whole words and their meaning. After the paragraph has been read, and the words are recognized and their meanings known, the next step which becomes part of the review activities, is taken.

2. *Finding words which, because of similarity to one another or striking character, special difficulties or familiar elements, are worthy of comparison and study.* In the above passage, different words would be selected by different children and the kind of analysis made would differ. Some or all of the following would be noted.

a. Similar total appearance or configuration. *Winter* and *weather* and *not* and *hot* are similar as wholes. They are about the same length, they look much alike. Comparisons of such words help the child learn to perceive each more accurately and avoid confusing them in later reading. The teacher should assist the children in discovering the telltale differences. Thus, although *winter* and *weather* begin and end alike, they are different in the middle part. To distinguish *winter* from *hot*, obviously one must notice the differences between the initial letters.

b. Similar parts, such as initial, middle, or final letters, phonograms, or syllables. *Winter* and *weather* may be picked out because of the initial letter *w* and the common *w* sound. The fact that *winter*, *weather*, and *summer* all end in *er* may be noted and the *er* sound stressed.

Several children will probably note the fact that *hot* and *not* have the same *ot* and the further fact that these words rhyme.

Some children may see that *the* and *too* begin with the same letter

Certain pupils may note that several little words, *in*, *is*, *it*, all begin with *i*.

Someone may discover that *the* contains *th* and suggest other words—*this*, *they*, *them*, *their*—which contain it. The *ing* in *spring* and other phonograms and syllables may be pointed out.

Certain pupils may start a search for "little words" or "old friends" in words in the paragraph: *her* in *weather*; *old* in *cold*; *ring* in *spring*; *all* in *fall*, may be pointed out.

Some children may suggest words not in the paragraph which re

semble some which are in it. For example, *tall* or *fell* may be suggested as like *fall*; *thing* as like *spring*; *two* and *to* as like *too*, etc.

Thus it is seen that a passage selected at random offers opportunity for effective word comparison and study. The extent and character of the analysis will, of course, vary with the ability of the group.

### SPECIAL EXERCISES IN WORD ANALYSIS

Various exercises may be made up, using previously introduced words, to encourage word analysis. Note that in all the following exercises it is necessary to get the meaning before or during the solution of the exercise.

#### 1. Word selection and comparison.

hat		who		bat	
has	Picture of	which	Picture of	sat	Picture of
hay	hay	when	wheel	cat	a cat
his		wheel		hat	

In each exercise the pupil first underlines the word which goes with the picture. Then he may be asked to draw a circle around the part in which all the words in the column are alike. As may be seen from the exercise, this would be the initial *h* in the first, *wh* in the second, and the final *at* in the third.

2. *Sentence completion.* Similar activities may be carried out with such a sentence as:

The cat has a—rat, hat, mat, bat.

A picture or a paragraph previously read may be used to give the meaning.

3. *Sentence selection.* Instead of using words, as in (1) above, sentences may be used in which the words to be compared may be underlined. These words may be later studied and the common parts encircled as in (1) above.

The boy has a dog.  
The boy has a hat.  
The boy is in the hay.  
His hat is torn.

Picture of  
boy in  
hay

4. *Finding "little words" in big words.* In the following exercise the pupil underlines the word which goes with the picture and then puts a line to mark off a little word or words; for example school/room.

schoolroom  
bedroom  
upstairs  
policeman

Picture of a  
policeman

5. *Compounding words.* In this exercise the pupil is instructed to find "two small words which make a big word and draw a line between them."

police	room
school	man
up	to
in	stairs

6. *Rhyming words.* The pupil is asked to write a word from the top row under the one in the box with which it rhymes.

would	chews	kind	my	far	day
news	sky	play	should		
_____	_____	_____	_____		

7. *Following directions.* The following type of exercise may be adopted for study of phonograms, syllable, suffixes, "little words," and other word components. It may be graded in difficulty and varied in character. For example, line 2 may be changed to "What part of these words are alike?"

#### Exercise on initial *tr*

Write the right word on the line.

Frank's ponies like to \_\_\_\_\_

trap

trot

trade

trap

trot

trade

1. Look at the words

2. What are the first two letters?

3. How do they sound?

4. Draw a line under these letters in each word as you sound them.

5. Can you write any other words with the same letters and same sound?

8. *Matching word cards.* For an easier exercise than most of those given above, the teacher may prepare several cards each containing a word (or phrase) identical with that in a text, or the same words (or phrases) may be placed on the blackboard or bulletin board. The child merely picks out the same word (or phrase) and places it under or

beside the sample. Thus, such word cards as *weather*, *summer*, etc., may be matched with the words in the text on page 23, or the text in (2) above may be given in full and the cards for *rat*, *hat*, *mat*, *bat*, etc., selected and placed beside the last words in the lines.

9. *Superimposing words*. This exercise provides a very striking comparison of two words. It is useful for children who cannot see the differences satisfactorily by looking from one word to another placed above or beside it. Suppose we wish to compare *store* and *stove*. Print *store* on a card and *stove* in identical size and character on cellophane or thin paper. Then place the latter carefully over the former. Point out the parts which are identical and the parts which are different. Remove *stove* and place it under *store*. Note the differences. Then place it over *store* again, etc.

10. *Word games*. For the slow learners, occasional use of word games is justified because of the variety and interest they add to word study. For example, words of similar beginnings or endings such as *ball*, *bat*, *baby*, *bark*, etc., may be used in games similar to "Authors" or "Dominoes," "Spinning Wheel," etc. References at the end of this manual list many such games.

# REMEDIAL INSTRUCTION FOR SERIOUS DIFFICULTIES IN THE DIRECTION OF ATTACK ON WORDS

In some instances, pupils who make little or no progress in reading suffer from failure to learn always to view words from left to right. Instead of viewing words systematically in the left to right direction, these pupils usually study the word in some other order, much as they might observe a picture or any object. They may, for example, first observe the ending instead of the beginning of the word and then look at the middle or beginning and move the eyes over the word in various directions. Or, they may first see the middle part and then look back and forth over the word. These movements may be either consistent or irregular and varied. They tend to produce reversals such as *was* for *aw*, semi-reversals such as *own* for *won*, and other errors. They make the recognition of words so difficult that pupils learn to read slowly and incorrectly, if at all. These inappropriate methods of attack are rarely due to constitutional defects or limitations, as some have claimed. They usually are due to the transfer of habits of observing objects—pictures, designs, etc., in which regular left to right eye-movements are not predominant or necessary—to the observation of words.

Remedial instruction for pupils subject to such defects consists of

experiences designed to teach the pupil how to observe words effectively. The pupil must learn how to observe the words systematically in the left to right direction. For this purpose, the following exercises and forms of instruction have proved useful.

1. *Explaining the appropriate method.* Tell the pupil that words must be looked at from left to right. Move a pointer or pencil with the finger under the word and explain that the eyes should move in the same direction. Demonstrate and explain with words of different sized types. Do this both with isolated words and with words in short sentences made up of the most familiar words. Use words of different lengths and shapes. Ask the pupil to follow your pencil and try to recognize the words.

2. *Having pupils name or sound the letters in words.* Some of the children are helped at first by noting or naming the letters in order in the words. It should be understood that such a practice is conducted merely to demonstrate and develop the habit of surveying words in the proper direction and not to establish fixed habits of recognizing every word by naming the letters. In some cases, it is helpful for the same purpose to assist the pupil to sound the letters in order.

3. *Writing words.* Practice in writing words is often helpful in developing desirable habits of surveying words. In the case of beginning pupils who fail to progress in reading, it is advisable to teach them to write words, even if writing is not taught to other members of the class until later. For these pupils, the print-like or manuscript writing is better than cursive, since the former has more resemblance to printed words. These pupils should be first taught to write words and not single letters. At first, they may copy words from printed or typed or print-like written models. As soon as possible they should write the words from memory without a model. They should write short sentences from the beginning. As soon as a few words are learned, the pupils should write sentences of their own making. They should be given opportunities and incentives to write as much as possible. The teacher should provide incentives for writing announcements, directions, legends for pictures, letters, stories, rhymes, etc. She should let the children have a large share in writing things for the class on paper cards, or on the blackboard. Finally, it is very important to induce them to reread what they have written.

4. *Printing and typing.* These children are helped in straightening out their observation of words by practice in producing and rereading words by means of letter-stamping outfits and typewriters. In general, the methods of making stamping and typing experiences helpful are the



same as those suggested for writing. In all cases, practice in producing sentences and later paragraphs is better than work on single words, since the former includes more of the techniques, such as taking up the words in order on the line, than the latter.

5. *Making transitions to larger word units.* Great care must be exercised to avoid the development of firmly fixed habits of seeing a word letter-by-letter. As soon as the pupil gets his direction and order of observation straightened out, the teacher should encourage him to see more than a single letter while reading in the same direction as before. To develop this ability, the teacher should call attention to larger units and to common visual and phonetic elements by use of methods outlined in the preceding sections.

In brief, these exercises are to be used, first, to induce the pupil to observe the word consistently in the left to right direction and, second, to induce him gradually to learn to perceive words in the more helpful units. Even if it is often advisable to begin with a letter-by-letter approach in order to secure the proper direction and orientation, it is not necessary to remain long on this level. Gradually, larger units should be substituted for the smaller. The teacher should try also to get the child to make a corresponding enlargement of the units with which he spells, writes, and types words. Usually, such children soon become reoriented. When they have gotten on the track of the proper techniques, they usually proceed thereafter with gratifying rapidity, and need only an abundance of full-fledged reading and the instruction suited to normal pupils.

#### TREATMENT OF DEFICIENCIES BOTH IN WORD RECOGNITION AND IN PARAGRAPH READING

Pupils will be found who are below their grade status in both tests. If they are approximately equally retarded in both tests, they are cases of general, rather than specialized, backwardness. They need to develop both word recognition and reading ability. Suggestions previously offered for developing both types of abilities are therefore applicable. Whether anything other than the usual classroom instruction, nicely adjusted to the individual status and interests, needs to be provided depends upon other factors which only a full understanding of the abilities and needs of each pupil can provide.

It is a mistake to treat a child as a "special remedial case" (if this treatment is anything more than a well-rounded program adjusted with special care to the individual) unless it is known that his backwardness

is not the consequence of low intelligence, poor health, lack of interest, poor home incentives or opportunities, or specialized disabilities requiring specific and unusual treatment, such as visual defects, etc. For the child who learns slowly because of low intelligence or inferior previous instruction or lack of "readiness" or a late start or absence from school, etc., a well-rounded program of vital activities and materials and attention to the requirements of good technique is usually the most satisfactory.

However, if a child's mental age is much higher than his reading age and there are no obvious defects or lack of opportunity to learn to read, careful inquiry should be made to find out if he is markedly retarded both in word recognition and in paragraph reading. The most serious disabilities and non-readers are of this type—retarded in all aspects of reading. If such measures as were outlined above do not produce improvement, the case is one which merits diligent, experimental study as a possible "special disability" case.

#### DISTRIBUTION AND RELIABILITY OF THE SCORES

It may appear to some teachers that the most difficult words in Type 1 and the most difficult paragraphs in Type 2 are really too hard for children in the latter half of the second grade or in the third grade. It is necessary, however, to include items of such a high level of difficulty in order to measure the very best readers in the third grade. Taking 160 pupils from six classes selected at random from schools in Briarcliff, New York, Pleasantville, New York and Ossining, New York, it was found that in Type 1 two children obtained the maximum possible score. The lowest score obtained in these schools in Type 1 (by one child) was 5. The highest score corresponds to a grade status of 7.0 and the lowest to a grade status of 1.9. The mean score of the 160 pupils was 27, which corresponds to a grade position of 3.4. In Type 2, no perfect score was found in this group, but one child got a score of 30 and three children got a score of 0. The mean score was 18. The highest score corresponds to a grade position of 7.4 and the lowest to 1.7 and the mean to 3.2. From these data it may be seen that perfect scores in the third grade are rare and that the range covered in a representative group is very great.

Reliabilities were computed by the separate halves method for two classes given the test near the beginning of the third grade. The Spearman-Brown reliability coefficients are for Type 1, 0.89 and 0.90 and for Type 2, 0.86 and 0.88.

The reliability of the results of these tests is determined greatly by the skill of the examiner. Two factors are of supreme importance: the explanation of the tasks to the pupils and the management of the group during the test period. If a pupil does not correctly and fully understand what he is to do before the test is begun, his performance is unlikely to reveal his ability accurately. If pupils do not work systematically and vigorously, yet without fluster and excitement, the results will be unreliable. After a great deal of experience it has been found that when properly given, managed, and scored, the tests are long enough to yield reasonably reliable results in the individual cases and highly reliable scores for a class. When more precise individual appraisals are desired, two forms of the tests should be given, preferably on different days.

#### SIGNIFICANT DIFFERENCES BETWEEN SCORES FOR THE TESTS

In the preceding sections, examples of significant differences between the Reading Grade scores for the different tests were illustrated. How large should the difference be in order to indicate a real difference? As suggested above, the answer depends on the care with which the tests are given and scored, and it is different for an individual and a whole class.

If the tests were given well and scored carefully, differences between Reading Grade scores of four-tenths of a grade or more are significant for a class of fifteen or more pupils within the range of grade scores from 2.0 to 4.5. For example, if a class of 30 pupils got an average Reading Grade of 3.0 in Word Recognition and either 2.6 or less or 3.4 or more on Paragraph Reading, this difference is really significant.

For an individual pupil measured by a single test of each type, a difference in the range of scores from 2.0 to 4.5 of a half grade is probably but not certainly significant. A difference of seven-tenths is fairly reliable and a difference of a grade is quite significant. In scores above Grade 4.5, the differences should be somewhat larger for the individual; about three-quarters of a grade to be probably, and a full grade to be highly reliable.

When the differences are not very certain, for example, in the case of a pupil who got Reading Grade 3.5 in Word Recognition and 3.0 or 3.1 in Paragraph Reading, the instruction should emphasize comprehension without neglecting word recognition. The teacher must

make provision for normal growth in word recognition along with more rapid development of comprehension. She must be careful not to change the emphasis in instruction so drastically, and for so long a time as to get the skills unbalanced in the opposite direction.

### GIVING THE TESTS

In giving these tests, the main considerations are making clear to the pupils what they are to do, and getting them to do their best. It is not only proper but desirable to curtail, supplement, or alter the directions or illustrative exercises in any way that helps a particular group to understand what to do. It is also proper to repeat the instructions to any pupil after the test is begun and to let him make up lost time. It is, of course, improper to tell a pupil the answer to any exercise. It is allowable to collect papers before the full time is up when it is certain that the pupils have done everything they can do on the test.

Since the directions are printed in full on the title page of each test they will not be repeated here. The work of individual pupils should be surveyed as soon and as often as possible after the test has been started. Pupils in the primary grades require much fuller explanation and demonstration and much more supervision during the tests than do older pupils. Pupils making gross errors or losing considerable time should be retested under more careful supervision.

It is preferable to give the tests in the order in which they are numbered, although there is no serious objection to reversing the order.

### SCORING THE TESTS

Keys for scoring the tests are readily made by marking a copy of the test with a colored pencil. In Type 1 the correct answers are so obvious that they can be entered after a glance at the exercise and will therefore not be duplicated here.

#### *Scoring Type 1.*

In Type 1 the score is the *number of exercises correct minus one-third (1/3) the number incorrect*. There are 48 items in this test. Each test sheet should be scored by marking plainly with a C every correct exercise and with an X (or W) every incorrect one. Count the number of C's and place the total at the left top of the title page. To the right of this number place a dash. Enter next the number of X's (or W's).

It is better later to compute  $1/3$  the number of errors, draw a line through the number of X's, enter the computed one-third next, and subtract to get the final score.

In computing one-third the number of errors, use the nearest whole number.

In scoring, an exercise is marked wrong if more than one word is marked. Omissions are scored neither right nor wrong but are disregarded. When erasures, etc., appear, the examiner must use his judgment concerning the pupil's intent.

### *Scoring Type 2*

In Type 2, the score is the *number of exercises correct*. The last eight paragraphs are given 2 credits each if both parts are correct. In other words, the pupil gets a credit of 1 for each direction carried out correctly, rather than for each paragraph. Although there are 24 paragraphs, there are 32 directions to be executed (because there are two in each of the last eight paragraphs) and the highest possible score is therefore 32. As in the preceding type, a test should be marked to serve as a key.

In scoring this test, the responses should be considered with the child's writing limitations and his types of interpretation in mind. The following notes should give the "set" for scoring.

An exercise is always scored incorrect unless the type of mark specified is used; e.g., if the direction is to "Put an X on" the object, any other mark, such as a circle or a line, is scored wrong. Count a double line, as when directions say "Draw a line," however, as correct.

Unless the right mark is placed in the position called for in the directions, such as *on*, *under*, *over*, the exercise is scored wrong. In deciding on the correctness of the position, allowances must be made for the young child's imperfect motor control. Thus, while intending to place the X *under*, the child may make a mark partly *on* as well as *under* the object. This should be scored correct if the pupil apparently intended to put it *under*. The smaller the picture of the object to be marked, the greater the likelihood of overlapping marks. In all these cases the scoring should be rigid after reasonable allowances are made for the pupil's motor limitations. Base the score on what was his probable intent.

Certain paragraphs may be legitimately interpreted by a child in two or more different ways. Any of these interpretations should be scored correct. In the notes on the following page are mentioned paragraphs of this type.

*Special Notes on Form 1*

- 10. Line from shovel to one or both children is correct.
- 12. Line must touch some part of gun; if only touching arm holding gun it is incorrect.
- 13. X on either or both wild horses is correct.
- 17. Line under entire length of fence or some part of it is correct.  
X on gate or part of picture representing gardens is correct.
- 21. X anywhere on road going east, before end of last curve, is correct.  
O anywhere on road going west, before end of last curve, is correct.
- 23. X must touch main stalk of plant. Line around all or part of picture of man painting is correct.
- 24. X on or next to word "contracts" is correct.

*Special Notes on Form 2*

- 5. Line around each of five pennies, or line around or through group of five pennies is correct.
- 6. Line around each or both robins is correct.
- 12. X anywhere on picture of woman spinning is correct.
- 17. Line under either one pipe, both pipes, soap or water, or all four objects is correct.
- 20. X anywhere on rectangle containing the word "Italy" is correct.

*Special Notes on Form 3*

- 3. Line under each sack of flour, or one continuous line under two sacks of flour is correct.
- 11. Line under either or both hives is correct.
- 18. Line around figure 40 or around group of cows is correct.
- 19. X on either horse or cow or both is correct. Two lines under either lion or tiger or both is correct, or one line under lion and one line under tiger may be considered correct.
- 20. Line must include picture of goat.
- 21. Line around figure 4 or around four baskets is correct.
- 22. X on word "Sat." or in column thus designated is correct.
- 23. One line around each or both door knob and lock is correct.

## NORMS FOR THE ADVANCED PRIMARY READING TESTS

The norms given in the tables on pages 35-36 are based upon approximately 5,500 records obtained from schools in various places. It is believed that the tables indicate the median attainments of representative American pupils.

TABLE I  
GRADE AND AGE NORMS FOR TYPE 1, WORD RECOGNITION

TEST SCORE	READING GRADE	READING AGE	TEST SCORE	READING GRADE	READING AGE
0.....	1.7	7-0	25.....	3.2	8-8
1.....	1.7	7-0	26.....	3.3	8-9
2.....	1.8	7-1	27.....	3.4	8-10
3.....	1.8	7-1	28.....	3.4	8-10
4.....	1.9	7-2	29.....	3.5	9-0
5.....	1.9	7-2	30.....	3.5	9-0
6.....	2.0	7-3	31.....	3.6	9-1
7.....	2.0	7-3	32.....	3.7	9-3
8.....	2.1	7-5	33.....	3.8	9-4
9.....	2.2	7-6	34.....	3.9	9-5
10.....	2.3	7-8	35.....	4.0	9-8
11.....	2.3	7-8	36.....	4.1	9-9
12.....	2.4	7-9	37.....	4.3	10-0
13.....	2.5	7-10	38.....	4.5	10-3
14.....	2.5	7-10	39.....	4.6	10-4
15.....	2.6	8-0	40.....	4.8	10-7
16.....	2.6	8-0	41.....	5.0	10-10
17.....	2.7	8-1	42.....	5.3	11-1
18.....	2.7	8-1	43.....	5.5	11-4
19.....	2.8	8-3	44.....	5.8	11-8
20.....	2.9	8-5	45.....	6.0	11-10
21.....	3.0	8-6	46.....	6.3	12-1
22.....	3.0	8-6	47.....	6.5	12-3
23.....	3.1	8-7	48.....	7.0	12-9
24.....	3.1	8-7			

In Tables I and II, the first column gives the Test Score, the second gives the Reading Grade, the third gives the Reading Age. Thus, as Table I shows, a score of 22 on Type 1 is equivalent to a Reading Grade of 3.0, or the beginning point of the third grade, and a Reading Age of 8 years 6 months. A score of 30 is equivalent to a Reading Grade of 3.5, or the middle of the third grade, and a Reading Age of 9 years 0 months. Similarly, a score of 32 is equivalent to a grade score of 3.7, which means a grade position seven-tenths of a year above the beginning of Grade Three and three-tenths below the beginning of Grade Four.

For the sake of uniformity, it is recommended that when tests are given at the end of the school year, the grade position be considered as nine-tenths above the beginning of the year and one-tenth below the

TABLE II  
GRADE AND AGE NORMS FOR TYPE 2, PARAGRAPH READING

TEST SCORE	READING GRADE	READING AGE	TEST SCORE	READING GRADE	READING AGE
0.....	1.7	7-0	15.....	3.0	8-6
1.....	1.7	7-0	16.....	3.1	8-7
2.....	1.8	7-1	17.....	3.2	8-8
3.....	1.8	7-1	18.....	3.3	8-9
4.....	1.9	7-2	19.....	3.5	9-0
5.....	1.9	7-2	20.....	3.7	9-3
6.....	2.0	7-3	21.....	3.8	9-4
7.....	2.1	7-5	22.....	4.0	9-8
8.....	2.2	7-6	23.....	4.2	9-11
9.....	2.3	7-8	24.....	4.4	10-1
10.....	2.4	7-9	25.....	4.8	10-7
11.....	2.5	7-10	26.....	5.4	11-2
12.....	2.6	8-0	27.....	6.0	11-11
13.....	2.8	8-3	28.....	6.4	12-2
14.....	2.9	8-5	29.....	6.8	12-7
			30.....	7.4	13-1
			31.....	7.8	13-7
			32.....	8.2	13-11

beginning of the next school year. For example, for a class which began Grade Two in the fall, the norm for a test given at the very end of the school year should be Grade 2.9. The norm for this class at the opening of the following school year, after the summer vacation, should be Grade 3.0. If the class began the school year at a middle grade position, say 2.5, the norm for the end of the school year should be Grade 3.4 and for the beginning of the next school year, Grade 3.5.

Tables I and II give the norms for several ages and grades. The test score in the first column is the norm for pupils at the grade position given in the second column and for the age given in the third column. Thus, in Type 1, the norm for pupils at the middle of Grade Three (that is, at grade 3.5) is a score of 29; the norm for a pupil at the age of 9 years 0 months is also 29.

#### REFERENCES FOR FURTHER STUDY

In *The Improvement of Reading* (Macmillan Company, Revised Edition, 1935) the author of the tests here described considers problems of diagnosis and remedial treatment of difficulties in reading in a number of chapters.



thorough fashion. Fuller descriptions and illustrations of remedial materials, more extended discussions of reading difficulties, and diagnostic instruments for the study of the more stubborn cases both in the primary and in the higher grades are included.

The following publications are recommended for further study:

- Betts, E. A. *The Prevention and Correction of Reading Difficulties*. Row, Peterson, & Company, Evanston, Ill., 1936.
- Booker, I. A. *Better Reading Instruction*. National Education Association, Research Bulletin 13, No. 5, 1935.
- Cole, Luella. *The Improvement of Reading*. Farrar and Rinehart, New York, 1938.
- Dolch, E. W. *A Manual for Remedial Reading*. World Book Company, Yonkers, N. Y., 1939.
- Dolch, E. W. *The Psychology and Teaching of Reading*. Ginn and Company, Boston, 1931.
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- Durrell, D. D. *Improvement of Basic Reading Abilities*, Houghton Mifflin Company, Boston, 1940.
- Gans, Roms. *Guiding Children's Reading Through Experiences*. Bureau of Publications, Teachers College, Columbia University, New York, 1941.
- Hildreth, Gertrude. *Learning the Three R's*. Educational Publishers, Minneapolis, Minn., 1936.
- McKee, Paul G. *Reading and Literature in the Elementary School*. Houghton Mifflin Company, Boston, 1934.
- Monroe, Marion. *Children Who Cannot Read*. University of Chicago Press, Chicago, 1932.
- National Society for the Study of Education. *The Teaching of Reading*. 36th Yearbook, Part I, especially pages 287-302. Public School Publishing Co., Bloomington, Ill., 1937.
- Russell, D. H. et al. *Reading Aids Through the Grades* (225 Remedial Reading Activities). Bureau of Publications, Teachers College, Columbia University, New York, 1938.
- Stone, C. R. *Better Primary Reading*. Webster Publishing Company, St. Louis, 1936.
- Storm, G. E. and Smith, N. B. *Reading Activities in the Primary Grades*. Ginn and Company, Boston, 1930.
- Witty, Paul and Kopel, David. *Reading and the Educative Process*. Ginn and Company, Boston, 1939.


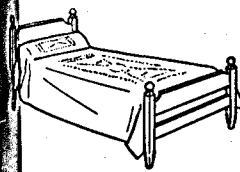
### Type 1. Word Recognition


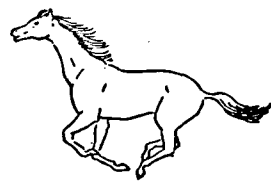
FORM 1

Write your name here . . . . .

When is your birthday? . . . . . How old are you? . . . . .

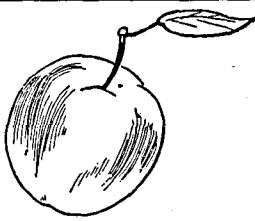
Grade . . . . . School . . . . .

	did                  egg  dog                  two	
	be                      bed  bag                    she	

	may                  make  come                  milk	
	horse                  play  hose                    house	

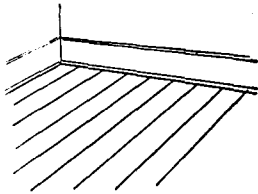
**The Examiner:** 1. See that each child has a pencil. 2. Distribute papers. 3. Have children fill in blanks at the top of the page (with your help). 4. Instructions to children: "I want you to look at the first picture, this one up here (holding up your copy and pointing to the picture of the dog). Next to it there are four words. One of the words goes with the picture. You are to draw a ring around that one word that tells about the picture. Put your finger on the word that belongs with the picture. What is it? (Let one child answer.) That's right, 'dog.' The four words are 'did,' 'egg,' 'dog,' and 'two' (pointing to the words on your own copy and making sure children look up at the copy). We are going to draw a ring around the word 'dog' because that's the one *that tells the most* about the picture. Everyone find the word 'dog' on your paper and draw a ring around it. (Check to make sure children have marked the correct word.) Now look at the box right underneath that one. Find the word that goes with the picture. What is it? (Let a child answer.) That's right, 'bed.' The four words are 'be,' 'bed,' 'bag,' and 'she.' We are going to draw a ring around the word 'bed' because that's the one that tells us the most about the picture. Everyone find the word 'bed' and draw a ring around it. (Check to make sure each child has marked the correct word. Continue in the same way for the third and fourth boxes. When you are illustrating with your copy ask the children to look up if need be.)

**Do not open your books until I tell you to.** Now I am going to show what we are to do next: Inside the book are some more pictures and words. (Examiner holds up copy of the test showing the inner pages.) You are to do the first one, then the next one below it, etc. (Examiner points down first column, then second, etc., and also demonstrates order on all three pages.) As soon as you have drawn a ring around the one word for one picture, go right ahead and do the next one. Now remember, first you are to look at the picture, then at the words next to the picture, then find the one word that goes best with the picture and make a ring around that one word. Make a ring around one word only for each picture. Do you understand? All right. Open your books and BEGIN. Go ahead." 5. Inspect the work of each child; see that each works from top to bottom of columns and that each follows the pages in order. Urge children individually to try the examples in order but *do not tell them the answers*. Discourage dawdling over difficult problems; tell them to try the next. Watch for children who make rings indiscriminately and tell them to make only one ring for each picture. 6. The signal STOP is given at the end of 15 minutes. Collect papers immediately. 7. The score is the number of exercises marked correctly minus one-third the number incorrect. If more than one word in an exercise is marked, that exercise is scored as incorrect. For further details see the Manual of Directions.



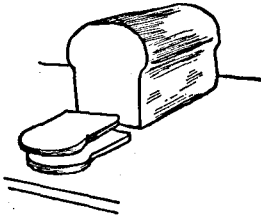
paper apple

land been



floor gold

part draw



only before

bread great



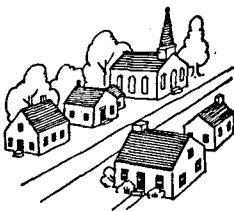
lost food

man fire



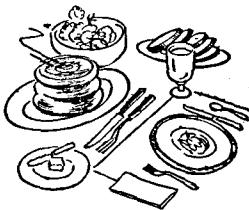
green horse

woman world



valley village

snow settle



doctor finger

dinner ocean



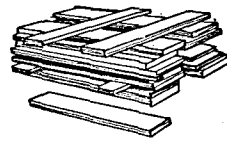
plate stamp

swim stair



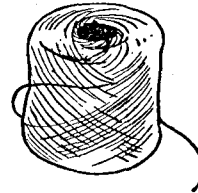
orange carriage

occupy secret



lumber recover

lover button



grind throat

string stroke



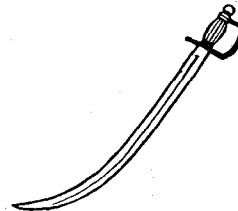
knee ring

hang knew



notice forget

stream forest



loose swift

worse sword



period forehead

organ orchard



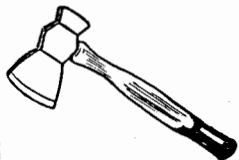
insect merit

inquire author



gross greedy

prisoner grocer



jacket hatch

hatchet hateful



distant meadow

frost merchant



harbor annual

anchor appetite



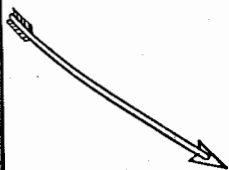
onion onward

opinion ourself



slender slipper

closet supper



arrange arrow

owner hero



veil vigor

rail vice



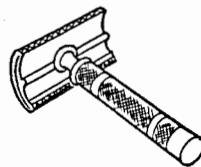
stubborn trample

stumble stately



chirp chip

chill sharp



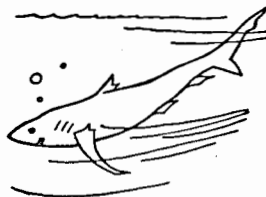
raisin realize

razor labor



fast mast

task mask



shamble shark

sheer hark



strike paint

study farm



final knife

fierce success



thread temple

needle thorn



weave military

mystery mirror



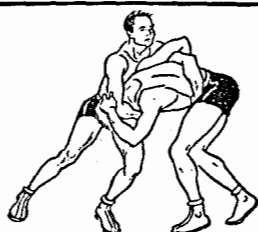
gymnasium grassy

gurgle gypsy



musician physician

museum mysterious



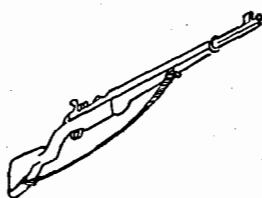
wriggle nestle

wrestle wringer



dragon dying

feeble dwelling



weapon weave

poison modest



statue slumber

glitter slope



advertise admiral

moral affirm



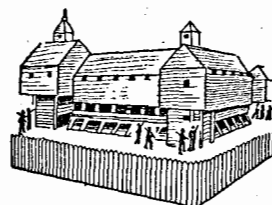
medical medal

model meddle



arbor argue

harbor apron



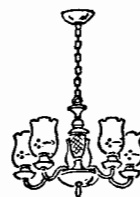
glimmer garrison

comparison garter



doughnut drawbridge

dormitory donation



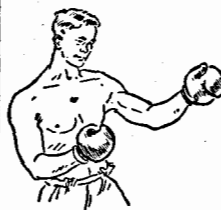
chocolate chandelier

chimpanzee chiffonier



equality epaulet

equestrian question



pulverize pursuer

puppet pugilist



rheumatic rhythmic

rhetorical rickety

REVISED  
BETA  
EXAMINATION

56  
MANUAL

BASIC REVISION

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1946 RESTANDARDIZATION

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Catonsville, Md.

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# REVISED BETA EXAMINATION

## INTRODUCTION

The Revised Beta Examination is a revision of the United States Army Group Examination Beta which was developed during World War I. It is intended, like that examination, to serve as a measure of general intellectual ability of persons who are relatively illiterate or who are non-English speaking.

The authors, Kellogg and Morton, revised the content of the test in the early thirties and a revised manual was prepared in 1943. In spite of its age, the Revised Beta Examination is still used extensively, especially in mass industries which employ persons with foreign background who have little education and in penal institutions where a group nonverbal test is necessary to supplement the more common group verbal tests.

This 1946 edition of the manual represents a considerable change in the use of the Revised Beta Examination. The original Kellogg-Morton data are given on pages 10-11 of this manual. Thus psychologists who wish to use the test in the future as they have been using it in the past can continue to do so.

However, the publishers are now recommending that a new standardization by Lindner and Gurvitz<sup>1</sup> be employed. A description of this standardization is given in the article by these authors and is briefly reviewed in

this manual. The features of the new standardization are as follows:

1. Refinement of the *administration* procedure. However, there is no basic change from that recommended by Kellogg and Morton in their earlier manual.
2. A few refinements in *scoring*, again with no changes from that of Morton and Kellogg.
3. A procedure for converting the raw scores of the separate parts of the test to *weighted scores* so that each test contributes equally to the total score.
4. The weighted scores are converted to *Beta IQs* in the same manner as weighted scores are transformed to IQs in the Wechsler-Bellevue Intelligence Scale.
5. Beta IQs take cognizance of the decrease in score performance with age.
6. The standardization sample used in deriving the weighted scores and the IQs is a representative sample of white adults.

The necessary tables for securing the Lindner-Gurvitz Beta IQs are provided in this manual.

The following instructions for administration and scoring the Revised Beta Examination apply whether one is using the new *Beta IQ* procedures or whether one is using the older norms provided by Kellogg and Morton.

## ADMINISTRATION

The examination room should be large enough so that the largest group contemplated may still be spaced with at least two feet between subjects. Pencils, with erasers, are essential and enough extra should be available to replace breakage of pencil points during the test.

Since this test is used chiefly to examine individuals who cannot read at all or who read very poorly, it is even more important than usual that the directions be read slowly and distinctly, and repeated if the examiner has any suspicion that certain members of the group do not understand the task.

Distribute the test booklets and say **FILL IN THE BLANKS ON THE FRONT OF THE BOOKLET. DO NOT OPEN THE BOOKLET UNTIL YOU ARE TOLD TO DO SO.**

If the group is illiterate, the examiner will have to fill in this information. The information requested on the face of the booklet should be filled in by the subject before any information or directions are given. During this period care should be taken to see that no subject gains advance knowledge of the test content.

When all preliminaries are finished, get the attention of the group and say **THIS IS A TEST TO MEASURE HOW WELL YOU THINK AND LEARN. SOME OF THE TESTS**

**ARE HARD. SOME OF THE TESTS ARE EASY. DO NOT WORRY IF YOU DO NOT FINISH A TEST. DO NOT STOP UNTIL I SAY GO! WHEN I SAY STOP I WANT EVERYONE TO STOP WORKING IMMEDIATELY, EVEN IF YOU ARE IN THE MIDDLE OF FINISHING SOMETHING. REMEMBER, DO NOT DO ANYTHING UNTIL I GIVE YOU DIRECTIONS TO DO SO.**

**BEFORE EACH ACTUAL TEST THERE IS A PRACTICE EXERCISE. THIS PRACTICE EXERCISE WILL SHOW HOW TO DO THE TEST THAT FOLLOWS. IF YOU DO NOT UNDERSTAND HOW TO DO THE TEST, THE TIME TO ASK FOR HELP IS DURING THE PRACTICE EXERCISE. WHEN WE ACTUALLY START THE TEST ITSELF, I WILL NOT BE ABLE TO ANSWER ANY QUESTIONS, OR GIVE YOU FURTHER DIRECTIONS.**

### TEST 1

Say **OPEN YOUR BOOKLET AND FOLD BACK THE COVER SO THAT JUST PAGE 3 IS ON TOP. Pause to see that they have complied with this direction. LOOK AT THE TOP OF THE PAGE. THE DIRECTOR WILL SAY: "MARK THE SHORTEST PATH FROM EACH ARROW AT THE LEFT TO THE OPPOSITE ARROW AT THE RIGHT BUT DO NOT CROSS ANY OF THE LINES." THE TOP OF THE PAGE HAS BEEN DONE TO SHOW YOU HOW TO DO IT; YOU MAY NOW GO AHEAD AND DO THE THREE AT THE BOTTOM OF THE PAGE. GO AHEAD!** The examiner, or examiners, should confer late among the subjects to make sure that every

<sup>1</sup> Lindner, Robert, and Gurvitz, Milton. Restandardization of the revised Beta examination to yield the Wechsler type of IQ. *Journal of Applied Psychology*, December 1946.

understands the directions and is successfully threading the maze. Any subject who does not comprehend may be redirected by repeating the original directions or by saying DO THESE JUST LIKE THIS ONE, and pointing to the first practice test and then to the example. If the subject still doesn't understand, it is permissible to say DRAW A LINE FROM HERE TO HERE WITHOUT CROSSING ANY OF THE PRINTED LINES, and at the same time point to number one at the beginning of the maze, and then trace through the example with the forefinger or a pencil eraser until number one is reached at the other end. If the subject still does not understand, a final resort should be made to drawing a line through maze 1 meanwhile saying YOU BEGIN HERE AND DRAW A LINE THROUGH WITHOUT CROSSING ANY OF THE PRINTED LINES. If the subject is then able to negotiate the first half of maze 2, he may be considered to have mastered the principle successfully.

Should one or two subjects prove very obtuse in understanding the directions, care should be exercised by the examiners that no one begins the actual maze test while the directions are repeated. Should the explanation be unduly prolonged, vigilance is necessary to prevent exploratory excursions through the booklet, due to sheer boredom while waiting. If there are several examiners available, one of them might do well to specialize in the instruction of the unduly backward. Once a subject is given aid by an examiner he should be noted for further attention, and, if possible, should be coached only by that examiner.

When all have understood the test and can negotiate it successfully say STOP! Get the attention of the entire group and continue immediately with TURN OVER THE PAGE AND FOLD UNDER THE BOOKLET SO THAT JUST PAGE 4 IS ON TOP. THE PAGE SHOULD LOOK EXACTLY LIKE THIS ONE. Hold up page 4 and say THE DIRECTIONS SAY: "MARK THE SHORTEST PATH FROM EACH ARROW AT THE LEFT TO THE OPPOSITE CORNER AT THE RIGHT, BUT DO NOT CROSS ANY OF THE LINES." READY: Go!

At the end of *exactly one minute and thirty seconds* say STOP! (A stop watch is indispensable to the proper and accurate timing of the test.) Any subject who fails to stop should be immediately admonished. If an appreciable amount of work has been done by a subject after the command to stop, such as completing a maze, the work done after the command "stop" was given should be crossed out in an unobtrusive manner.

Immediately after everyone in the group has stopped say TURN OVER YOUR BOOKLETS. YOUR PAGE SHOULD LOOK EXACTLY LIKE THIS ONE. Hold up page 5.

## TEST 2

When everyone has the correct page, say LOOK AT THE DIVIDED ROW OF BOXES AT THE TOP OF THE PAGE. IN THE TOP PART OF EACH BOX IS A DRAWING. UNDERNEATH EACH DRAWING IS A DIFFERENT NUMBER. WHENEVER YOU SEE THE DIVIDED BOXES, IN THE THREE ROWS AT THE BOTTOM OF THE PAGE, I WANT YOU TO PUT THE RIGHT NUMBER UNDER EVERY DRAWING. LOOK AT THE FIRST FOUR BOXES IN THE FIRST ROW. THEY HAVE BEEN DONE, AS AN EXAMPLE, TO SHOW YOU HOW TO DO IT. NOTICE THAT 3 HAS BEEN PUT BELOW PEAR, 1 BELOW

KITTEN, 2 BELOW CROSS, AND 3 BELOW PEAR. NOW YOU GO AHEAD AND DO THE REST. PUT THE RIGHT NUMBER UNDER EVERY MARK. GO AHEAD.

Should anyone not comprehend say LOOK AT THESE BOXES UP HERE. Point to them. THERE IS A DIFFERENT NUMBER UNDERNEATH EACH DRAWING; 1 IS BELOW KITTEN, 2 IS BELOW CROSS, 3 IS BELOW PEAR, AND SO FORTH. Point to each as you talk about it. THESE FOUR HERE HAVE BEEN DONE. NOTICE THAT 3 HAS BEEN PUT BELOW PEAR, 1 BELOW KITTEN, 2 BELOW CROSS, AND 3 BELOW PEAR. WHAT NUMBER GOES UNDERNEATH THIS ONE? Point to the cross. Should the subject still not be able to understand, fill in the first two or three blanks.

Any person who does not understand Tests 1 and 2 after a detailed explanation should be excused before the beginning of Test 2 and given an individual Beta afterwards. If such individuals are carried along they seriously interfere with the proper administration of the test by unduly prolonging the exercise period, thus making it very boring for the average and above-average subjects. Care should be taken to see that no one takes advantage of the practice periods to work on the preceding tests, or the ones anticipated.

When everyone has indicated a mastery of the test — in difficult cases completion of five or six items is sufficient — say STOP! TURN OVER THE PAGE AND FOLD UNDER THE BOOKLET SO THAT JUST PAGE 6 IS ON TOP. IT SHOULD LOOK EXACTLY LIKE THIS ONE. Hold up the page. THE DIRECTIONS SAY: "PUT THE RIGHT NUMBER UNDER EVERY MARK." READY: Go!

At the end of *exactly two minutes* say STOP! As soon as everyone has stopped, say TURN OVER YOUR BOOKLETS.

## TEST 3

Say LOOK AT THE THREE SQUARES AT THE TOP OF THE PAGE. THE DIRECTIONS SAY: "IN EACH SQUARE MARK THE THING THAT IS WRONG." THESE HAVE BEEN DONE, AS AN EXAMPLE, TO SHOW YOU HOW TO DO IT. IN SQUARE 1 THE HAT WITH THE HOLE IN IT HAS BEEN CROSSED OUT; IN SQUARE 2, THE COAT WITHOUT A SLEEVE HAS BEEN MARKED; IN SQUARE 3, THE TABLE WITHOUT A LEG. IN EACH ONE OF THE SQUARES AT THE BOTTOM CROSS OUT THE THING THAT IS WRONG.

Should anyone not understand, say WHICH ONE OF THESE IS WRONG? Point to the first square to be completed. If he still fails to understand, point to the first example and say WHICH ONE IS WRONG HERE? When he answers, ask THEN WHICH ONE IS WRONG HERE? Point to the first practice item. This can be repeated for the next two, if necessary. Completion of practice item number 4 should be taken as an indication of test comprehension.

When everyone understands, say STOP! TURN OVER THE PAGE AND FOLD UNDER THE BOOKLET SO THAT JUST PAGE 8 IS ON TOP. IT SHOULD LOOK EXACTLY LIKE THIS ONE. Hold up the correct page. THE DIRECTIONS SAY: "IN EACH SQUARE MARK THE THING THAT IS WRONG." READY: Go!

At the end of *exactly three minutes* say STOP! TURN OVER YOUR BOOKLETS.



## TEST 4

Say LOOK AT THE EXAMPLES AT THE TOP OF THE PAGE. THE DIRECTIONS SAY: "MARK EACH SQUARE TO SHOW HOW THE PIECES AT ITS LEFT WILL FIT INTO IT." THE TOP THREE HAVE BEEN DONE TO SHOW YOU HOW TO DO IT. YOU DO THE SIX AT THE BOTTOM. GO AHEAD!

If anyone does not understand, say DO YOU SEE THE WAY THESE TWO FIT INTO HERE? Point to example 1. YOU MUST DRAW A LINE TO SHOW HOW THESE FIT IN; JUST LIKE THIS ONE. This can be repeated for 2 and 3 if necessary. If the subject cannot do 4 independently, this should be done for him. Do not demonstrate 5 and 6.

When all understand, say STOP! TURN OVER THE PAGE AND FOLD UNDER THE BOOKLET SO THAT JUST PAGE 10 IS ON TOP. IT SHOULD LOOK EXACTLY LIKE THIS ONE. Hold up page 10. THE DIRECTIONS SAY: "MARK EACH SQUARE TO SHOW HOW THE PIECES AT ITS LEFT WILL FIT INTO IT." READY: Go!

At the end of *exactly four minutes* say STOP! TURN OVER THE BOOKLET.

## TEST 5

Say LOOK AT THE EXAMPLES AT THE TOP OF THE PAGE. IN SQUARE 1 THE FINGER IS MISSING, AND THE FINGER WAS DRAWN IN; IN SQUARE 2 THE TABLE LEG WAS MISSING, AND THE TABLE LEG WAS DRAWN IN. IN EACH ONE OF THE SQUARES AT THE BOTTOM DRAW IN WHAT IS LEFT OUT. WORK FAST.

The subjects should be checked to see that the missing items are actually drawn in; occasionally even a better than average subject will simply mark the missing item with an X. However, the subjects should be made to realize that the test is not one of drawing ability and they should not waste time making their additions any more than recognizable. In 2000 cases, many with rather low IQs, any misunderstanding has been cleared up by simply asking WHAT IS MISSING? ... WELL THEN, DRAW IT IN.

When everyone has completed the exercise, say TURN OVER THE PAGE AND FOLD UNDER THE BOOKLET SO THAT JUST PAGE 12 IS ON TOP. IT SHOULD LOOK EXACTLY LIKE THIS ONE. Hold up page 12. THE DIRECTIONS SAY: "IN EACH PICTURE DRAW WHAT IS LEFT OUT. WORK FAST." READY: Go!

At the end of *exactly two and one-half minutes* say STOP! TURN OVER THE BOOKLETS.

While the scoring is simple and uncomplicated, the following rules should be observed for the sake of uniformity. They supplement the scoring key which is so arranged that the answers are on two sides of a single card.

**Test 1.** One point of credit is given for each half maze completed. A half maze is considered completed if an imaginary line crossing the neck at the end of each half maze is crossed. No corrections are allowed; as this

## TEST 6

Say LOOK AT THE TWO COLUMNS AT THE TOP OF THE PAGE. THE DIRECTIONS SAY: "LOOK AT EACH PAIR OF DRAWINGS OR NUMBERS, AND MAKE A MARK ON THE DOTTED LINE IF THEY ARE NOT ALIKE." IN COLUMN THE SQUARE AND THE TRIANGLE ARE NOT ALIKE, THEREFORE A MARK HAS BEEN MADE BETWEEN THEM; THE PUMPKINS ARE EXACTLY ALIKE, THEREFORE NO MARK HAS BEEN MADE BETWEEN THEM. IN THE NEXT COLUMN, THE TWO SQUARES WITH THE LINE AND THE TRIANGLE ARE EXACTLY ALIKE, THEREFORE NO MARK HAS BEEN MADE BETWEEN THEM; 1 AND 3 ARE DIFFERENT, OR NOT ALIKE, THEREFORE A MARK HAS BEEN PLACED BETWEEN THEM. YOU GO AHEAD AND DO THE COLUMNS AT THE BOTTOM OF THE PAGE.

If anyone does not understand, say ARE THESE TWO ALIKE? Point to the first pair. THEN WHAT DO YOU DO? If the answer is right allow them to go on independently until three or four have been done correctly. If the wrong answer is given, say NO, BECAUSE THEY ARE DIFFERENT. A MARK IS PLACED BETWEEN THEM. This is repeated until the correct answer is given independently. Then the subject is allowed to continue on his own.

When all comprehend the directions, say TURN OVER THE PAGE AND FOLD UNDER THE BOOKLET SO THAT JUST THE PRINTED PAGE IS ON TOP. IT SHOULD LOOK EXACTLY LIKE THIS ONE. Hold up page 14. THE DIRECTIONS SAY: "LOOK AT EACH PAIR OF DRAWINGS OR NUMBERS, AND MAKE A MARK ON THE DOTTED LINE IF THEY ARE NOT ALIKE." REMEMBER, DO BOTH COLUMNS. READY: Go!

At the end of *exactly two minutes* say STOP! FOLD YOUR BOOKLETS WITH THE COVER ON TOP.

## Individual Testing

The test can be given to one person at a time as an individual test. Those individuals who have been excluded from the group testing because their poor comprehension hinders the progress of the group, have not yet exhausted the possibilities of the test. They should be retested individually. In this way the examiner can spend as much time as necessary explaining the practice test to the subject, without the unpleasant feelings engendered by the waiting of restless subjects who have long finished the practice test and are eager to continue. The directions for administering should be closely adhered to, however. Scoring and evaluating are carried out in exactly the same manner as the group test, and the weighting of scores and the IQ are derived exactly the same way.

## SCORING

includes erasures, the booklets must be examined carefully. Occasionally a doubt arises as to what constitutes an error, particularly the kind that heads toward a false opening and then just at the borderline turns back. The following figure shows that a half maze is counted correct if the error is recognized and the line turns back in an unbroken sequence, even if it is a fraction of an inch inside the wrong entrance. If the line is broken and then renewed, it is counted as an error. Maximum score is 10.

**Test 2.** The number of digits correct is divided by 3. For purposes of simplicity the three already done, as an example, are included unless none of the digits done by the subject are correct; then the score is 0. Occasionally a compulsive personality will use the number 1 on its side, as shown in the following figure. If the other numbers are written correctly this kind of response is counted as correct. Maximum score is 30.

**Test 3.** The key indicates which ones are correct, no deviations being allowed. One point is given for each correct response. Maximum score is 20.

**Test 4.** The key shows only one position of those possible for each item. Each correctly assembled square can be rotated 90 or 180 degrees. However, the juxtaposition of the pieces remain the same except for item 14. Permissible variations of this item are illustrated below. Credit 1 point for each square correctly marked. Maximum score is 18.

**Test 5.** This test will be scored according to the key, except for the changes noted. In item 13, if the hand is drawn without the arm, it should still be counted as correct. In item 18, a leg anywhere on the left-hand side is marked as correct. In item 19 some compulsive personalities will repeat the picture of the bag on the other side of the scale; this, or any other kind of weight, is to be counted as correct. The important concept here

is balance. One point is given for each picture correctly completed. Artistic accuracy is not expected. Maximum score is 20.

**Test 6.** The test is scored exactly as the key directs. Only those pairs which have been marked by the subject as unlike are considered in the scoring. Subtract the number of wrong responses from the number of correct responses. Maximum score is 25.

The maximum score for the entire test is 123 points.

### Summary of Steps in Securing the Beta IQ (Lindner-Gurvitz)

1. Score the test according to the instructions given in the manual. Check the scoring and the count of "number rights."

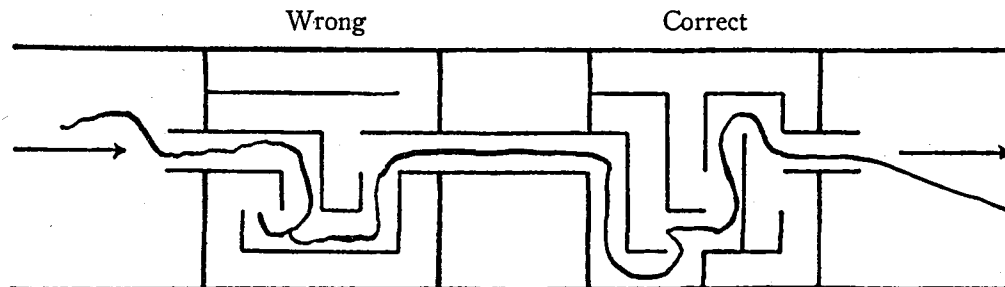
2. Transfer each of the six test scores to the column on the cover marked *Raw Score*. (The cover form of the test has been changed in 1947; if you have older copies record the data in some convenient way.)

3. Determine *weighted scores* for each test, using Table I. Enter in the proper column. Add the six weighted scores to secure the *Total Weighted Score*.

4. Determine the age of the subject.

5. Look up his *Beta IQ* in Table II. Enter in the space provided. (We have written Beta Quotient rather than Beta IQ in order not to disturb any subject who happens to know the meaning of IQ.)

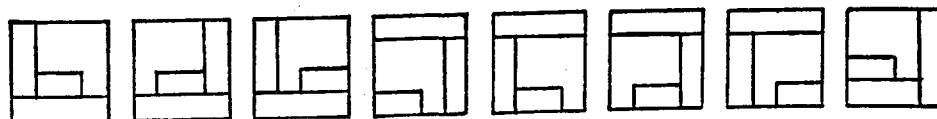
SCORING SAMPLE FOR MAZE, TEST 1



HOW A COMPULSIVE PERSONALITY SOMETIMES MARKS TEST 2

И	-	□	-	И	-	□	И	-	И	□	И	-	□	-
2	1	3	-	2	-	3	2	-	2	3	2	-	3	-

BASIC VARIATIONS TO ITEM 14, TEST 4



# THE LINDNER-GURVITZ STANDARDIZATION

## Weighted Scores and Allowance for Age

Lindner and Gurvitz made an extensive study of the Revised Beta Examination which resulted in a re-standardization of the test and the derivation of IQs according to the method used by Wechsler.<sup>2</sup> The main features of the Wechsler type of scoring and standardization are, first, that each of the subtests is converted into weighted scores so that a profile of the subtests may be secured, and, second, the computation of the IQ takes cognizance of the fact that mental ability as measured by the test declines with age after a peak of development in the early twenties.

The scoring has been arranged so that each subtest contributes equally to the total score. Using Hull's method<sup>3</sup> each raw point score of each subtest was equated to a new scale with a mean of 10 and a standard deviation of 3. Table I presents the weighted score equivalents of raw scores on each of the subtests. The sum of the weighted subtest scores (total score) may then be converted into an IQ by consulting Table II which gives the IQ equivalent of a given score for each of several age ranges.

The plan of making each subtest contribute equally to the total score has the advantage that it allows an examiner to prorate a score when, for some reason or other, one or two of the subtests have to be omitted.

## Standardization Sample

The final standardization sample included 1225 white male adult prisoners at the U. S. Federal Penitentiary at Lewisburg, Pennsylvania. These men were classified into age groups as shown in the column headings of Table II. The groups were carefully selected so that the education and socio-economic status of each was in proportion to the distributions for white male adults in the 1940 census. The total sample showed a tremendous range of occupations and had origins in all states east of the Mississippi River and most of the western states. No persons who were adjudged psychotics were included. The men were tested within one week of their entrance into the penitentiary; a fact of importance, since experience shows that incarceration for a longer period of time can develop stereotyped

modes of thought and expression. It should also be pointed out that the Federal Penitentiary at Lewisburg does not receive established criminals; it is an institution for adults who are considered improvable offenders.

The question of whether the newly devised norms are suitable for females can only be answered on a theoretical basis as no women subjects were available to Lindner and Gurvitz for the standardization. The Beta Examination has been used for testing women as well as men for many years, and no report has been found indicating that different norms were required for different sexes. A study of the census data indicates that there is no appreciable difference between the educational status achieved by native white males and native white females.

## Beta IQ Is Similar in Meaning to Wechsler IQ

Wechsler's method for calculating IQs has been followed in detail. One should remember that the IQ tables are constructed so as to yield an average IQ of 100 for each age group. A check disclosed that both the mean IQ and the standard deviation of the IQ remained relatively constant from age range to age range.

IQs as calculated for this revision of the Revised Beta Examination must be recognized as relative indices of the degree of intelligence. IQs determined by this method should always be labelled *Beta IQs* and not simply IQs. In interpreting the score one should also be aware of the fact that a Beta IQ of 70 in an older person is different from a Beta IQ of 70 in a younger person with respect to the performance on which it is determined. Tables III and IV present two modes of classification which will make more meaningful both the IQ and the weighted score.

Table III gives classifications which describe the subject's IQ with relation to his own age group. Table IV describes the subject's weighted score with relation to the 20-24 age group, the age group in which intelligence reaches its peak.

## Other Data

For 192 unselected persons from the standardizing sample, a coefficient of correlation of .92 was found between Beta IQs and Wechsler IQs.

Table V presents the intercorrelation of weighted subtest scores, and of weighted subtest scores with total weighted scores.

<sup>2</sup> Wechsler, David. *The measurement of adult intelligence*. Baltimore: The Williams and Wilkins Company, 1941.

<sup>3</sup> Hull, C. L. *Aptitude testing*. Yonkers, N. Y.: World Book Company, 1928, p. 396 ff.

TABLE I  
FOR CONVERTING RAW SCORES TO WEIGHTED SCORES

Weighted Scores	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Weighted Scores
0	0-1				0-1	0-2	0
1	2	0-1			2	3-4	1
2		2-3	0-1		3-4	5	2
3	3	4-5	2	0	5	6-7	3
4		6-7	3	1-2	6	8	4
5	4	8-9	4-5	3	7-8	9-10	5
6	5	10-11	6	4-5	9	11	6
7		12-13	7	6	10	12-13	7
8	6	14-15	8-9	7	11	14	8
9		16-17	10	8-9	12-13	15-16	9
10	7	18-20	11	10	14	17-18	10
11		21-22	12-13	11-12	15	19	11
12	8	23-24	14	13	16	20-21	12
13	9	25-26	15-16	14-15	17-18	22	13
14		27-28	17	16	19	23-24	14
15	10	29-30	18	17	20	25	15
16			19-20	18			16

TABLE II  
INTELLIGENCE QUOTIENTS FOR AGES 16 TO 59

Weighted Scores	A G E S									Weight Score
	16-19 IQ	20-24 IQ	25-29 IQ	30-34 IQ	35-39 IQ	40-44 IQ	45-49 IQ	50-54 IQ	55-59 IQ	
6	28	24	32	41	47	54	59	65	69	6
7	29	25	33	42	48	55	60	66	70	7
8	30	27	34	43	49	56	61	67	71	8
9	31	28	36	44	50	57	62	68	72	9
10	33	29	37	45	52	58	63	68	73	10
11	34	30	38	46	53	59	64	69	74	11
12	35	32	39	47	54	60	65	70	74	12
13	36	33	40	48	54	61	66	71	75	13
14	38	34	41	49	56	61	66	72	76	14
15	39	35	42	50	57	62	67	73	77	15
16	40	37	44	52	57	63	68	73	78	16
17	41	38	45	53	58	64	69	74	78	17
18	42	39	46	54	60	65	70	75	79	18
19	44	40	47	55	61	66	71	76	80	19
20	45	42	48	56	61	67	72	77	81	20
21	46	43	49	57	62	68	73	78	81	21
22	47	44	51	58	64	69	74	78	82	22
23	48	45	52	59	64	70	74	79	83	23
24	50	46	53	60	65	71	75	80	84	24
25	51	48	54	61	66	72	76	81	84	25
26	52	49	55	62	68	73	77	81	85	26
27	53	50	56	63	68	74	78	82	86	27
28	55	52	57	64	69	75	79	83	87	28
29	56	53	59	65	70	76	80	84	87	29
30	57	54	60	66	71	76	81	85	88	30
31	58	55	61	67	72	77	81	86	89	31
32	60	57	62	68	74	78	82	86	90	32
33	61	58	63	69	75	79	83	87	90	33
34	62	59	64	70	75	80	84	88	91	34
35	63	60	65	72	76	81	85	89	92	35
36	64	61	67	73	78	82	86	90	93	36
37	66	63	68	74	78	83	87	90	93	37
38	67	64	69	75	79	84	88	91	94	38
39	68	65	70	76	80	85	89	92	95	39
40	69	66	71	77	81	86	89	93	96	40
41	71	68	72	78	82	87	90	94	97	41
42	72	69	74	79	83	88	91	95	97	42
43	73	70	75	80	84	89	92	95	98	43
44	74	72	76	81	85	89	93	96	99	44
45	76	73	77	82	86	90	94	97	100	45
46	77	74	78	83	87	91	95	98	100	46
47	78	75	79	84	88	92	96	99	101	47
48	79	76	80	85	89	93	97	99	102	48
49	80	78	82	86	90	94	98	100	103	49
50	82	79	83	87	91	95	99	101	103	50

TABLE II — (Continued)

INTELLIGENCE QUOTIENTS FOR AGES 16 TO 59

Weighted Scores	A G E S									Weighted Scores
	16-19 IQ	20-24 IQ	25-29 IQ	30-34 IQ	35-39 IQ	40-44 IQ	45-49 IQ	50-54 IQ	55-59 IQ	
51	83	80	84	88	92	96	99	102	104	51
52	84	81	85	89	93	97	100	103	105	52
53	85	83	86	90	94	98	101	103	106	53
54	87	84	87	92	95	99	101	104	106	54
55	88	85	88	93	96	100	102	105	107	55
56	89	86	90	94	97	101	103	106	108	56
57	90	88	91	95	98	102	104	107	109	57
58	91	89	92	96	99	103	105	108	109	58
59	93	90	93	97	100	103	106	108	110	59
60	94	91	94	98	101	104	107	109	111	60
61	95	93	95	99	102	105	108	110	112	61
62	96	94	97	100	103	106	109	111	112	62
63	97	95	98	101	104	107	110	112	113	63
64	99	96	99	102	105	108	111	112	114	64
65	100	98	100	103	106	109	111	113	115	65
66	101	99	101	104	107	110	112	114	116	66
67	103	100	102	105	108	111	113	115	116	67
68	104	101	103	106	109	112	114	116	117	68
69	105	102	105	107	110	113	115	117	118	69
70	106	104	106	108	111	114	116	117	119	70
71	107	105	107	109	112	115	117	118	119	71
72	109	106	108	110	113	116	118	119	120	72
73	110	107	109	111	114	116	119	120	121	73
74	111	109	110	112	115	117	119	121	122	74
75	112	110	112	113	116	118	120	121	122	75
76	113	111	113	115	117	119	121	122	123	76
77	115	112	114	116	118	120	122	123	124	77
78	116	114	115	117	119	121	123	124	125	78
79	117	115	116	118	120	122	124	125	125	79
80	118	116	117	119	121	123	125	125	126	80
81	120	117	118	120	122	124	126	126	127	81
82	121	119	120	121	123	125	126	127	128	82
83	122	120	121	122	124	126	127	128	128	83
84	123	121	122	123	125	127	128	129	129	84
85	124	122	123	124	126	128	129	130	130	85
86	126	124	124	125	127	129	130	130	131	86
87	127	125	125	126	128	130	131	131	132	87
88	128	126	126	127	129	131	132	132	132	88
89	129	128	128	128	130	131	133	133	133	89
90	131	129	129	129	131	132	134	134	134	90
91	132	130	130	130	132	133	134	134	135	91
92	133	131	131	131	133	134	135	135	135	92

TABLE III

IQ CLASSIFICATION\*  
(BASED ON WEIGHTED SCORES AND AGE)

IQ	Classification
129 and up	Very Superior
120-128	Superior
110-119	Above Average
90-109	Average
80- 89	Below Average
71- 79	Inferior
70 and below	Defective

\* Classification system same as that used by Wechsler.

TABLE IV

WEIGHTED SCORE CLASSIFICATION  
(WITH REFERENCE TO AGE GROUP 20-24)

Weighted Score	Classification
90 and above	A
83-89	B
75-82	C+
59-74	C
51-58	C—
43-50	D
42 and below	E

TABLE V

INTERTEST CORRELATIONS OF THE SUBTESTS AND WEIGHTED SCORES  
(N = 1006)

	Weighted Score	Maze	Digit Symbol	Error Recog- nition	Form- board	Picture Com- pletion	Identi-
Weighted Score	—	.68	.86	.82	.75	.83	.79
Maze	.68	—	.62	.51	.52	.55	.54
Digit Symbol	.86	.62	—	.60	.57	.67	.77
Error Recognition	.82	.51	.60	—	.74	.76	.58
Formboard	.75	.52	.57	.74	—	.62	.57
Picture Completion	.83	.55	.67	.76	.62	—	.56
Identities	.78	.54	.72	.58	.51	.56	—
Average	.79	.57	.67	.67	.62	.67	.62

## THE KELLOGG-MORTON STANDARDIZATION

The data which follow are fundamental to the Revised Beta Examination. They are the same as printed in the 1943 Kellogg-Morton manual of this test. They should be used in interpreting Revised Beta scores when the new Lindner-Gurvitz Beta IQs are *not* desired.

### STATISTICAL INFORMATION

TABLE VI

RELIABILITY COEFFICIENTS<sup>4</sup>

	Odd-even tests	Tests 4, 5, 6
Total scores	.899	
Tests 1, 2, 3		.904

TABLE VII

RETEST MEANS AND CORRELATION COEFFICIENTS<sup>4</sup>

	Mean Score		
Test	1932	1933	r
1	6.8	7.5	.295 ± .0
2	18.7	21.2	.638 ± .0
3	10.8	12.6	.575 ± .0
4	7.8	9.4	.737 ± .0
5	13.9	15.4	.614 ± .0
6	18.5	20.7	.737 ± .0
Total	77.3	87.0	.770 ± .0

<sup>4</sup> Kellogg, C. E., and Morton, N. W. Revised Beta examination. *The Personnel Journal*, Vol. 13, No. 2, August 1934. Pp. 98-99.

Correlations based on 60 sixth grade children.

TABLE VIII

SUBTEST INTERCORRELATION COEFFICIENTS AND  
CORRELATION WITH TOTAL<sup>5</sup>

(N = 127)

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
1	—	.601	.610	.477	.577	.441
2	.601	—	.734	.596	.714	.600
3	.610	.734	—	.554	.786	.588
4	.477	.596	.554	—	.603	.433
5	.577	.714	.786	.603	—	.630
6	.441	.600	.588	.433	.630	—
Total	.698	.896	.872	.731	.880	.761

The correlation of Revised Beta Examination scores with Stanford-Binet (1916) mental ages is .78 for 521 cases referred for special testing in the New York City schools; with Otis Self-Administering Tests of Mental Ability, higher examination A, .71 for 364 subjects.

## NORMS

TABLE IX

OTIS SELF-ADMINISTERING TEST (HIGHER EXAMINATION A) SCORE EQUIVALENTS FOR REVISED  
BETA SCORES

<u>Beta Score</u>	<u>Otis Score<sup>6</sup></u>
118	68
113	63
108	58
103	53
98	48
93	43
88	38
83	33
78	28
73	23
68	18
63	13
58	8

N=364

r=.71

Kellogg, C. E., and Morton, N. W. Revised Beta examination. *The Personnel Journal*, Vol. 13, No. 2, August 1934. Pp. 98-99.

The angle formed by the two regression lines was bisected by a midline, and reading from this midline the Otis score corresponding to the midpoint of each frequency step-interval of the Revised Beta scores was found.

TABLE X

STANFORD-BINET (1916) MA EQUIVALENTS FOR  
REVISED BETA SCORES<sup>7</sup>

<u>Beta Score</u>	<u>S-B MA<sup>8</sup> yrs.—mos.</u>	<u>Beta Score</u>	<u>S-B MA<sup>8</sup> yrs.—mos.</u>
103	16—8	64	11—2
102	16—6	63	11—0
101	16—5	62	10—10
100	16—3	61	10—9
99	16—1	60	10—7
98	15—11	59	10—5
97	15—10	58	10—3
96	15—8	57	10—2
95	15—6	56	10—0
94	15—5	55	9—10
93	15—3	54	9—8
92	15—1	53	9—7
91	14—11	52	9—5
90	14—10	51	9—3
89	14—8	50	9—1
88	14—7	49	9—0
87	14—5	48	8—10
86	14—3	47	8—8
85	14—1	46	8—7
84	14—0	45	8—5
83	13—10	44	8—3
82	13—8	43	8—1
81	13—7	42	8—0
80	13—5	41	7—10
79	13—3	40	7—8
78	13—1	39	7—7
77	13—0	38	7—5
76	12—10	37	7—3
75	12—9	36	7—1
74	12—7	35	7—0
73	12—5	34	6—10
72	12—3	33	6—8
71	12—2	32	6—6
70	12—0	31	6—5
69	11—10	30	6—3
68	11—9		
67	11—7		
66	11—5		
65	11—3		

	<u>Revised Beta Raw Score</u>	<u>Stanford-Binet MA (months)</u>	<u>Stanford-Binet IQ</u>	<u>Chronological Age (months)</u>
Mean	67.05	138.65	91.65	156.9
Sigma	15.06	33.19	14.49	30.41

N=521

r=.78

<sup>7</sup> The Psychological Corporation wishes to acknowledge the assistance of Miss Clara Carroll, Bureau of Child Guidance of the New York City Department of Education, who collected the data on which these norms were based.

<sup>8</sup> The regression equation for predicting Stanford-Binet mental ages from Beta scores was computed and three points were plotted. The Stanford-Binet mental ages given in this table were read directly from the resulting chart.



Write your name here.....

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO

Age..... Sex.....

Address.....

Place of Birth.....

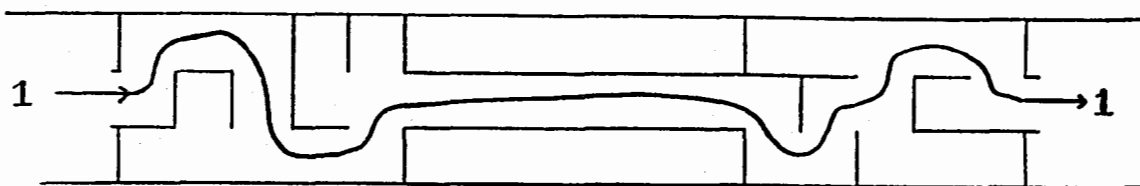
How many years have you lived in this country?.....

Last grade reached in school.....

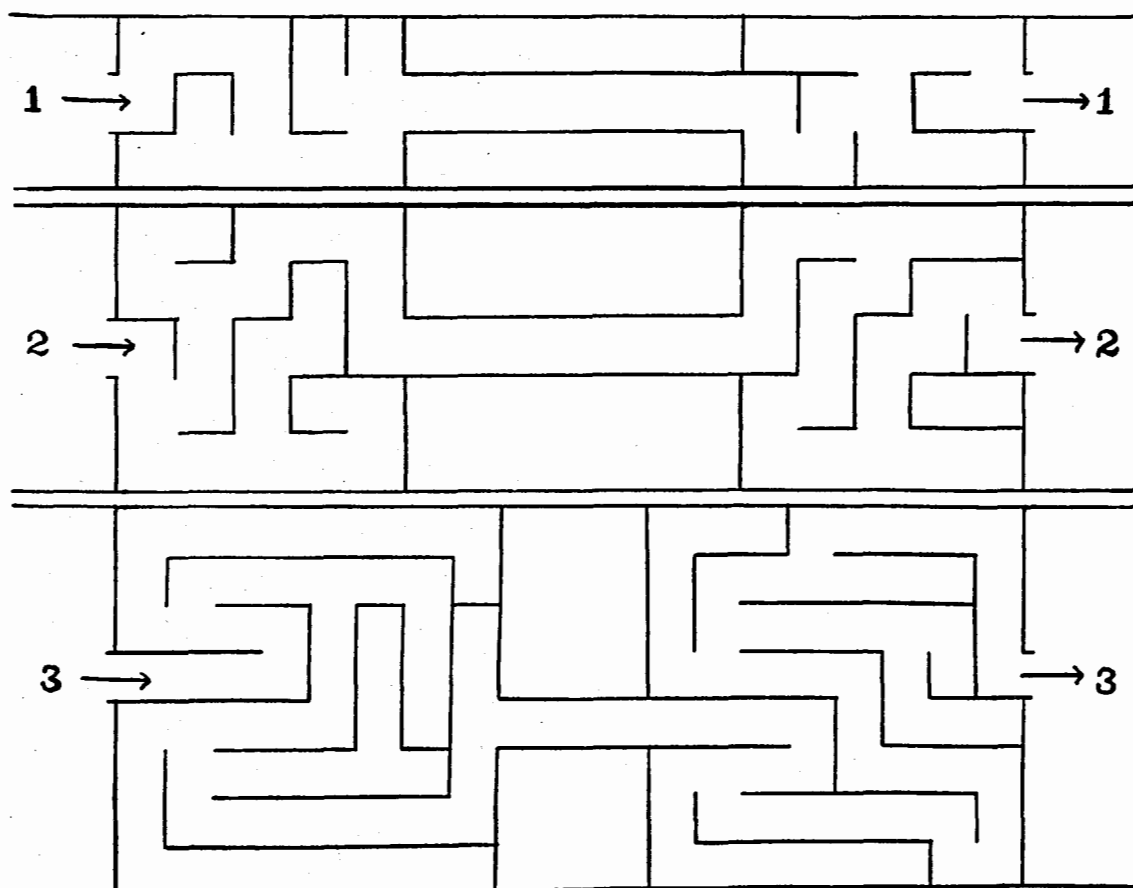
Present position.....

Last position.....

## EXERCISE 1

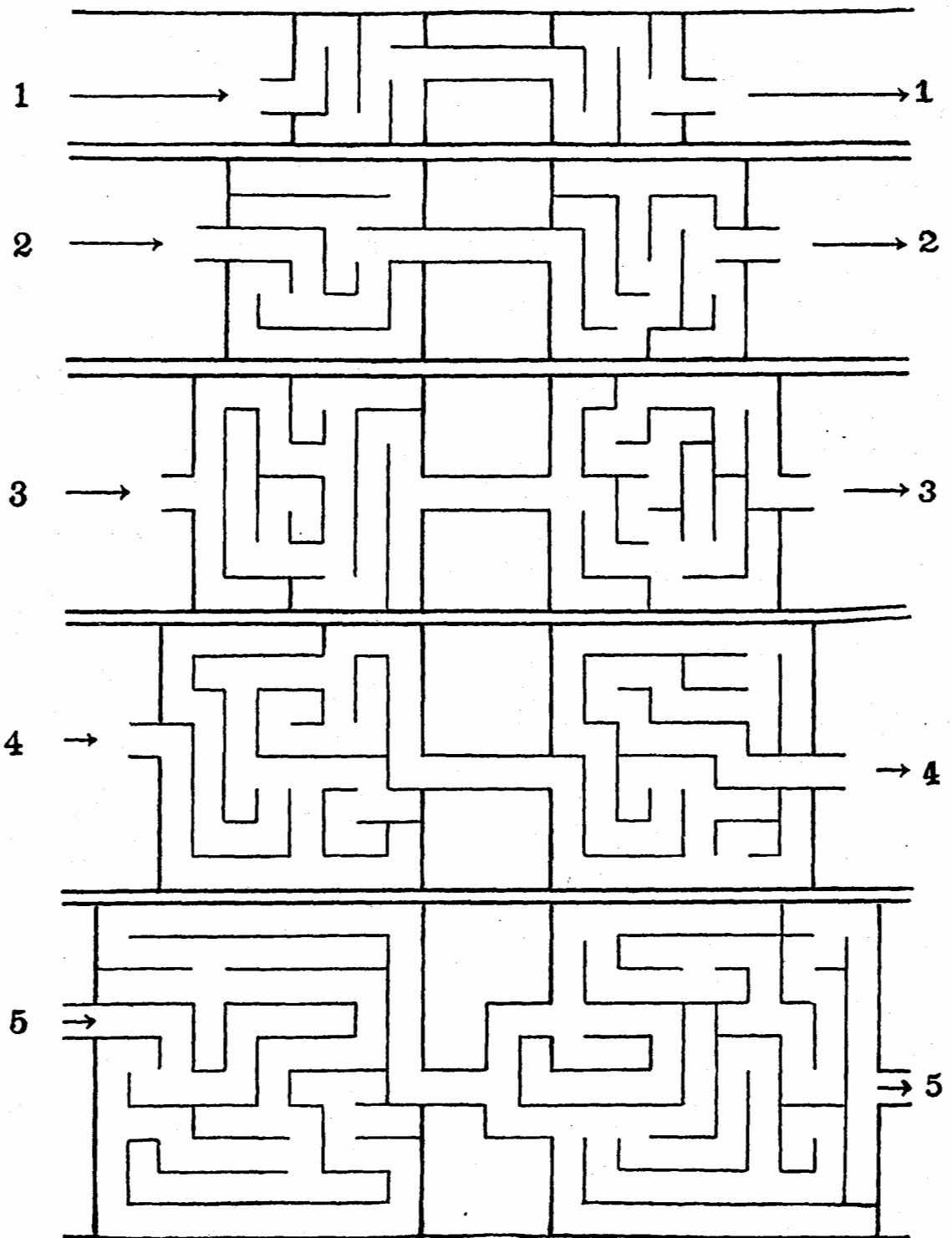


**Mark the shortest path from each arrow at the left to the opposite arrow at the right, but do not cross any of the lines**



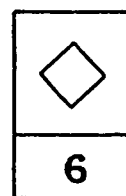
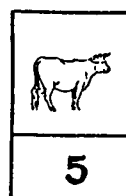
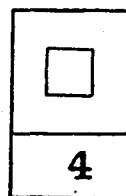
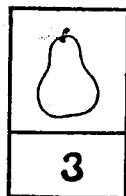
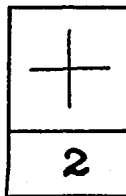
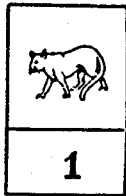
# TEST 1









Mark the shortest path from each arrow at the left to the opposite arrow at the right, but do not cross any of the lines



















## EXERCISE 2

Put the right number under every drawing



							
3	/	2	3				

# TEST 2

Put the right number under every mark

-	И	□	L	U	0	Λ	X	=
1	2	3	4	5	6	7	8	9

И	-	□	-	И	-	□	И	-	И	□	И	-	□	-
2	1	3												

L	И	□	И	L	□	-	U	И	-	L	□	-	U	L

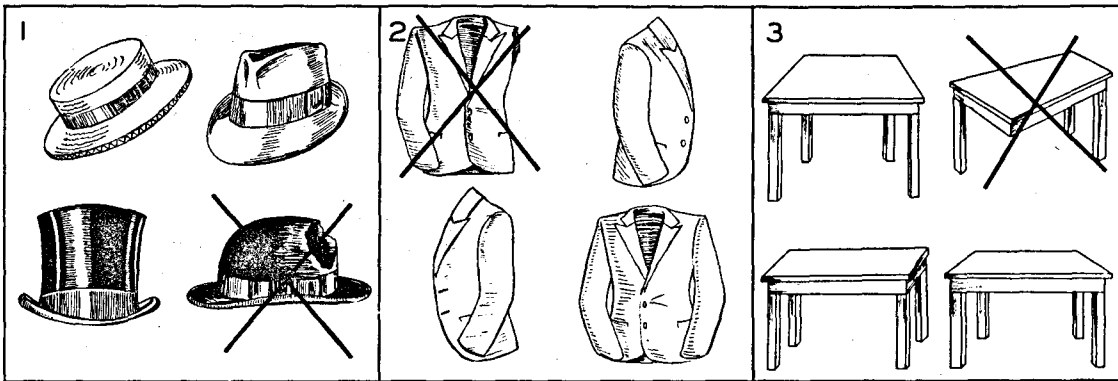
И	0	□	И	U	L	0	□	И	-	Λ	U	□	0	U

-	L	И	□	Λ	X	L	0	U	L	X	U	Λ	=	0

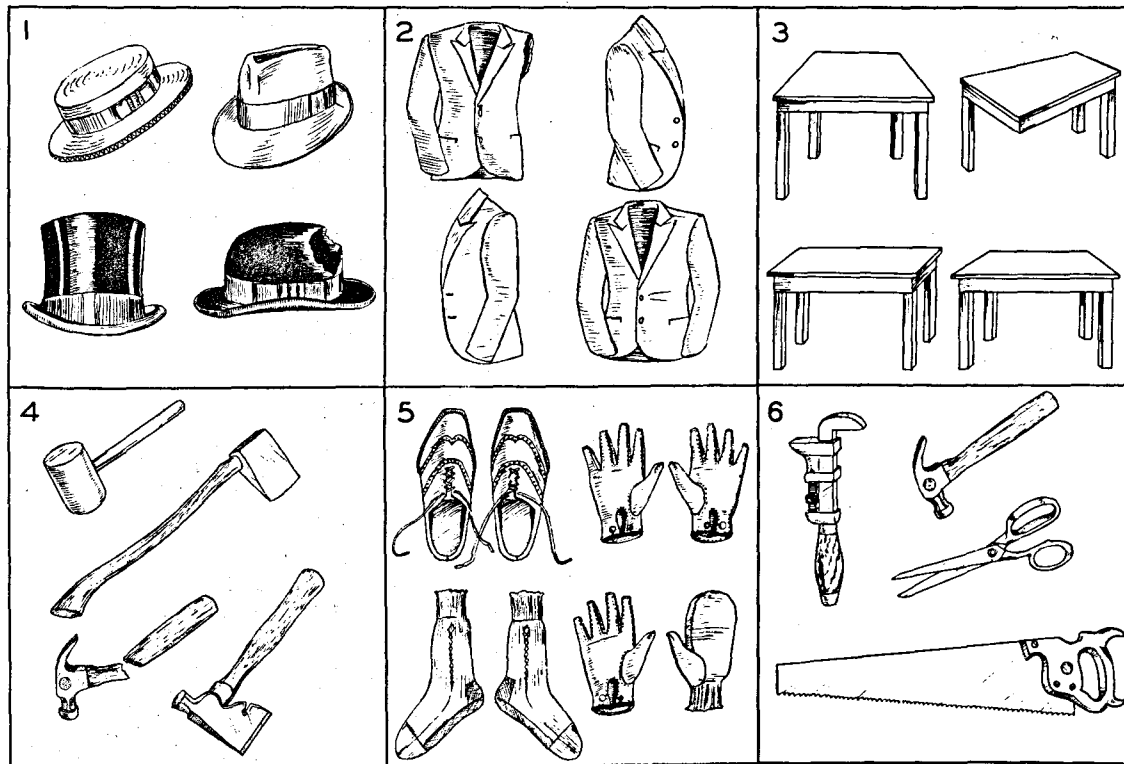
=	□	X	0	L	-	U	Λ	И	0	И	L	X	-	□

L	=	U	-	Λ	U	И	0	=	□	Λ	X	L	-	X

### EXERCISE 3

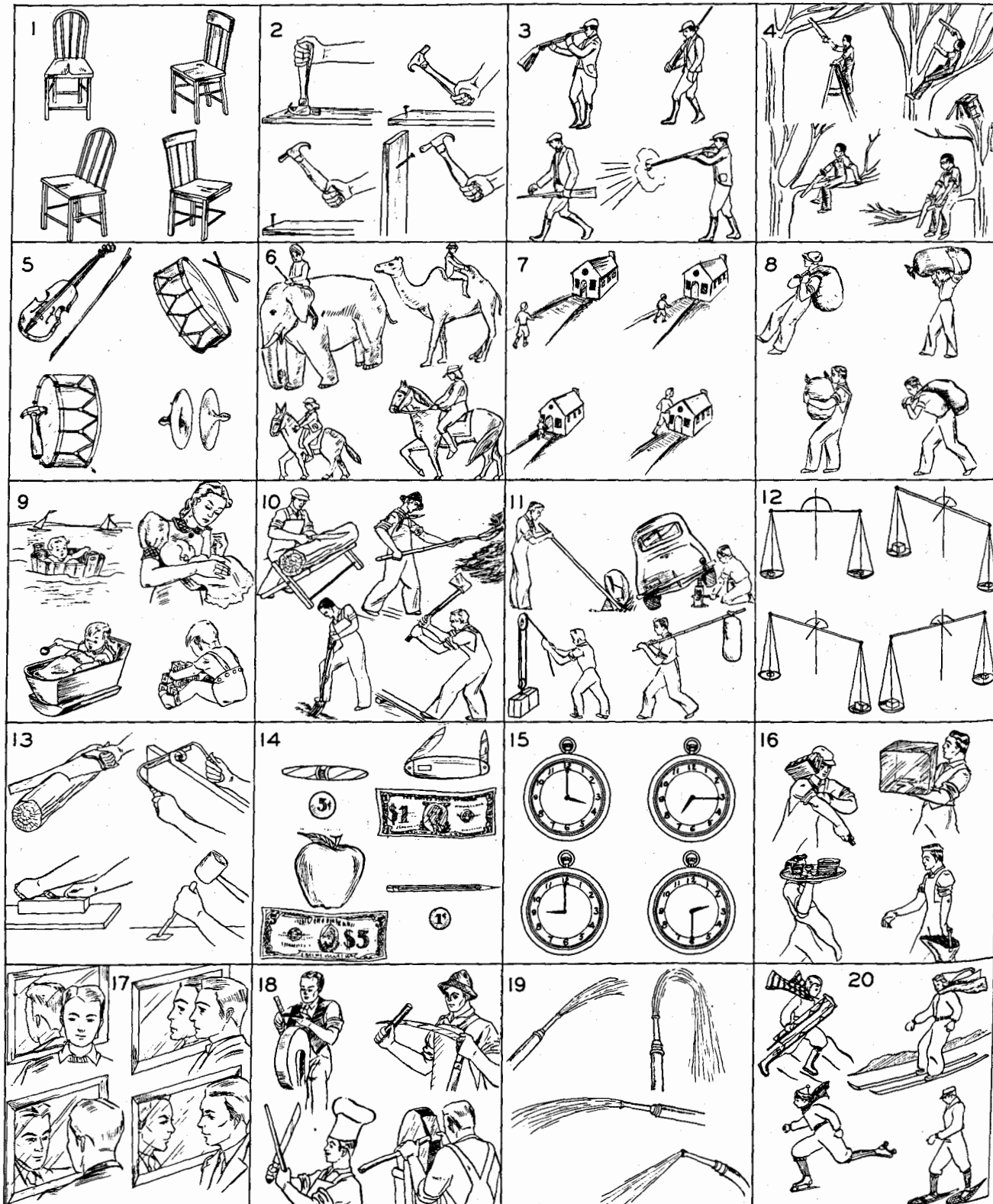


In each square mark the thing that is wrong

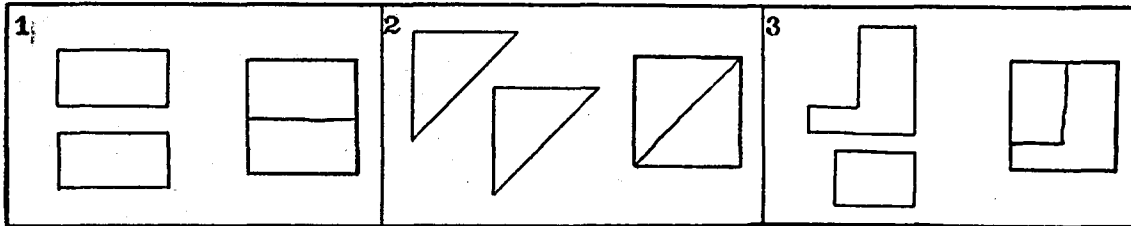


# TEST 3

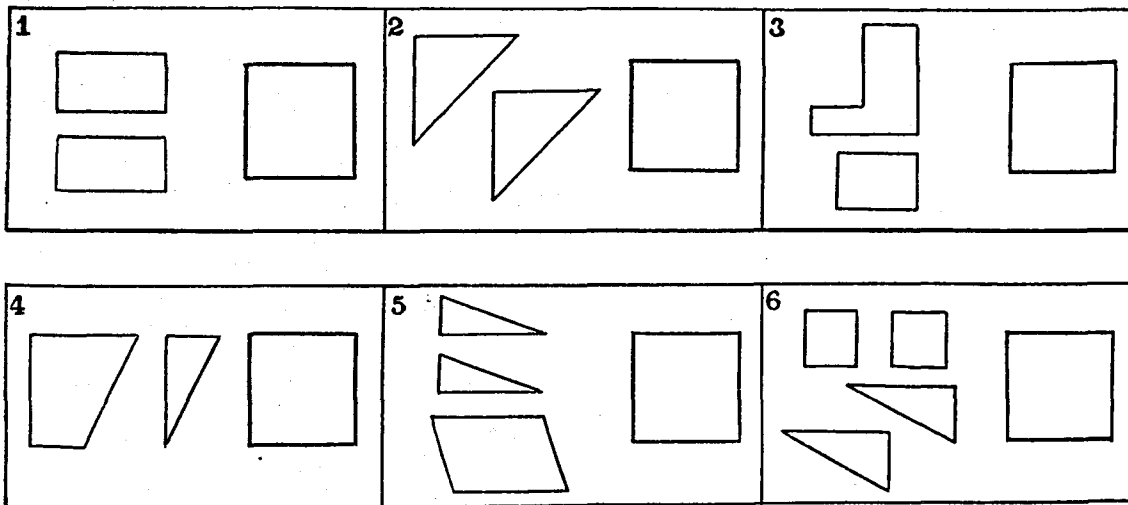
In each square mark the thing that is wrong



# EXERCISE 4



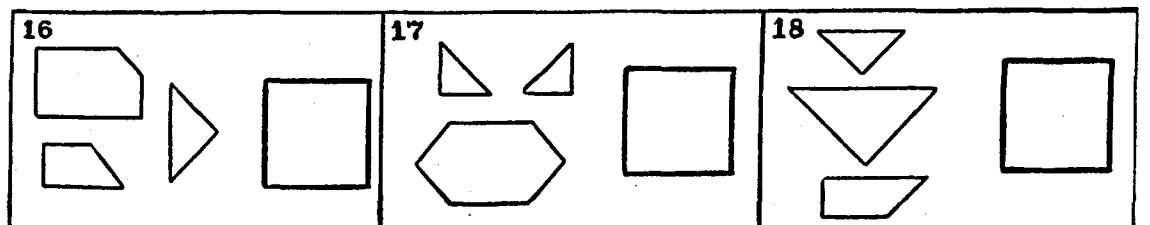
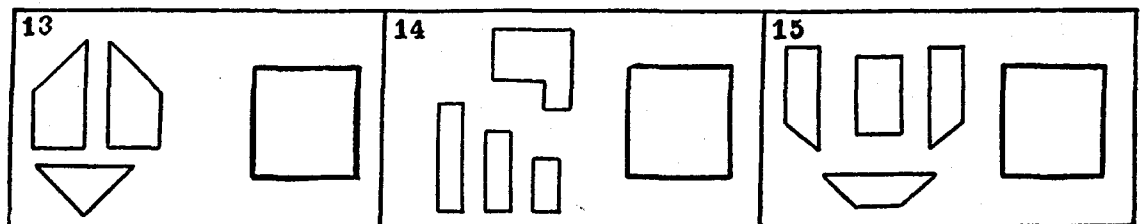
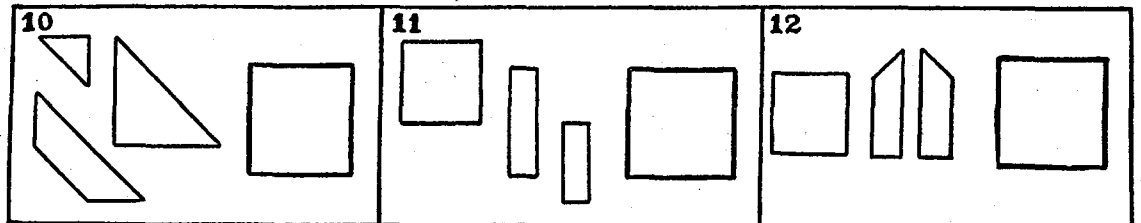
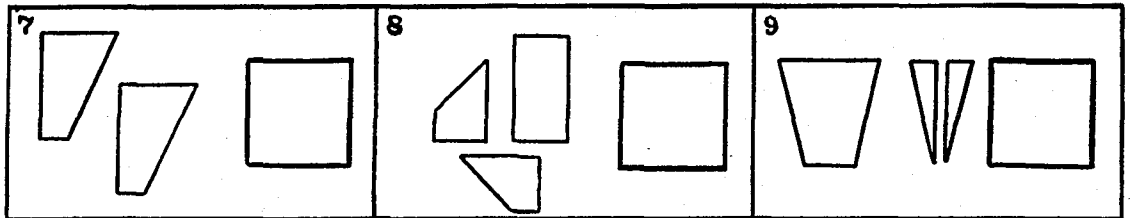
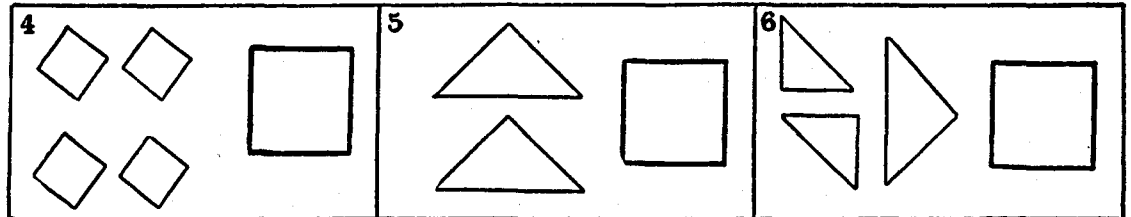
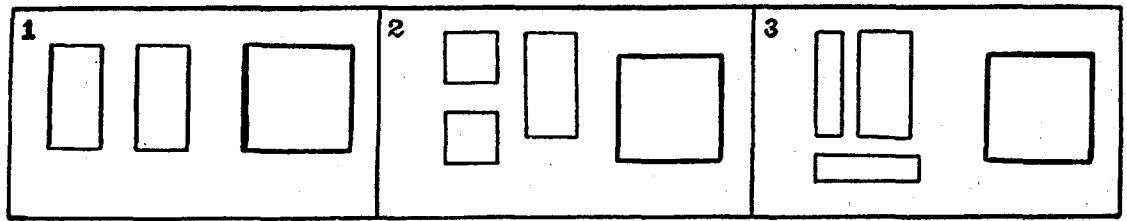
Mark each square to show how the pieces at its left will fit into it



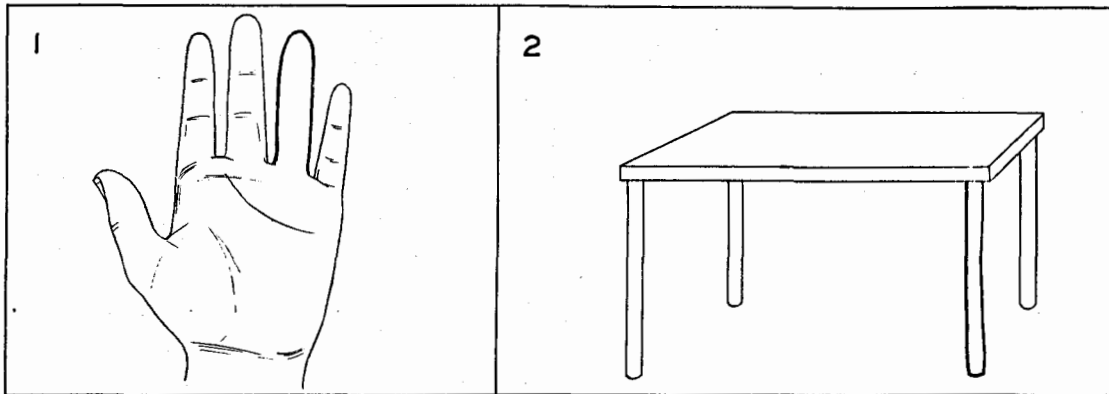


# TEST 4

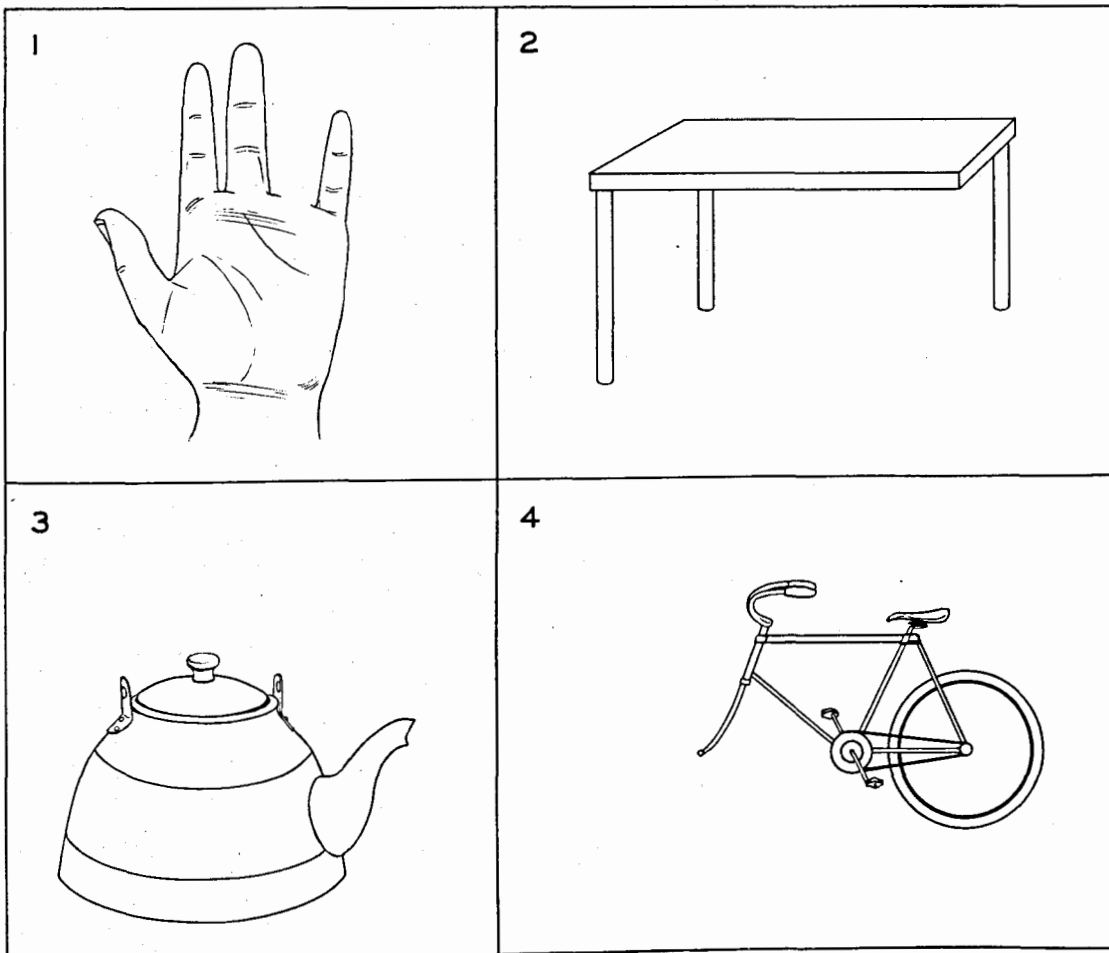
Mark each square to show how the pieces at its left will fit into it



# EXERCISE 5

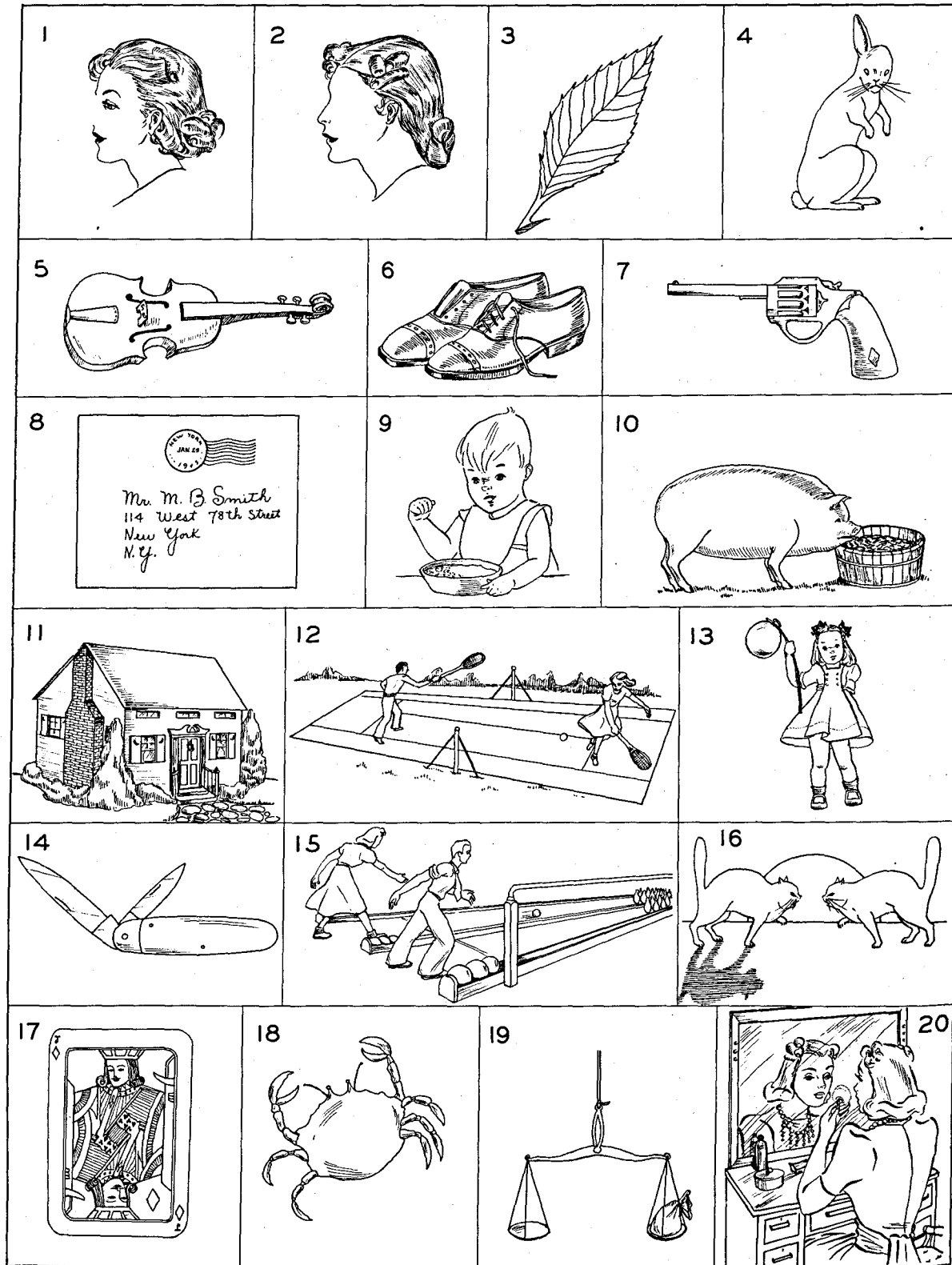


In each picture draw what is left out. Work fast

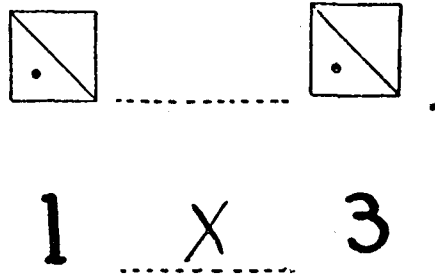
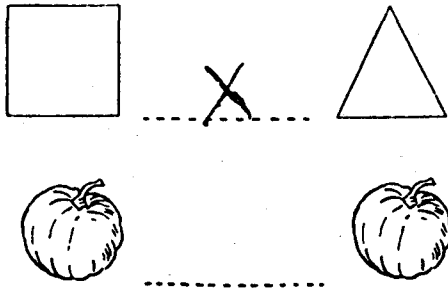


# TEST 5

In each picture draw what is left out. Work fast



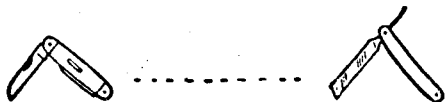
# EXERCISE 6



Look at each pair of drawings or numbers, and make a mark on the dotted line if they are not alike



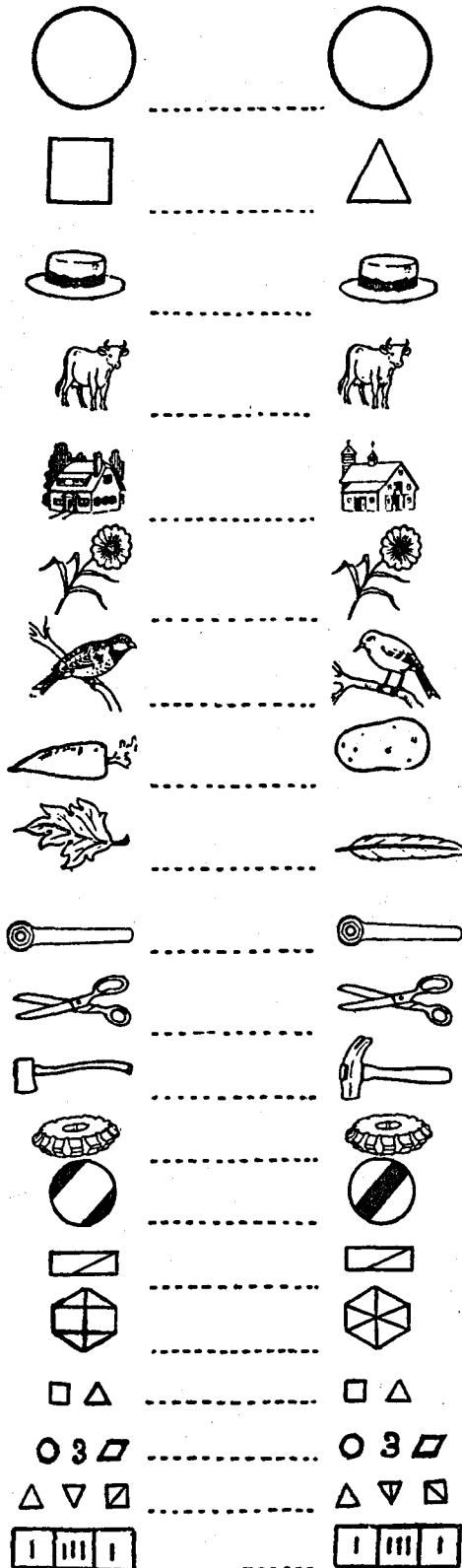
650 ..... 650



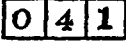
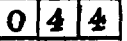


658049 ..... 650849

# TEST 6

Look at each pair of drawings or numbers, and make a mark on the dotted line if they are not alike



	.....	
	.....	
3281 .....		3281
55190 .....		55102
482991 .....		482991
1024858 .....		1024858
59021854 .....		59012584
888172902 .....		881872902
631027594 .....		631027594
2499901854 .....		2499901584
2261059810 .....		2261659810
2911038227 .....		2911038227
318377752 .....		318877752
1012988567 .....		1012988567
7166220988 .....		7162220988
3177628449 .....		3177682449
468672663 .....		468672663
9104529003 .....		9194529003
3484657120 .....		8484657210
8588172556 .....		8581722556
3120166671 .....		3120166671
7611848879 .....		76111845879
26557239164 .....		26557239164
8819002341 .....		8819002341
6571018034 .....		6571018034
38779762514 .....		38779765214
39008126557 .....		39008126657
75658100898 .....		75658100898
41181900726 .....		41181900726
6543920817 .....		6548920871

The *Directions for Examiners*  
which formerly appeared on this page  
are now included in the  
*Manual of Directions*

August 1943

# REVISED BETA EXAMINATION

PREPARED *by* C. E. KELLOGG, Ph. D.,  
Associate Professor of Psychology, McGill University.

ASSISTED *by* N. W. MORTON, Ph. D.,  
Lecturer in Psychology, McGill University.



## SCORES

Test 1	
Test 2	
Test 3	
Test 4	
Test 5	
Test 6	
Total	
Rating	

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522 Fifth Avenue, New York, N. Y.

PLEASE FURNISH THE FOLLOWING DATA AND MAIL TO:

58

Jos. L. Hendrick, 2401 Mechanicsville Pike  
FAIRFIELD ELEMENTARY SCHOOL, Richmond, Virginia

Classroom Teacher's Name: \_\_\_\_\_

PUPIL'S NAME NO. (BOYS)	BIRTHDATE			OCCUPATION OF FATHER (Or mother if father deceased)
	DAY	MTH.	YR.	
1.				
2.				
3.				
4.				
5.				
6.				

(GIRLS)

1.				
2.				
3.				
4.				
5.				
6.				

S T U D Y F O R M I.

CLASSROOM TEACHER'S NAME: \_\_\_\_\_

(BOYS)

1.				
2.				
3.				
4.				
5.				
6.				

(GIRLS)

1.				
2.				
3.				
4.				
5.				
6.				



[illegible]

A P P E N D I X   B

# SCHEDULE OF TESTS APPOINTMENTS

MAY, 1954

Experimental Schools			Control schools		
School designation	Gates Test Date	Beta Test Date	School designation	Gates Test Date	Beta Test Date
SCHOOL A <sub>e</sub>	May 11	May 19 & May 20	SCHOOL A <sub>c</sub>	May 12	May 21
SCHOOL B <sub>e</sub>	May 11	May 21 & May 24	SCHOOL B <sub>c</sub>	May 14 & May 17	May 24
SCHOOL C <sub>e</sub>	May 12	May 20	SCHOOL C <sub>c</sub>	May 13 & May 14	May 24

A P P E N D I X   C

## F O R M U L A E

## MEAN

$$\text{Mean} = \frac{\text{Sum of the Months}}{\text{Number}}$$

## S.D. OF THE DISTRIBUTION

$$\sigma = \sqrt{\frac{\text{Sum } M_1^2}{N} - M_1^2}$$

## STANDARD ERROR

$$\sigma_{M_1} = \frac{\sigma}{\sqrt{N - 1}}$$

## S.D. OF THE DIFFERENCE

$$\sigma_{\text{diff}} = \sqrt{M_1^2 + M_2^2}$$

ARITHMETICAL DIFFERENCE  
OF THE MEANS

$$D = M_1 - M_2$$

CRITICAL RATIO  
OR 'T' RATIO

$$\text{C.R.} = \frac{D}{\sigma_{\text{diff}}}$$

TABLE #V

## CALCULATION OF P (PROBABILITY)

AND

## COEFFICIENT OF MEAN-SQUARE CONTINGENCY

## FOR OCCUPATION OF PARENTS VS. READING AGE

FORMULA FOR 'P':

$$P = \frac{\text{Reciprocal of Column Total}}{\sqrt{\frac{\text{Cell quantity squared}}{\text{Row Total}} + \text{ditto, etc.}}}$$

$$P_1 = \frac{1}{16} \sqrt{\frac{5^2}{39} + \frac{4^2}{37} + \frac{1^2}{42} + \frac{4^2}{43} + \frac{2^2}{25} + \frac{0^2}{28}}$$

$$P_1 = \frac{.461 + .432 + .024 + .381 + .160}{16}$$

$$P_1 = .102$$

$$P_2 = \frac{1}{25} \sqrt{\frac{64}{39} + \frac{49}{37} + \frac{1}{42} + \frac{16}{43} + \frac{1}{25} + \frac{16}{28}}$$

$$P_2 = \frac{1.641 + 1.324 + .024 + .372 + .040 + .571}{25}$$

$$P_2 = .159$$

$$P_3 = \frac{1}{50} \sqrt{\frac{400}{39} + \frac{16}{37} + \frac{64}{42} + \frac{81}{43} + \frac{25}{25} + \frac{16}{28}}$$

$$P_3 = \frac{10.256 + .432 + 1.524 + 1.884 + 1 + .571}{50}$$

$$P_3 = .313$$

TABLE #V ( continued )  
 CALCULATION OF P (PROBABILITY)  
 AND  
 COEFFICIENT OF MEAN-SQUARE CONTINGENCY  
 FOR OCCUPATION OF PARENTS VS. READING AGE

$$P_4 = \frac{1}{85} \div \frac{36}{39} \div \frac{361}{37} \div \frac{529}{42} \div \frac{256}{43} \div \frac{100}{25} \div \frac{121}{28}$$

$$P_4 = \frac{.923 \div 9.757 \div 12.595 \div 5.953 \div 4 \div 4.321}{85}$$

$$P_4 = .442$$

$$P_5 = \frac{1}{38} \div \frac{0}{39} \div \frac{9}{37} \div \frac{81}{42} \div \frac{100}{43} \div \frac{49}{25} \div \frac{81}{28}$$

$$P_5 = \frac{.243 \div 1.929 \div 2.326 \div 1.960 \div 2.893}{38}$$

$$P_5 = .246$$

$$P = P_1 \div P_2 \div P_3 \div P_4 \div P_5$$

$$P = .102 \div .159 \div .313 \div .442 \div .246$$

$$P = 1.262$$

(Chi-Squared)

$$X^2 = N (P-1)$$

$$X^2 = 214 (1.262-1)$$

$$X^2 = 56.068$$

REF: TABLE #IV, pge.30

TABLE #V ( continued )  
 CALCULATION OF P (PROBABILITY)  
 AND  
 COEFFICIENT OF MEAN-SQUARE CONTINGENCY  
 FOR OCCUPATION OF PARENTS VS. READING AGE

Degrees of Freedom = Number of rows less one, times  
 Number of Columns less one.

$$df = ( r - 1 ) ( c - 1 )$$

$$df = ( 6 - 1 ) ( 5 - 1 )$$

$$df = 20$$

$$\therefore x^2(56.068) < 37.566 \cong P \text{ of } .01^*$$

COEFFICIENT OF MEAN-SQUARE CONTINGENCY

$$C = \sqrt{\frac{P-1}{P}}$$

$$C = \sqrt{\frac{1.262-1}{1.262}}$$

$$C = .455$$

A rough measure of the meaningfulness of a C of .455 is obtained from the following formula, suggested by Garrett:

$$\sigma_c = \frac{1}{\sqrt{N}}; \sigma_c = \frac{1}{\sqrt{214}}; \sigma_c = \frac{1}{14.628};$$

$$\sigma_c = .00007$$

$$\frac{C}{\sigma_c} = \frac{.455}{.00007} = 6500 \quad \text{Thus, } C \text{ is 6500 times } < \sigma_c.$$

Also, when  $C = .00$ ,  $\sigma_c = \frac{1}{\sqrt{1000}}$  or .03.

The derived C of .455 is 151 times  $< \sigma_c$ .

REF: TABLE #IV, pge.<sup>30</sup>

\*Garrett, op. cit., 3rd. ed., May, 1951, p.242, Table #XXXII.

\*\*Ibid., p. 360.



A P P E N D I X   D

# SCHOOL A, EXPERIMENTAL GROUP, MORNING-SHIFT

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R. Test)	Mental Age In Months (Revsd. Beta Ex.)	Occupational Classification Of Father
	M	F				
1	x		97	92	96	*W
2	x		93	102	99	W
3	x		98	111	78	P
4	x		94	86	106	M
5		x	94	112	78	P
6		x	95	105	96	W
7		x	97	106	87	W
8		x	102	106	108	P
9		x	91	111	87	P
SUB- TOTALS	4	5	$\Sigma M-861$ $\Sigma M^2-82,453$	$\Sigma M-931$ $\Sigma M^2-96,947$	$\Sigma M-835$ $\Sigma M^2-78,439$	

## \*Occupational Classification Symbols:

U--Unskilled; SS--Semi-skilled; S--Skilled; W--Clerical(White collar);  
M--Exec.-Mgr.; P--Professional.

THE FOLLOWING PAGES CONTAIN  
ABSTRACTS  
OF ALL STUDY FORM II  
WORKSHEETS

# SCHOOL A, EXPERIMENTAL GROUP, MORNING-SHIFT

Pupil	Sex		Chronological Age in Months	Reading Age in Months (Gates R. Test)	Mental Age in Months (Revsd. Beta Ex.)	Occupational Classification Of Father
	M	F				
1	x		99	99	82	W
2	x		93	97	94	P
3	x		93	96	94	P
4	x		99	90	89	M
5	x		96	97	80	M
6	x		92	94	72	W
7		x	95	97	78	P
8		x	98	102	77	P
9		x	93	102	96	W
10		x	96	101	99	M
11		x	99	101	96	P
SUB- TOTALS	6	5	$\Sigma M_1, 055$ $\Sigma M_2 - 101, 251$	$\Sigma M_1, 076$ $\Sigma M_2 - 105, 390$	$\Sigma M - 957$ $\Sigma M_2 - 84, 147$	

# SCHOOL A, EXPERIMENTAL GROUP, MORNING-SHIFT

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.Beta Ex.)	Occupational Classification Of Father
	M	F				
1	x		96	124	99	W
2	x		102	101	96	P
3	x		96	104	106	P
4	x		104	111	106	M
5	x		102	103	89	P
6		x	97	108	185	P
7		x	103	99	75	W
8		x	105	109	82	W
9		x	100	106	84	W
SUB-TOTALS	5	4	$\Sigma M-905$ $\Sigma M^2-91,099$	$\Sigma M-965$ $\Sigma M^2-103,905$	$\Sigma M-822$ $\Sigma M^2-76,040$	

# SCHOOL A, EXPERIMENTAL GROUP, AFTERNOON-SHIFT

Pupil	Sex		Chronological In Months	Age Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.Beta Ex.)	Occupational Classification Of Father
	M	F				
1	x		103	85	104	M
2	x		102	102	94	W
3	x		89	92	89	M
4	x		98	99	91	W
5	x		93	109	99	P
6	x		93	99	94	M
7		x	90	106	78	M
8		x	96	101	96	M
9		x	99	96	92	P
10		x	103	102	82	S
SUB- TOTALS	6	4	Σ M-966 Σ M2-93,562	Σ M-991 Σ M2-98,633	Σ M-919 Σ M2-84,979	

SCHOOL A, EXPERIMENTAL GROUP, AFTERNOON-SHIFT

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx.)	Occupational Classification Of Father
	M	F				
1	x		98	106	92	W
2	x		103	112	99	P
3	x		100	105	108	P
4	x		99	112	108	SS
5	x		99	111	109	M
6	x		93	103	80	P
7		x	96	111	99	P
8		x	103	111	109	P
9		x	92	120	91	P
10		x	94	116	96	W
11		x	94	99	94	P
SUB- TOTALS	6	5	$\Sigma M-1,071$ $\Sigma M^2-104,425$	$\Sigma M-1,206$ $\Sigma M^2-132,578$	$\Sigma M-1,085$ $\Sigma M^2-107,889$	

# SCHOOL B, EXPERIMENTAL GROUP, MORNING-SHIFT

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R. Test)	Mental Age In Months (Revds. Beta Ex.)	Occupational Classification Of Father
	M	F				
1	x		92	93	103	P
2	x		103	90	87	W
3	x		98	103	99	SS
4	x		100	102	94	W
5	x		97	96	97	P
6	x		95	90	97	S
7		x	95	92	91	U
8		x	106	124	78	M
9		x	92	94	89	W
10		x	98	93	89	W
11		x	94	101	89	P
12		x	99	99	78	S
SUB-TOTALS	6	6	$\Sigma M-1,169$ $\Sigma M^2-114,077$	$\Sigma M-1,177$ $\Sigma M^2-116,405$	$\Sigma M-1,091$ $\Sigma M^2-99,845$	



# SCHOOL B, EXPERIMENTAL GROUP, AFTERNOON-SHIFT

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Beta·Revsd.Ex.)	Occupational Classification
	M	F				
1	x		120	87	96	S
2	x		102	103	96	SS
3	x		100	96	89	W
4	x		102	97	94	W
5	x		98	136	97	S
6	x		94	103	92	U
7		x	106	101	91	W
8		x	98	92	89	W
9		x	99	99	85	U
10		x	93	93	80	SS
11		x	95	96	73	M
12		x	95	102	87	SS
SUB-TOTALS	6	6	$\Sigma M-1,202$ $\Sigma M^2-120,988$	$\Sigma M-1,205$ $\Sigma M^2-122,643$	$\Sigma M-1,069$ $\Sigma M^2-95,787$	

# SCHOOL B, EXPERIMENTAL GROUP, AFTERNOON-SHIFT

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.Beta Ex)	Occupational Classification Of Father
	M	F				
1	x		101	87	84	W
2	x		112	90	92	M
3	x		100	89	103	SS
4	x		100	102	87	S
5		x	94	97	80	S
6		x	91	97	91	P
7		x	95	97	75	S
8		x	93	94	92	W
9		x	93	96	60	M
10		x	99	105	104	P
SUB-TOTALS						
	4	6	$\Sigma M-978$ $\Sigma M^2-95,986$	$\Sigma M-954$ $\Sigma M^2-91,298$	$\Sigma M-868$ $\Sigma M^2-76,884$	

# SCHOOL C, EXPERIMENTAL GROUP, MORNING-SHIFT

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx)	Occupational Classification Of Father
	M	F				
1	x		104	112	92	M
2	x		97	103	89	P
3	x		97	104	99	M
4	x		92	90	91	M
5	x		98	97	104	W
6	x		91	92	89	S
7		x	98	92	84	W
8		x	94	93	92	W
9		x	94	96	91	W
10		x	93	127	113	M
11		x	90	90	97	U
SUB- totals	6	5	$\Sigma M-1,048$ $\Sigma M^2-100,008$	$\Sigma M-1,096$ $\Sigma M^2-110,500$	$\Sigma M-1,041$ $\Sigma M^2-99,183$	

# SCHOOL C, EXPERIMENTAL GROUP, AFTERNOON-SHIFT

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx)	Occupational Classification Of Father
	M	F				
1	x		95	92	85	M
2	x		95	130	84	W
3	x		101	94	109	SS
4	x		93	86	87	SS
5	x		101	87	104	S
6	x		96	84	85	U
7		x	96	84	74	U
8		x	97	89	87	S
9		x	107	86	87	S
10		x	98	102	109	W
11		x	96	104	108	S
12		x	95	87	77	U
SUB-TOTALS	6	6	$\Sigma M-1,170$ $\Sigma M^2-114,236$	$\Sigma M-1,125$ $\Sigma M^2-107,383$	$\Sigma M-1,096$ $\Sigma M^2-101,860$	

# SCHOOL B, CONTROL GROUP, NON - SHIFT CLASSES

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.Beta Ex)	Occupational Classification Of Father
	M	F				
1	x		96	85	77	SS
2	x		101	85	72	W
3	x		97	85	87	SS
4	x		92	85	92	W
5		x	100	84	73	S
6		x	92	85	92	S
7		x	96	85	104	S
8		x	94	92	89	SS
9		x	108	87	84	S
<hr/>						
SUB- TOTALS	4	6	$\Sigma M-1,002$	$\Sigma M-858$	$\Sigma M-871$	
			$\Sigma M^2-101,346$	$\Sigma M^2-73,664$	$\Sigma M^2-76,933$	

# SCHOOL B , CONTROL GROUP , NON-SHIFT CLASSES

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx.)	Occupational Classification Of Father
	M	F				
1	x		97	108	94	W
2	x		97	97	89	W
3	x		93	102	92	U
4	x		96	103	91	P
5	x		93	113	87	P
6	x		99	99	89	M
7		x	96	106	101	M
8		x	95	102	85	W
9		x	103	112	103	S
10		x	97	140	120	SS
11		x	93	103	91	S
12		x	94	97	85	S
SUB-TOTALS	6	6	$\Sigma M-1,153$ $\Sigma M^2-110,877$	$\Sigma M-1,282$ $\Sigma M^2-138,458$	$\Sigma M-1,127$ $\Sigma M^2-106,933$	

# SCHOOL B , CONTROL GROUP , NON-SHIFT CLASSES

Pupil	Sex		Chronologic al Age	Reading Age	Mental Age	Occupational
	M	F	In Months	In Months (Gates R.Test)	In Months (Revstd.BetaEx)	Classific ation Of Father
1	x		96	89	80	S
2	x		100	96	94	S
3	x		96	96	99	W
4	x		95	96	82	P
5		x	94	106	85	S
6		x	93	94	101	S
7		x	94	99	91	M
8		x	93	130	84	S
9		x	103	97	84	W
SUB-	4	5	Σ M-864	Σ M-903	Σ M800	
TOTALS			Σ M <sup>2</sup> -83,036	Σ M <sup>2</sup> -91,751	Σ M <sup>2</sup> -71,580	

# SCHOOL A , CONTROL GROUP , NON-SHIFT CLASSES

Pupil	Sex M F	Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEX)	Occupational Classification Of Father
1	x	103	92	82	SS
2	x	92	106	113	W
3	x	93	120	92	S
4	x	100	93	101	P
5	x	97	90	106	M
6	x	98	136	123	W
7	x	98	109	92	P
8	x	101	90	89	U
9	x	92	94	94	W
10	x	99	92	82	SS
11	x	94	102	97	P
12	x	97	94	91	W
SUB-TOTALS	6	6 $\Sigma$ M-1,164 $\Sigma$ M <sup>2</sup> -113 ,050	$\Sigma$ M-1,218 $\Sigma$ M <sup>2</sup> -125,866	$\Sigma$ M-1,162 $\Sigma$ M <sup>2</sup> -114,158	78



# SCHOOL A, CONTROL GROUP, NON-SHIFT CLASSES

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx)	Occupational Classification Of Father
	M	F				
1	x		106	102	94	S
2	x		99	103	104	W
3	x		92	99	101	P
4	x		93	99	70	W
5	x		95	84	82	SS
6	x		95	89	82	M
7		x	93	89	109	S
8		x	96	99	85	S
9		x	100	96	89	W
10		x	93	105	91	W
<hr/>						
SUB- totals	6	4	$\Sigma M-962$ $\Sigma M^2-92,714$	$\Sigma M-965$ $\Sigma M^2-93,555$	$\Sigma M-907$ $\Sigma M^2-83,509$	

# SCHOOL A , CONTROL GROUP , NON-SHIFT CLASSES

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx)	Occupational Classification Of Father
	M	F				
1	x		97	104	92	S
2	x		97	109	104	S
3	x		94	101	96	W
4	x		94	103	103	U
5	x		98	92	92	W
6	x		102	97	84	W
7		x	93	104	94	SS
8		x	94	108	106	U
9		x	100	97	97	W
10		x	96	102	87	S
11		x	96	101	74	W
<hr/>						
SUB-TOTALS	6	5	$\Sigma M-1,061$ $\Sigma M^2-102,415$	$\Sigma M-1,118$ $\Sigma M^2-113,874$	$\Sigma M-1,029$ $\Sigma M^2-97,151$	8

# SCHOOL A , CONTROL GROUP , NON-SHIFT CLASSES

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx.)	Occupational Classification Of Father
	M	F				
1	x		97	106	89	U
2	x		96	117	101	P
3	x		103	87	96	S
4	x		96	102	103	W
5	x		92	124	96	W
6		x	102	106	82	S
7		x	99	84	106	S
8		x	101	116	92	SS
9		x	107	86	94	SS
10		x	95	112	96	W
11		x	92	94	92	P
SUB-TOTALS	5	6	$\Sigma M-1,080$ $\Sigma M^2-106,258$	$\Sigma M-1,134$ $\Sigma M^2-118,798$	$\Sigma M-1,047$ $\Sigma M^2-100,103$	81

# SCHOOL C, CONTROL GROUP, NON-SHIFT CLASSES

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx.)	Occupational Classification Of Father
	M	F				
1	x		97	94	80	SS
2	x		97	106	82	P
3	x		100	87	92	SS
4		x	96	117	97	SS
5		x	93	97	89	S
6		x	102	104	101	S
SUB-TOTALS						
	3	3	$\Sigma M-585$ $\Sigma M^2-57,087$	$\Sigma M-605$ $\Sigma M^2-60,955$	$\Sigma M-541$ $\Sigma M^2-49,119$	

# SCHOOL C, CONTROL GROUP, NON-SHIFT CLASSES

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx.)	Occupational Classification Of Father
	M	F				
1	x		99	93	113	SS
2	x		94	103	94	U
3	x		97	86	89	S
4		x	94	89	77	S
5		x	100	85	84	S
6		x	98	89	87	S
7		x	98	87	68	S
SUB-TOTALS						
	3	4	$\Sigma M-680$ $\Sigma M^2-66,090$	$\Sigma M-632$ $\Sigma M^2-57,290$	$\Sigma M-612$ $\Sigma M^2-54,704$	

# SCHOOL C, CONTROL GROUP, NON-SHIFT CLASSES

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx)	Occupational Classification Of Fathers
	M	F				
1	x		92	102	106	W
2	x		98	96	115	M
3	x		92	90	91	S
4		x	101	103	97	W
5		x	100	97	66	S
6		x	95	106	80	S
<hr/>						
SUB-TOTALS	3	3	$\Sigma M-578$ $\Sigma M^2-55,758$	$\Sigma M-594$ $\Sigma M^2-58,974$	$\Sigma M-555$ $\Sigma M^2-52,907$	

# SCHOOL C, CONTROL GROUP, NON-SHIFT CLASSES

Pupil	Sex		Chronological Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx)	Occupational Classification Of Father
	M	F				
1	x		93	94	73	U
2	x		104	85	99	S
3	x		96	85	89	U
4	x		92	103	85	S
5		x	96	96	82	W
6		x	95	108	104	SS
SUB-TOTALS						
	4	2	$\Sigma M=576$ $\Sigma M^2=55,386$	$\Sigma M=571$ $\Sigma M^2=54,775$	$\Sigma M=532$ $\Sigma M^2=47,816$	

# SCHOOL C, CONTROL GROUP, NON-SHIFT CLASSES

Pupil	Sex		Chronologic al Age In Months	Reading Age In Months (Gates R.Test)	Mental Age In Months (Revsd.BetaEx)	Occupational Classification Of Father
	M	F				
1	x		97	97	92	SS
2	x		102	89	94	SS
3	x		112	85	82	U
4	x		98	92	97	W
5		x	95	97	75	M
6		x	97	106	87	S
7		x	92	85	85	S
SUB- TOTALS	4	3	Σ M-693 Σ M <sup>2</sup> -68,859	Σ M-651 Σ M <sup>2</sup> -60,889	Σ M-612 Σ M <sup>2</sup> -53,852	98



A P P E N D I X   E

SUM OF THE MONTHS (R.A.) ACCORDING TO OCCUPATION, SHIFT  
AND NON-SHIFT GROUP

No.	Profess.	Mgr-Exec.	Clerical	Skilled	S-Skilled	Unskilled	TOT.
1	97 103	96 104	96 97	87	93	99	
2	96 111	90 127	97 101	97	89	84	
3	99 112	96 101	92 130	97	94	84	
4	93 106	92 111	87 102	87	86	87	
5	96 111	85	94 102	89	103	92	
6	97 102	92	99 106	86	102	90	
7	96 101	99	90 116	90	112	103	
8	97 101	90	94 102	99	103		
9	105 104	86	93 102	92			
10	109 103	90	92 105	136			
11	112 108	97	93 106	102			
12	105 111	106	96 102	104			
13	103	101	92 124	102			
14	111	111	99 109				
15	120	124	94 106				
16	101	112	99				
Sub-totals	2910	2010	3117	1268	782	639	10726
1	96	99	85 106	84,89, 103	85 108	90	
2	93	99	85 136	85,85, 106	85	94	
3	99	90	97 103	85,89, 106	92	85	
4	94	89	96 105	87,87, 85	92	85	
5	103	96	97 101	85,97, 85	92	102	
6	113	97	94 101	97,112	84	103	
7	109	106	99 102	89,103	86	108	
8	102		96 124	96,106	94	106	
9	117		92 112	94,130	87	103	
10	106		97 102	89,120	93		
11			97 103	99,102	97		
12			92	90,104	89		
13			96	87,109	140		
14			94	84,102	104		
15			108	97,106	116		
16			102	86,104	117		
Sub-totals	1032	676	2922	3564	1661	876	10531
TOTALS	3942	2686	5839	4832	2443	1515	21,257

SOURCE: STUDY FORM II

A P P E N D I X F.

A SUBJECTIVE DISCUSSION  
OF OPINIONS  
GATHERED LARGELY FROM THE LITERATURE  
CONCERNING MORNING AND AFTERNOON SHIFT CLASSES

In view of the many and varied complaints of parents, teachers, and others against shift- or double-session classes, it might be well to examine these opinions briefly.

Double-assignment Shift Teachers and Fatigue Factors.

In 17 counties and ten cities in the State of Virginia,<sup>1</sup> teachers are burdened with double-shift assignments; that is, they teach both morning and afternoon sessions successively. They may be responsible for a job less well done as a

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<sup>1</sup>H. F. Gobbard, "Children On Double Shift---A State Studies The Problem," School Life, 36:19, November, 1953.

result of fatigue. Those teachers complain that they feel rushed and breathless each day, for there is not enough time for 'fundamentals', much less for enrichment subjects. A teacher instructing under these conditions would certainly be atypical if she did not lose some interest and spark, tend to be irritable, and less efficient as a teacher. It follows that children instructed under these conditions cannot fail to note and be affected by these attitudes of the teacher. There is little doubt in the writer's mind that teaching under these conditions soon becomes little more than 'keeping class'. As to the advantages of the morning over the afternoon shift, it is probably true that the teacher will likely be less fatigued in the early part of the day than later, and this factor will be reflected in the behavior of the pupils. However, under the previously described teaching conditions, the writer fails to see how instruction could be anything other than of an extremely poor quality, regardless of the time of day. Whether teaching in the morning or afternoon, the effects of cumulative fatigue are experienced throughout the day. Dr. Howard S. Bartley and Eloise Chute, Dartmouth Medical School authorities on fatigue say,<sup>2</sup> 'Both sickness and fatigue represent an

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<sup>2</sup>John Kord Lagemann, "You Only THINK You're Tired," Nation's Business, 42:44, June, 1954.

attempt to escape from a situation that has become too difficult to contend with.' This might be just the right shade of meaning to apply to the word 'fatigue' when it results from teaching double-sessions. From the standpoint of purposes of elementary education, a more untenable anti-thesis could hardly be found.

In response to the question, "Is it better for the morning or afternoon pupil?", the question resolves itself into a more or less academic discussion, for there is little to offer either morning or afternoon classes under the burdensome conditions of double-assignments.

#### Single-Assignment Shift Teachers

When the teacher instructs only one class each day, possibly assisting in another briefly, the situation may be entirely different from that just described. For here, the attitudes of the teacher will likely be substantially different. She may be responsible for the instruction of only 25 or 30 children, as compared with fifty or sixty for the teacher on double-assignment. Her workday may be hours shorter than the double-session teacher. Certainly, the time required for pre-planning, correction of papers, home visitation, parent conferences, etc., is much less. Under these circumstances, it is worthwhile to consider the merits of the morning vs. afternoon shift.

Morning classes, parents' attitudes. The writer chooses to leave, for the moment, a consideration of the optimum times for learning. Instead, the attitudes of parents in the case of afternoon shifts seems worthy of some consideration. It is probably reasonable to assume that most parents have attuned their lives to a regular-day program of activities; that is, they arise in the early hours of the day, complete various chores during the first half of the day, lunch around noon, work during the afternoon, dine in the evening hours, and retire during late evening. If this constitutes a more or less normal day for most parents, then shifts are an added burden to them, especially afternoon shifts. In the case of the morning shift, the child must arise somewhat earlier, in order to reach school at the required hour, generally from 8:00 to 8:30 a.m. In returning home, the child is less likely to be well supervised than would be the case if the school were not on shifts. Of course, the child returns home earlier when on morning shift, thereby requiring longer supervision by the mother or other attendant, in the case of working mothers. Then too, the child on shift seldom has the privilege of a hot lunch during school hours, for the close schedules do not allow the time. This means that the mother has that much less time for her own devices.

Teachers' attitudes. Furthermore, the teacher on shift has less time for parent conferences than a regular-day teacher, for she must observe the same contractual day as others, with the added burden generally of assisting the afternoon shift teacher. Shift teachers complain that there is not enough time for instruction, resulting in a perpetual feeling of being rushed.

Curtailed curriculum. Under these conditions, most administrators report that instruction tends to be bookish and three-R-centered. Homework assignments are seldom planned for remedial and review purposes, but tend to become an extension of the regular school day, offering the teacher a way in which to cover material which the shortened school day does not permit. Since it is true that the quality of learning is affected by the environment and atmosphere in which instruction is offered, then children in schools employing shift sessions often do not have the same opportunities for learning and all-round growth. In almost every study of shift programs that the writer has reviewed, and this is substantiated by his own research, the evidence shows that these schools are reading-writing-arithmetic centered. Proportionately more time and effort are devoted to the skill subjects than in regular-day schools. And it follows, of course, that less time is spent on the enriched curriculum.



Music, art and physical education are the areas most often neglected. Several teachers and principals complained that there was not enough time for dramatizations, rhythms and music as was needed. Little time is available for field trips, excursions, experimentation and similar activities. The benefits of group discussion are often lost. There is seldom time for plays or other highly creative activities. There seems to be little doubt that areas of social learning and skills are neglected. This is not to say that a shift program cannot, in large measure, achieve the objectives of elementary education. The purpose of this discourse is to point out some of the objections to shifts, and to show why many complain that children do not learn as well on shifts. Granted, more evidence is needed on the question of optimum times for learning--but the writer merely wished to emphasize that much evidence is already available concerning conditions conducive to learning, and that these are as worthy of consideration as the time of day in which instruction is offered.

Afternoon classes and pupil-teacher fatigue. Most of the objections to morning shift classes are valid with respect to afternoon classes, also, with the major additional complaint being that pupils have expended much of their energies in play at home before coming to school. As one principal in this study put it, the pupils on the afternoon shift are less

peppy and seem to have more trouble concentrating. Also, he pointed out that they were accustomed to having a nap in the afternoon before they came on the second shift, and they generally appear in need of a nap around the middle of the afternoon shift. Shift teachers seem to make this complaint more often than any other, that children are slower and are more difficult to motivate during the afternoon shift. Then too, many of the afternoon shift pupils have breakfast at the usual hour, but because of conflict with the beginning hour of the shift have an early lunch. This constitutes a problem to learning, in the opinion of some teachers. The writer suspects, however, that many of these complaints are based as much upon the teachers' own dissatisfaction with the shift-sessions as they are upon the pupils' reactions. In any event, the effect is equally undesirable.

Psychology of fatigue. Some of the studies in industry concerning the times of peak production, and supposedly optimum learning, are in conflict with one another. However, there seems to be rather general agreement concerning the nature of fatigue, which seems to constitute a major portion of the problem in afternoon sessions. As one psychologist states, 'The symptoms of fatigue do not manifest themselves at any given hour of the day, but are a function of the nature of the task and the conditions under which it is per-

formed.<sup>3</sup>

One rather interesting psychological experiment deals with the effect of sleep upon learning and retention.<sup>4</sup> Among other findings was the discovery that a period of sleep immediately preceding a learning session significantly impairs learning ability. The implication here is that learning sessions in the early hours of the day may not be as productive of learning as is commonly supposed. However, the evidence would have to be tremendous indeed in order to counteract the popular prejudices concerning what constitutes the optimum time for learning, mind-set on this point being so firmly established.

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<sup>3</sup>Henry Beaumont, The Psychology of Personnel. New York: Longmans, Green and Company, November, 1946, p. 172.

<sup>4</sup>Phillip Worchel and M. H. Marks, "Effect of Sleep Prior To Learning," Journal of Experimental Psychology, 42:313-16, November, 1951.

V I T A

## V I T A

The writer, Joseph L. Hendrick, was born on November 25, 1922 in Richmond, Virginia. He is the son of Marguerite E. and Frank G. Hendrick, parents of a family of eight children. He was educated in the public schools of Richmond, receiving a diploma of graduation from John Marshall High School in 1940

During his enlistment in the U. S. Army (7/42 through 11/45) he served with the Fifth Army as a Private First Class in the United States, Africa, and Italy.

In June, 1946 he entered the Richmond Professional Institute of the College of William and Mary and was graduated from that institution, receiving the Bachelor of Science Degree in June, 1950.

In August, 1948 he married Ruth H. Slaughter of Kenbridge, Virginia. They are the parents of a two-year-old daughter, Ruth Renee.

During 1950-51 he was employed by the Boeing Airplane Company, Seattle, Washington, as a parts buyer.

In 1951 he served as an instructor at the Tomlinson Technical Vocational Institute in St. Petersburg, Florida. From February 1952 through February 1953 he was enrolled in the Graduate School of Education at the University of Richmond.

Since that date he has been in the employ of the School Board of the County of Henrico, serving first as a sixth-grade teacher at Laurel Elementary School and then as principal of Fairfield Elementary School.

## V I T A

Joseph Lawson Hendrick was born on November 25, 1922 in Richmond, Virginia. He is the son of Frank G.(deceased) and Marguerite Coppridge Hendrick, and the seventh in a family of eight children. He was educated in the public schools of Richmond, receiving a diploma of graduation from John Marshall High School in 1940. From 1940-42 he accepted various clerical jobs.

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