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A Study of the Relationship Between the Intelligence Quotient and Reading Ability Before and After An Intensive Remedial Reading Program with Sixth Grade Pupils

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**A STUDY OF THE RELATIONSHIP BETWEEN THE INTELLIGENCE
QUOTIENT AND READING ABILITY BEFORE AND AFTER
AN INTENSIVE REMEDIAL READING PROGRAM
WITH SIXTH GRADE PUPILS**

By

Sister Mary Emma Cleary

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF MASTER
OF ARTS IN LOYOLA UNIVERSITY**

August

1945

VITA

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CHAPTER I

DEFINITION OF THE PROBLEM

The inconsistencies of intelligence quotients obtained for pupils who come under classroom jurisdiction, as compared with their ability in various branches of scholastic accomplishments, led to a desire to discover, in cases where reading ability had not developed normally, to what extent intelligence test scores obtained from a group mental test could be raised by an intensive reading program.

The importance of reading as a tool subject and its function in a group test is evident. The immediate effect of low reading ability in a test situation is the inability to respond to test items which demand reading; the long-time effect is the prevention of opportunities for vicarious experience, and the prevention of enjoyment usually derived from reading.

Retardation in reading is measured by the discrepancy between mental age and reading age. This retardation has an adverse effect on pupil scores in I Q tests. We can be reasonably certain of the accuracy of the I Q indicated by a low test score only if an intensive remedial reading program fails to result in a higher I Q test score.

If, after an adequate remedial program, the pupil's M.A. and R.A. are in agreement, the M.A. can be accepted as a valid

measure of his capacity (other things being equal).

The need for remedial reading became appallingly apparent in the results of the September tests given to a class of thirty-four sixth grade children, in which, as will be shown in Chapter IV, the great majority was found to be reading below the level of sixth grade. Poor, average, and superior pupils were among those rating below their mental ability; therefore, there was a wide field for accomplishment in remedial reading within this experimental group.

The problem of the thesis has been limited. No attempt has been made to prove or disprove the constancy of the I Q, or to establish the validity of previous I Q ratings for the students who participated in the testing and remedial reading program. Nor has any consideration or prognostic attempt been made regarding the constancy or inconstancy of the final I Q ratings for the members of the experimental group at the close of the remedial period, as compared with I Q ratings on any future testing programs with the same group, whether or not the remedial reading project is continued.

The results herein summarized and tabulated are reliable and indicative of accomplishment for this particular experimental group only, under the particular accompanying circumstances. The number of pupils (thirty-four) participating in the complete eight month's investigation and study was too limited in scope to justify any generalizations or predictions

to be looked for in similar future experiments. Additional studies in the field, substantiating the conclusions herein reached, would be necessary before a reliable conclusion could be accepted regarding the effect that the improvement in reading brought about by an intensive remedial reading program will have on a pupil's ability to rate well on a group test of mental ability, requiring the reading of every item before responding thereto.

The purpose of this study is: (1) To obtain the I Q's of thirty-four sixth grade pupils by means of a group intelligence test; (2) To obtain the Reading Ages of these pupils with a standardized reading test; (3) To institute an immediate remedial reading program for these students; (4) To re-measure the I Q's and Reading Ages of these students at the end of the first semester, and also early in May; (5) To determine the effect of gains in Reading Ages upon I Q test scores.

out. This results in the subject's mental age in many cases being the same as his reading age, and in all cases it causes it to be lowered because of reading disability. Even in such individual tests as the Stanford-Binet, the language disability will seriously affect the results because of such sections as the reading of a selection, the code tests, the vocabulary tests, the dissected sentences, on which he will fail before reading disability is removed, and pass easily after he has acquired normal reading skill.

Durrell's³ investigations indicate that even on individual tests such as the Stanford-Binet, the I Q of a reading disability case may be five or ten points too low because of the weight given to vocabulary, and the inclusion of one or two items requiring reading.

Witty and Kopel⁴ found that groups of poor readers generally achieve an average I Q five or ten points below that of the unselected groups. Thus the I Q appears to reflect, not only mental ability, but also reading ability to some extent. It also reflects experience, direct and vicarious, to which reading ability makes a significant contribution.

Studies of a large number of poor readers in the elementary and high schools show that about 90% of them have I Q's be-

³ Donald D. Durrell, Improvement of Basic Reading Abilities, World Book Co., New York, 1940, 332.

⁴ Paul Witty and David Kopel, op. cit., 228.

tween eighty and one hundred. Almost equal numbers fall in the categories eighty to ninety, ninety to one hundred, and one hundred to one hundred ten. These groups include about 75% of the total school population. These figures indicate that most poor readers are sufficiently bright to read satisfactorily, if appropriate and attainable goals are given to them, as well as proper motivation.

Greene and Jorgensen⁵ state that concepts such as language symbols, which are basic to reading, underlie all mental measurement, and make it apparent that mental tests do not in any direct way measure the pupil's native capacity to learn, or even to any great extent his ability to learn. As all the items must be read, they measure reading especially. When considered in relation to the individual's opportunity to learn, as well as to his rate of learning, they afford most indirect evidence on capacity.

Mental tests are incapable of securing a direct measure of capacity, unaffected by experience and training or the general native adaptability of the organism.⁶

However, vacarious experience gained through reading cannot be discounted.

⁵ Greene and Jorgensen, The Use and Interpretation of Elementary School Tests, Longsman, Green and Co., New York, 1939, 264.

⁶ Ibid., 265.

Stoddard⁷ asserts that a series of failures on the part of a child to learn the meaning of words, which is an essential reading skill, is frequently designated as a failure in "intelligence." Having failed to learn, the child rates low in an intelligence test, and this behavior is then considered by some persons as a sufficient reason for failing to learn in the first place. He is, therefore, branded as a "dullard" because of his poor reading.

For a culture that has employed and developed symbolic and language procedures, which become necessary for silent reading skills, it is important to include them in a mental test, since their omission from a mental testing program would distort all measurement and comparison.

It is stated by Carmichael that reading, which is the tool upon which most of our intellectual pursuits depend, is based upon concepts:

Human intelligence, considered realistically and pragmatically involves among other skills the capacity of individuals to manipulate concepts and use what may be called "intellectual tools."⁸

Freeman and Flory⁹ maintain that, when intellectual a-

⁷ George D. Stoddard, The Meaning of Intelligence, The Mac-millan Co., New York, 1943, 31.

⁸ Thirty-Ninth Yearbook, National Society for the Study of Education; "Intelligence: Its Nature and Nurture;" Part II, "Original Studies and Experiments," Public School Publishing Co., Bloomington, Ill., 1940, 446.

⁹ George D. Stoddard, op. cit., 183.

bility increases beyond early or middle adolescence, the objection is sometimes made that the later increase is not true intellectual growth, but the product of education. This includes reading, the tool subject of most of our educational pursuits.

Fernald¹⁰ mentions that Hegge and other investigators have shown that in cases where disability is due to mental deficiency, reading skill can be developed to the mental age level of the child by proper instruction and motivation. We have a great number of individuals who fail to learn under the most careful instruction by methods which are successful with the average child. A child of normal intelligence fails to learn because he cannot read well enough to prepare his work or to take his place in classroom pursuits that require reading. He receives a low rating on a group intelligence test, and while he may have normal intelligence, because he has not learned to read normally for his age, he comes out of high school classified as an academic failure, and barred from any further education.

The relation between vocabulary and I Q test scores is significant. Terman¹¹ states that the vocabulary test, which involves a major phase of reading ability, has a far higher value than any other single test of the scale, and probably

¹⁰ Grace M. Fernald, op. cit., 57.

¹¹ L.M.Terman, The Measurement of Intelligence: An Explanation of and a Complete Guide for the Use of Stanford Revision and Extension of the Binet-Simon Intelligence Scale, Houghton Mifflin Co., Boston, Mass., 1916, 230.

higher than any three other tests. Statistics show that in a large majority of cases the vocabulary test alone will give an intelligence quotient within 10% of that secured by the entire scale.

According to Stoddard¹² vocabulary contains:

(1) A measure which is regarded as an essential ingredient of intelligence at all ages from one year up. (2) A measure easily and reliably obtained. (3) A function that improves with successive age groupings.

This functional improvement is influenced and dependent upon reading of which vocabulary is an indispensable skill.

Jones and Conrad¹³ concluded that for children verbal factors, which involve vocabulary, general information, and reading comprehension, make the largest contributions to "intelligence".

In a comparison of twin brothers, Goodenough¹⁴ explains how the ability of the first lad to score well on intelligence tests was facilitated to some extent by the increase in vocabulary that came from his reading, and from specialized skills and knowledge of mechanical principles or similar matters that he developed as a result of his intellectual interests.

Joseph Miller¹⁵ concluded that twenty-three children out

¹² George D. Stoddard, op. cit., 111.

¹³ Ibid., 229-230.

¹⁴ Thirty-Ninth Yearbook, II, op. cit., 361.

¹⁵ Joseph Miller, "The Retarded Child and the Special Class," Educational Method, XI (February, 1932), 267.

of forty-eight in a special class scored low on intelligence tests because of poor environment and limited experience, which impoverished their vocabulary and the necessary conceptions for correct interpretation. Twenty-eight out of the forty-eight were able for their regular grade after one year of remedial reading instruction.

Harris¹⁶ remarks that adequate understanding of spoken language is necessary for normal progress in reading. While mastery of language is dependent on many other factors, such as intelligence, hearing, and home environment, children coming from homes of low cultural level do not have normal opportunities to develop an adequate language background. Foreign language in the home tends also to develop a small English vocabulary. When a great many even common-place words mean nothing to him, a child often finds it hard to progress in reading, even when he has normal intelligence.

In discussing the effect of Remedial Reading on Intelligence, Harris says that, while no radical changes in brightness should be looked for, the effective functioning of a child may improve, due to his improvement in vocabulary, enlargement of his range of knowledge, and as his interest in school increases. Even if these results are obtained, they may fail to show in in-

¹⁶ Albert J. Harris, How to Increase Reading Ability, Longsman, Green and Co., New York, 1940, 56.

telligence test scores, but they are very worth-while in themselves.

In Mr. Foster's study,¹⁷ which is discussed more at length in a later chapter, he points out that our chief approach to vocabulary teaching is abstraction. His two-year remedial program consisted almost wholly of vocabulary training. In a seventy-day period of similar intensive training in abstracting words, he found that the I Q scores were increased.

Dr. Coney¹⁸ used the same technique for a minimum of seventeen days. He secured an amount of improvement which was six times its own standard error, and therefore statistically significant. His plan involved training in both vocabulary and thought relationships, and included an application to non-readers through the use of pictures.

Otis's¹⁹ study of feebleminded girls over sixteen years (discussed more at length in a later chapter) showed that all tended to gain somewhat in I Q. Those who participated actively in this club made the most gains, and the improvement showed up in the vocabulary and language portions of the Stanford Revision.

¹⁷ W. J. Osburn, "What Next in Reading," The Elementary English Review, XVI (April, 1939), 142-146.

¹⁸ W. J. Osburn, op. cit., 146.

¹⁹ M. Otis, "Improvement of Feeble-Minded Girls over Sixteen Years of Age," Journal of Applied Psychology, 1929, 301-315.

Recently Terman and Merrill²⁰ claimed that they found the vocabulary test to be the most valuable single test in the scale. It has high interest value, a note of familiarity to the subject, and begins with words in common use and increases rapidly in difficulty, thus giving the examiner a rapid survey method of estimating the subject's ability. It corresponds to a high degree with the mental age rating on the scale as a whole. These correlations for single age groups range from .65 to .91, with an average of .81.

Reference is also made to the vocabulary and sentence structure sections of the Stanford-Binet test, stating that a child who has reading difficulties would do better if the tests of vocabulary and sentence structure were eliminated, but to eliminate them would damage the total validity of the scale.

Gilbert²¹ says that ability to maintain or increase vocabulary over the years is in itself a measure of a person's resistance to mental deterioration. Vocabulary, general information, and reading comprehension are factors which make the largest contribution to "intelligence".

Sorenson,²² like Jones and Conrad, will not concede the validity of the contribution of vocabulary to intelligence, al-

20 George D. Stoddard, op. cit., 302.

21 Ibid., 231.

22 Loc. cit.

though he postulates a relationship between mental exercise and mental ability.

The effect of remedial reading on the reading ages of children is another significant factor in this thesis. In regard to this matter, Durrell says:

The rapid gains made in remedial instruction are the result of adjusting the instruction to the child's learning rate, his interests, his confusions and incorrect habits. When this is done in the regular classroom, the need for remedial classes rapidly diminishes.²³

It is the aim of the Boston University Educational Clinic to bring about three years' average gain in reading achievement during a year's attendance. The gains from 1938 to 1939 for twelve pupils who received daily individual tutoring during the first semester, and small-group instruction during the second semester, ranged from two years to three years and eight months. The mental ages were based on a composite score made up of several tests.

Zirbes, Field, and Boney²⁴ have shown that in the elementary school gains in reading which resulted from individual reading were comparable to those resulting from class instruction, even without special remedial exercises for slow pupils.

Kirk²⁵ states that, apart from the reports of Hegge and Kirk, little work has been done with remedial reading for

²³ George D. Stoddard, op. cit., 231.

²⁴ Donald D. Durrell, op. cit., 75.

²⁵ Samuel A. Kirk, Teaching Reading to Slow-learning Children, Houghton, Mifflin Co., Boston, Mass., 1940, 168-169.

mentally retarded children. Monroe and Backus in their study of twenty-eight children (dull normals) from a vocational school in Washington, D. C., show an average gain of one-half year in one year's training, with average chronological age of fifteen years three months, average mental age eleven years ten months, and average I Q of eighty-one.

Hegge reports on thirteen mentally deficient children on whom Hegge-Kirk's remedial method was used. His data shows an average chronological age of thirteen years nine months, average I Q of seventy-five, number of lessons sixty-eight, months of training five and three tenths, progress one year two months.

From these results it appears that remedial training with mentally retarded children produces significant and satisfying results. The attainments of Hegge and Kirk show that mentally retarded children can profit sufficiently from remedial instruction, and that, after a beginning has been made, the children may be left to their own resources to continue the progress under classroom conditions.

Fernald²⁶ claims that in all cases included in her clinical studies, the learning process was normal or better when the kinesthetic methods described by her were used. A detailed study of the activities of these cases shows a normal learning curve, ending in normal reading and writing skills. The rate of

²⁶ Grace M. Fernald, op. cit., 144.

learning in all these cases was distinctly superior to the average, as can be seen from the number of grades of progress made in a few months.

In another place, Fernald claims that all disability in reading and spelling (except one case in spelling) was overcome by some form of hand-kinesthetic method.²⁷ Fernald claims normal or superior learning rate, and complete success as the end result in sixty-two cases of total reading disability.

Witty and Kopel²⁸ give a practical remedial reading program by Gates and Bennett. Under this program, pupils of average I Q of eighty-seven gained 7.68 months with thirty or more days of instruction, whereas 1.75 months would have been normal. Only 5% failed to show 1.75 months' gain. The pupils were the most serious reading problems in the school, and the teachers were not specialists.

Fitzgerald²⁹ and others demonstrated that the regular classroom teacher can and should be able to make rather expert diagnosis of children's abilities, interests, and special problems, and should be responsible for developing and applying modified instructional practices. Fitzgerald stated:

The classroom teacher generally can make the requisite diagnosis from the performance of the child on intelligence and reading tests, and her knowledge of his interests, habits, attitudes, and defects.

²⁷ Grace M. Fernald, op. cit., 144.

²⁸ Paul Witty and David Kopel, op. cit., 93.

²⁹ Ibid., 94.

According to Harris³⁰ it is common to find an improvement of a full year or more in reading ability as a result of a few weeks of intensive remedial instruction. Many remedial teachers consider their work ineffective if the pupil does not improve in reading ability at least twice as fast as normal pupils. In some cases, three or four years' gain was made in one. The amount and rate of improvement is related to the seriousness of the handicap, to the child's intelligence, and to the adequacy of instruction. Potentialities for marked improvement are present in average and superior readers, as well as in poor readers. Many studies have shown that paying attention to the improvement of reading in normal classes brings return in the form of more than average improvement.

Ansley³¹ reported a program used with an opportunity class of tenth grade pupils, in which extensive reading was combined with remedial exercises. All the pupils were two or more years below grade in reading, the majority had I Q's below 100, and all had racial and economic handicaps. The average gain as measured by Gates tests was 2.5 years.

Ansley's method was to have pupils read articles or stories they liked, and write brief impressions of them. A record of each pupil's reading was kept on a large chart. After

³⁰ Albert J. Harris, op. cit., 8.

³¹ Ibid., 369.

four weeks, thirty novels were introduced to the classroom, and the pupils chose the ones they liked, read and reported on them. Individual conferences were held during silent reading periods in which the special difficulties of individual pupils were treated.

Jacobson and Van Dusen³² tried their plan out with five ninth-grade classes, four of which were retarded in reading. Easy material of a wide range was used, and many forms of motivation. Work books, study-type readers, and finally grammar and literature of the required course of study were taken up in all but the lowest class. An average gain of 2.1 years was reported. This program put more emphasis on work-type reading, and less on free-reading than the study described above.

Fitzgerald³³ was given charge of one of three reading clinics set up in Chicago by Dr. W. H. Johnson. The work was done with 376 children in grades four to eight. 125 children were found retarded in reading from two months to more than four years. They were given remedial treatment according to the needs revealed by diagnosis.

Kuhlman-Anderson tests revealed I Q range from 70 to 110, with an average of 89.79. Two silent reading tests were used, the New Stanford for general level of reading achievement, and Gates Four-Type test. Utilization of teachers' observations

32 Albert J. Harris, op. cit., 368-369.

33 J. A. Fitzgerald, "A Diagnostic and Remedial Program in Reading," Educational Method, XVII (Feb., 1938), 221-225.

from day to day was even more important than any of these other factors.

Recreational and work-type reading was supplied for each child. Scores were kept and progress was made known. All methods and materials used pointed to one or more of the main aims in reading: (1) rich and varied experience; (2) strong motives for permanent interests in reading; (3) desirable attitudes and effective habits.

The work was done individually and in small groups. Fifty of the one hundred twenty-five were taught by special adjustment or remedial reading teacher in groups of approximately ten for forty minutes daily. Seventy-five were taught in the regular classroom in groups of about ten.

The children were tested again in January with a comparable form of Gates Four-Type Test. The average silent reading gain in about three and one-half months was 6.6 months for the 106 pupils who took the second test. Thirty pupils with average I Q's of 85.03, who were retarded 2.72 years in reading, made a gain of 7.03 months in 3.5 months; forty-five pupils with 88.2 I Q, retarded 1.45 years, made a gain of 6.9 months; and thirty-one, with .61 year's retardation, with I Q of 93.4, made a gain of 4.65 months. Thus it appears that children handicapped the most, who had the lowest I Q's, made the most gains in reading.

Failure in reading is likely to mean failure in the child's whole educational life. It means a shortening of schooling. It means going into work of a lower level. It means wrong attitudes of many kinds. It often definitely means development of poor citizenship. Any measures

which may prevent some of this social loss will certainly pay to a degree too great to be measured.³⁴

Research in similar studies has revealed that many accounts are to be found in current literature relating to remedial reading programs, and to studies concerning intelligence quotients. A number of experiments have been written which illustrate the relationship existing between pre-school test ratings and later test results, concerning the differences brought about from unstimulating backgrounds to stimulating ones, and from poor schools to those which are equipped to offer an enriched curriculum, although no study identical to the present one was found.

But as we read in the Thirty-Ninth Yearbook I,³⁵ experiments carried on for the sole purpose of raising the I Q have been relatively rare.

Experiments which were brought about by better schools, or improved environment, may be made more comparable to the present study by the consideration that better attitudes, cooperation of the home, ability groupings, small group and individual work, material of proper level and interest, have all helped to bring a superior school setting into the regular classroom, and

³⁴ E. W. Dolch, A Manual for Remedial Reading, The Garrard Press, Champaign, Ill., 1939, 150.

³⁵ Thirty-Ninth Yearbook, National Society for the Study of Education, "Intelligence: Its Nature and Nurture"; Part I, "Comparative and Critical Exposition," Public School Publishing Co., Bloomington, Ill., 1940, 28.

have also changed the environment of the child by opening up new avenues of interest, leisure-time pleasures, and friends in good books.

Wellmen³⁶ says that everything that has an effect upon the development of intelligence is environmental, unless it is carried in the genes.

The following experimental studies have significance in the light of the present study.

Sherman D. Scruggs,³⁷ in his doctor's dissertation, "Effect of Improvement in Reading upon the Intelligence of Negro Children", describes an experimental group of 101 pupils of the fifth grade, distributed in ten classes in six different elementary schools in Kansas City, Kansas. His data indicates that reading exercises effected an improvement in the reading ability of the pupils; that improvement in reading effected an improvement in the behavior reactions of these children; and that change in intelligence status was maintained with a marked degree of constancy.

Mr. W. T. Foster³⁸ of the Campbell Hill School conducted a two-year remedial program consisting mostly of vocabulary training. Two of his pupils at the close of the experiment

36 Thirty-Ninth Yearbook I, op. cit., 24.

37 Sherman D. Scruggs, "Effect of Improvement in Reading upon the Intelligence of Negro Children." (unpublished Doctor's dissertation, University of Kansas, Lawrence, 1935), 45.

38 W. J. Osburn, op. cit., 146.

21

averaged more than two years in advance of the reading norms, as given by the Unit Scale Test. The poorest was one year in advance of the norm, and the two best ones were three and one-half years in advance, vocabulary training likely playing the major role in these results. One sixteen-year-old girl, with a mental age of ten measured by Otis, later made 96 I Q on the Kuhlman-Anderson and Otis Classification Tests. She maintained B and C grades in her high school subjects. The influence of vocabulary training seemed to be significant in her case.

A seventy-day period of intensive training in abstracting words was made in order to see if a similar improvement would occur in the mental ages of other pupils. The results showed that the twenty-one pupils involved made an average increase in I Q of two-tenths of a point as measured by the Kuhlman-Anderson Test. The McCall Intelligence Test was given before and after the seventy-day period of vocabulary training. As only one form of this test exists it was repeated at the end of the training period. The McCall Multo-Mental Test was also given, and the results yielded an average almost the same as the McCall Test results given after seventy days.

Mr. Foster gives his results as mental ages. They indicate very great changes, ranging from two months to fourteen years and five months.

He concluded that the results given in Table I of his

study are likely to be genuine, in spite of the tremendous gains shown by some of the pupils. No general measure of the amount of improvement in reading which took place during this seventy-day period, covered by Table I, was made; however, one pupil was known to have increased her reading achievement four years during that time.

All this improvement was achieved in a schoolroom that contained five grades. This fact indicates that the program is possible even under adverse circumstances. . . .³⁹

Helen Dawe⁴⁰ has reported an improvement in the language ability of children in the Davenport Orphanage in relation to an intensive educational program. This program emphasized the understanding and use of language symbols, training in the understanding of words and concepts, looking at books and pictures, listening to poems and stories, and going on short excursions. Words were made meaningful.

The experimental group made an average gain of fourteen I Q points while the control group lost two points in average. The experimental group also made a significant gain in vocabulary. The form M of Stanford-Binet was used for the final testing. This does not include a vocabulary, which is significant.

The experiment had provided the orphans with the give-

39 W. J. Osburn, op. cit., 146.

40 George D. Stoddard, op. cit., 378-379.

and-take informational contact between child and adult, which they usually lack.

In the Thirty-Ninth Yearbook II, the following summary is given of Stoddard and Wellman's study:⁴¹ They state that changes in the I Q's of high-grade feeble-minded and dull-normal children, who have been introduced to special training programs, have been reported by Otis, Resden, and Kephart.

Otis studied the changes brought about by reading in the I Q's of feeble-minded girls in a state school, whose median I Q was 68, and whose medial life age was 24.

Twenty-five girls joined a reading club and made written reports of books read. When five books were completed a certificate was issued. Fifteen girls received five or more certificates; their gain in I Q was 7.2 points. Ten girls received 0 to 4 certificates; their gain in I Q was 5.6 points. Fifteen girls not in the reading club made a gain of 4.8 points. Otis concluded that training in reading and book work affected the results of the Stanford-Binet tests, and that improvement in I Q was possible for some cases after the age of sixteen years.⁴²

Milton J. Cohler's article⁴³ summarizes a study of the effect of an enriched environment upon the I Q's of children. Changing to better schools was the method. Wellman found changes in I Q's in a genetic study of individual children who attended a superior type of school. Growth in I Q was rather

41 Thirty-Ninth Yearbook, II, op. cit., 422.

42 Loc. cit.

43 Milton J. Cohler, "Some Educational Implications of the Changing I Q," Educational Method, XIX (November, 1939), 113-117.

general, with one 55-point increase being recorded, and gains 20 points being rather common. However, he does not attribute all of this gain to the school alone, but to better housing, a other environmental improvements which exercised a beneficial effect on the I Q.

In the same article from which the above study was taken Cohler tells about Dawson's study which dealt with a slight change in environment over a short period of time. Cohler closes his summary as follows:

Summing up this brief resumé of a few of the more important studies concerned with the influence of environment on intelligence test performance, it appears likely that control of the environment can exercise a significant influence on intelligence. Heredity thus fixes limits through which environment can be effective, and recent studies in the field of intelligence suggest that those limits are broad.⁴⁴

Joseph Miller⁴⁵ gives the I Q's of children who were low, and also their academic standings, although teachers and psychologists who studied them thought they were of normal mental capacity. We find in his article the following quotations which are significant in the light of the present study:

During the present study it was found that 23 children out of 48 members of the special class were scoring low on intelligence tests because, due to their environment and limited experience they lacked the vocabulary solutions.⁴⁶

44 Ibid., 116.

45 Joseph Miller, op. cit., 267.

46 Loc. cit.

Harris⁴⁸ and others seem disinclined to agree with the theory that I Q's can be raised by remedial reading. Harris claims that, while no radical changes in brightness should be expected from remedial instruction, the effective functioning of a child may improve as his vocabulary enlarges, his range of knowledge expands, and his interest in school work increases. These results are worth-while in themselves.

"Teachers should not make the mistake of labelling a child dull because his reading and other school work are poor."⁴⁸

Cattell⁴⁹ found that the bright I Q's were higher, and the low I Q's were lower after three to six years. He says that it may be due to the fact that the bright child finds more opportunities to acquire that type of information which aids in successfully passing the Binet tests than the older child of the same mental age. There is also the greater interest in reading of the bright child, and the lesser interest of the dull child, which may be an influencing factor.

Pritchard, Horan, and Hollingworth⁵⁰ report complete inability to raise the I Q's of dull children in special classes even by the most stimulating program that they were able to provide. Hollingworth failed to raise the learning ability of gifted children at 130 I Q to the learning ability at 160 I Q

48 Albert J. Harris, op. cit., 135-136.

49 P. Cattell, "Constant Changes in the Stanford-Binet I Q," Journal of Educational Psychology, XXII (1931), 544-550.

50 Thirty-Ninth Yearbook II, op. cit., 465.

under a special class program that probably had no equal in the country.

Bernice L. Storey,⁵¹ in her Doctor's dissertation, "Analytical Appraisal of a Remedial Program in Reading for Pupils with an I Q 90 and Below," deals mainly with the effects of a three-year remedial program in silent reading comprehension, with a group of 208 pupils from third to sixth grade, having I Q's of 90 or below, in order to determine the relative worth of different methods of teaching comprehension. However, in her concluding remarks she states that success of the program, brought about by the use of varied methods of improving comprehension, rather than any one type, resulted in gain in both reading age and mental age, although reading age advanced more rapidly than mental age.

In evaluating and summarizing the studies referred to in this chapter, it can be concluded that reading is recognized by authorities in the field as an important phase of intelligence testing where group tests are employed. Most authors, although not all, agree that a remedial reading program will result in higher I Q scores on group intelligence tests, while vocabulary training is considered by many as the most influential single phase of such a reading program.

Few experiments have been carried on for the sole pur-

⁵¹ Bernice L. Storey, "Analytical Appraisal of a Remedial Program in Reading for Pupils with an I Q 90 and Below." (unpublished Doctor's Dissertation, University of Pittsburgh, Pittsburgh, 1936), 56.

pose of raising the I Q through improvement in reading. Those studies cited above indicate that such improvement has been and can be made with bright, average, and dull children, up to the point where ability and accomplishment meet, and that beyond that point, instruction in reading does not change I Q test results, but merely improves reading ability.

Significant comparisons between the above references and the present study will be made in the following chapters.

CHAPTER III

THE TECHNIQUES USED IN THIS STUDY

The Otis Quick-Scoring Mental Ability Tests, Beta A and Beta B¹ and the Otis Self-Administering Test of Mental Ability, Form A (Intermediate)² were used in this experimental study.

The Otis Quick-Scoring Mental Ability Tests, Beta A and Beta B, are designed for grades four to nine. They are revisions and extensions of the Intermediate Otis Self-Administering Tests of Mental Ability, which were modeled after a group test of mental ability designed by the author in January, 1918, for use in a large commercial establishment in Connecticut. This test consisted of a list of questions printed with directions and provision for answers in single columns. The author, Arthur S. Otis, Ph.D., was formerly development specialist with advisory board, General Staff United States War Department. He was one of the earliest authors of successful mental ability tests, keeping closely to the ideas of the Binet tests.

Two significant features of the Otis Quick-Scoring Mental Ability Tests are the ease of administration and of scoring which provide for great economy of time, and little training on

1 A.S. Otis, The Otis Quick-Scoring Mental Ability Tests, The World Book Co., New York, 1939.

2 A.S. Otis, The Otis Self-Administering Tests of Mental Ability, The World Book Co., New York, 1922.

the part of the examiner. All that is required on his part is to distribute the blanks and to see that all the pupils understand the printed directions. The scoring is so simplified as to require less than a minute for one examination. No arithmetical calculations are necessary to figure the I Q's. A chart is provided, on which the I Q of a pupil can be found directly from the score and age in years and months, by locating a point on the intersection of two lines, or by locating the score equivalent for the child's chronological age on a table in the manual, finding the deviation between this and the obtained score. If the obtained score is larger than the chronological score, the deviation of scores is added to 100, and if smaller, it is subtracted from 100 to obtain the Beta I Q.

The author of the Otis tests uses the term "I Q" only in its original significance. Beta I Q's are less dispersed than I Q's obtained by the division method used in most mental group tests. In the following pages, a comparable study will be worked out showing this difference. As will be seen, the Beta I Q's tend to be somewhat nearer to 100. According to the Otis manual for the Beta tests: ". . . the above method is recommended as yielding measures of brightness that are more consistent and constant for a given individual than ordinary I Q's."³

Arthur Otis's Tests are closely correlated with the tests of Dr. Terman. The Stanford-Binet tests, like his own, give

³ A. S. Otis, Manual of Directions for Beta Tests, World Book Co., New York, 1937, 9.

I Q's distributed very closely in accordance with the law of normal distribution, with 50% within the range from 92 - 108.

The Otis Quick-Scoring Mental Tests contain eighty questions, folded in such a way that the test can be opened out and scored as one sheet. The Otis Self-Administering Test of Mental Ability contains seventy-five questions which must be checked page by page. All questions in both tests require the pupil to read before he can make a response.

A lengthy discussion of validity and reliability is beyond the scope of this thesis. All that is attempted here is to define them briefly, and to indicate the degree to which they exist in the tests used, as indicated by competent authority.

A very simple way of defining the validity of a test is: "the degree to which it serves its purpose."⁴ The purpose of the Beta test is to find the degree of brightness of a pupil by obtaining some measure, such as I Q, to indicate the probable rate of progress he will make in school; therefore, it follows that actual rate of progress through school is the most appropriate criterion of the validity of the Beta Test.

This method was used to determine the validity of the Otis Self-Administering Test, and the Otis Quick-Scoring Mental Test. As the rate at which a student can progress through school is predicted by the mental-ability test, it is therefore believed also to be the best criterion by which to judge the

⁴ Ibid., 10.

validity of each item that goes into the test. Each item justified its inclusion in these tests by distinguishing between students who progressed slowly and those who progressed rapidly.

The reliability, or degree of precision with which a test measures what it measures, for the Otis Quick-Scoring Mental Ability Tests for grades four to nine combined, has a coefficient of correlation of .96. This figure is a statistical expression of the consistency of the performance of the test, and is an indication of the reliance which may be placed on scores obtained from its use. Chance factors such as temporary physical disturbances, fatigue, etc., affect the consistent reaction of individuals, and thus lower the reliability of the results. This can be eliminated to some extent by having the test period long enough. The Otis tests allow one half hour.

Another measure of reliability is the probable error of a score. By this is meant the median amount by which any pupil's actual score differs from his true score. As given in the manual, the probable error for Otis Quick-Scoring Tests A and B is: 50% between 0 and 2.7; 16% between 5.4 and 8.1; 32% between 2.7 and 5.4; and 2% over 8.1. This means that a pupil's score will be in error only between these points in the corresponding percentage of cases. The probable error for Otis Self-Administering Test is 2.85 for Form A, and 2.78 for Form B. These P.E.'s are also applicable to the I Q's found by these tests.

The higher the reliability coefficient of a test, the smaller is the probable error of the score, expressed in terms

of the test scale. It is necessary to know the coefficient of reliability in order to express the reliability of measurement, or the probable error of a test score.

The Otis tests were chosen for the testing program because reading of the study-type is involved in every question. Before an answer can be determined, the question must be read and comprehended. Besides this, the test is recent enough to have been influenced by modern research in the testing field, and the author's work in mental testing comprises years of valuable experience. The tests were highly recommended to us by experts, and also by the publishers. According to the manual of the Iowa Silent Reading Test which was also used, the Otis Test and the Iowa test, "naturally correlate rather well."⁵

As Beta C was not ready for publication, Form A of the Otis Self-Administering Test of Mental Ability was substituted upon the publisher's recommendation. It was used in the January testing. It also has high validity and reliability, and high correlation with the Otis Quick-Scoring Tests which are revisions and extensions of this test.

The Iowa Silent Reading Tests, New Edition,⁶ by H. A. Greene, director of the Bureau of Educational Research and Service of the University of Iowa, and V. H. Kelley, of the

⁵ H. A. Greene and V.H. Kelley, Elementary Test: Manual of Directions, for Iowa Silent Reading Tests, World Book Co., N.Y., 1939, 2.

⁶ Loc. cit.

University Appointment Office, University of Arizona, Tucson, Arizona, are available in four forms, AM and BM, Revised, 1939, and CM and DM, 1943. The first three-mentioned forms were used in the present classroom testing program. The four comparable forms extend the usefulness of the tests. The new manual (1943) is revised and extended so as to be used with all four forms. There is a new arrangement of sub-tests in the newest forms, a new system of standard scores, revised and extended tables of norms, improved methods of scoring and interpreting the tests, and additional suggestions for remedial treatment of poor readers, all of which are explained and discussed in the manual.⁷

The Iowa Silent Reading Elementary Test is designed to measure the silent reading ability of pupils in grades four through eight in doing reading of the work-study type. This test represents:

. . . an effort to go beyond the ordinary general survey of a single phase of silent reading ability. The test is designed to cover a wide range of the skills indispensable to effective reading of the work-study type. The test measures three major aspects of silent reading ability: namely, (1) Rate of Reading at a Controlled Level of Comprehension, (2) Comprehension of Words, Sentences, Paragraphs, and Longer Articles, and (3) Ability to Use Skills Required in Locating Information.⁸

Each of these fields is covered in a number of different ways by

⁷ H. A. Greene and V. H. Kelley, Elementary Test: Manual of Directions for Forms AM (Revised), BM (Revised), CM and DM, for Iowa Silent Reading Tests, World Book Co., New York, 1943, 2-15.

⁸ Loc. cit.

means of eleven different types of test material arranged in six sub-tests, and requiring a total testing time of forty-nine minutes.

The validity of tests can be established by using the judgment of the teacher or of competent authority as the criterion. According to Greene and Jorgensen,⁹ the Iowa Silent Reading Test, Elementary Examination (1933), was validated in terms of qualified authorities. A comparison of the list of skills measured by the Iowa test with the major objectives of reading instruction given in the manual, shows with what exactness the test parts have been paralleled with these objectives of reading. The validity of this examination rests on the exactness of this parallelism, as the validity of a silent reading test is determined by the extent to which it measures the desirable skills in silent reading as recognized by specialists in this field.

The more nearly the test situation reflects the actual situation in life the more valid it becomes as a measure.¹⁰

In regard to the reliability of the Iowa Silent Reading Test, its forty-nine minute timing period removes it from the range of doubt cast upon general survey tests which limit their sampling to one period of two, five, or even ten minutes.

⁹ H. A. Greene and A. N. Jorgensen, The Use and Interpretation of Elementary School Tests, Longsman, Green and Co., New York, 1939, 108.

¹⁰ Ibid., 109.

The four elementary forms, AM, BM, CM, and DM, with their scores converted to AM, show a reliability coefficient of .93 for the median of total reading ability, with a standard deviation of 12.1, and a probable error of 2. This information is also given in the manual for each subtest for each of the grades the reliability data being based on Kuder-Richardson Formula 21 for the total 1942 Iowa Silent Reading National Standardization Population.

The reliability of the test was measured by correlating the odd-numbered items, and correcting the coefficients by the Spearman-Brown formula, in order to get an estimate of the whole test rather than the half. In both the sixth grade reliability coefficients and the total 1942 coefficients, all four forms of the test entered equally random fourths of each testing unit, and converted them to AM equivalents for the reliability calculations.

The 1939 manual gives the reliability coefficient for forms AM and BM for correlation of the odds and evens of Form A as .97, with a standard deviation of 13.5, and a probable error of 2.

The recency of this publication, together with the availability of three needed comparable forms, led to investigation and final choice of this test. The authors claim in the 1943 manual that:

The tests, measuring as they do such a wide range of abilities in a highly complex field, naturally correlate rather well with such measures of general

ability as the . . . Otis Group Intelligence Scale.¹¹

One of the objectives of testing is to rank the pupils according to their total achievement in a given field, and the other objective is to discover specific weaknesses, errors, or gaps in achievement. Since these two objectives determine the usefulness of a test, they cannot be ignored. The purpose for which it was to be used was considered; therefore, both of these objectives entered into the selection of the tests. Knowledge of the pupil's total achievement in reading was needed in order to compare it with his total mental capacity, and also to group the class in as nearly a homogeneous classification of ability as is possible in a regular classroom. Knowledge of each individual's specific weaknesses was also necessary in order to bring him up to his capacity by giving individual or group drill on certain weak points revealed by the analytical features of the Iowa Silent Reading Tests.

This test was highly recommended by several experts in the field, both for differentiating between abilities, and analyzing individual and group weaknesses.

One of the important remedial reading techniques used was grouping.¹² Most remedial reading authorities of the present day recommend that the best method of meeting individual differences

¹¹ H.A. Greene and V.H. Kelley, op. cit., 2.

¹² Donald D. Durrell, Improvement of Basic Reading Abilities, World Book Company, New York, 1940, 319.

is through work with small groups in the regular classroom. Separating the bright pupils from the dull saves the poor readers from being dominated and embarrassed by the bright ones.¹³

Harris's¹⁴ scheme for grouping was adapted to the present study. The most common plan, he tells us, for grouping children according to ability within the classroom, is to divide them into groups each of which is given a different type of instruction in reading. This differential teaching within the classroom is beginning to become increasingly popular.

Harris recommends the use of three groups, bright, average, and dull, but states that as many as five are used in some schools employing a differentiated course of study, the bright receiving an enriched curriculum with less drill and more emphasis on the development of initiative in working under little supervision. Social maladjustment is avoided by enriching the course of study, rather than accelerating the child.

A modification of this homogeneous grouping plan, where pupils were divided according to reading ability only, without regard to age or intelligence, was carried out in the present study with four groups, selected according to the reading grade level earned in the September testing, and regrouped in January on the basis of these test results.

¹³ E. W. Dolch, A Manual for Remedial Reading, The Garrard Press, Champaign, Ill., 1939, 88.

¹⁴ Albert J. Harris, How to Increase Reading Ability, Longsman, Green and Co., New York, 1940, 178-180.

Another matter which was given careful consideration was material used. As pointed out by Durrell,¹⁵ providing suitable material which will give each child a sense of security and realization of steady growth essential to his success, is both a difficulty and a necessity which every teacher encounters. There must be sufficient practice at each level to provide success at the next highest level. The availability of books often determines the groups, as it did in this present situation.

The suggestions of Durrell and Dolch were followed in giving the poor reader easier material to increase his interest and comprehension. He should have material similar to that of the rest of the class, but with easy vocabulary. A list of available materials and their use in the four groups will be found in Chapter IV. Harris's recommendation of giving a retarded reader material, not more difficult than the grade-level at which he can read successfully, was followed carefully.

Durrell and other remedial reading authorities recommend the use of check lists upon which, after each child's name, his outstanding difficulties are checked. A card was made out for each group, and kept close at hand in order that individual differences and difficulties could receive at least a minimum amount of attention during the group reading period.

The use of pupil-teachers in group work is rapidly gaining favor. Durrell lists it in his considerations for organiz-

¹⁵ Donald D. Durrell, op. cit., 65.

ing small groups, recommending that a pupil who is ordinarily a member of the group be chosen, and that he should be given private instruction in order to learn how to work with his group. Claims are made by Dolch that this plan is possible even in the lower grades. Kirk¹⁶ recommends this help just for the retarded pupils. Gertrude Kellogg¹⁷ claims excellent results in her experiment with such aid for the slower pupils.

The plan adapted to the present remedial reading program, and explained in Chapter IV, was based on Durrell's suggestion. The pupil-teachers were chosen from the group to which they were regularly assigned. The plan was followed in all four groups. By using it in all groups, the bright as well as the slower pupils, there was no stigma attached, and a greater amount of individual help could be given. Most of the instructor's time could in this way be given to the poorest group.

Full attention was given to growth in vocabulary in its three-fold phase of meaning, recognition, and analysis. Context, word-building, syllable analysis, and other forms of word study as recommended especially in Durrell, Dolch, Kirk, Harris, Witty and Kopel,¹⁸ were used successfully, while the kinesthetic method

¹⁶ S.A. Kirk, Teaching Reading to Slow-Learning Children, Houghton, Mifflin Co., Boston, Mass., 1940, 141.

¹⁷ Gertrude Kellogg, "Remedial Reading Through Pupil-Teachers," The Instructor, Owen Publishing Co., Dansville, N.Y., (November, 1943), 27-28.

¹⁸ Paul Witty and David Kopel, Reading and the Educative Process, Ginn and Co., 1939, 84.

of Fernald¹⁹ was tried by the instructor, but was found unsatisfactory for pupil needs.

Witty and Kopel suggest that efforts be directed in remedial reading to the mastery of a specific number of sight words, the lists being different for different children. They claim that drill upon standard lists sacrifices individuality.

Dolch gives a list of 220 words for sight vocabulary, which, he claims, makes up more than 50% of all words found in elementary school text books. By using this list, together with selections from Durrell-Sullivan Vocabulary (both contained in Durrell's book²⁰), together with word lists taken from readers used, and individual vocabulary notebooks, we had a sufficient variety of words to care for individual differences.

With regard to phonics, Kirk²¹ remarks that recognizing words through phonic analysis is widely used in America, although its value has been debated. Dolch recommends it;²² Durrell²³ gives a splendid outline; Pennell and Cusack²⁴ say that

¹⁹ Grace M. Fernald, Remedial Techniques in Basic School Subjects, McGraw-Hill Book Co., New York, 1943, 35-55.

²⁰ Donald D. Durrell, op. cit., 345-387.

²¹ Samuel A. Kirk, op. cit., 161.

²² E. W. Dolch, op. cit., 47.

²³ Donald D. Durrell, op. cit., 197-229.

²⁴ Mary Pennell and Alice Cusack, The Teaching of Reading for Better Living, Houghton Mifflin Co., Boston, Mass., 1935, Chapter VIII, 206.

a moderate amount is helpful, together with other skills; while others claim that it is helpful, but insufficient. Authors, Kirk claims, seem agreed that an excess of phonics may be detrimental, but that phonics properly taught is essential to reading.

Durrell's phonics outline was followed by the instructor in the present study. The following recommendations were used: A complete review of sounds was given to the entire class at the beginning of the school year, and drill in phonics throughout the remainder of the year made to fit pupil-needs in the various groups, while phonics and syllabication were also correlated with the spelling lesson.

Training in getting word meanings through context as a result of wide reading, and also through training in the use of the dictionary, is necessary. All authorities make these recommendations, stressing the need for instruction in these abilities; they are not acquired without training.

Comprehension is very essential. The kinds of practice questions and exercises to develop skill in specific kinds of reading comprehension, found in several remedial reading references, and employed in the present classroom procedure, are briefly as follows: (1) Reading to get the central thought; (2) Reading to follow a sequence of events; (3) Reading to note details; (4) Reading to follow directions; (5) Reading to discover cause and effect relationship; (6) Finding answers to fact questions; (7) Skimming; (8) Thorough reading; (9) Asso-

ciational reading; (10) Outlining; (11) Adjusting rate to type of reading; (12) Criticism, application, and evaluation of what is read; (13) Use of dictionary, index, card catalogues, and encyclopedias.

Silent reading, according to Harris,²⁵ should comprise about three-fourths of the reading in fifth grade and above. In oral reading, audience situations must be genuine. Rereading for details, to find answers to questions, or to find the part liked best, are all ways used to motivate oral reading.²⁶

Kirk²⁷ emphasizes the need for oral reading in order to train in proper pronunciation, enunciation, to uncover errors, and for correct word-grouping into thought units. He says it is a diagnostic as well as a teaching method. According to Dolch, and other writers, oral reading should not be emphasized in the upper grades, although ability to read orally with understanding should be developed.

Interest and motivation were insured mainly through the use of properly selected material with easy vocabulary and upper-grade interest appeal for the poorer readers, and interest and ability for the better readers. This assured successful performance for all reading levels in the class.

Once the child became convinced of his ability to im-

25 Albert J. Harris, op. cit., 43.

26 Donald D. Durrell, op. cit., 116.

27 Samuel A. Kirk, op. cit., 123-126.

prove his reading, keeping him informed of the amount of his progress proved a strong motivation for greater growth. The reading period was one of enjoyment for all.

Another feature of the reading program was a free-reading period. Durrell²⁸ tells us that independent reading is important, and that providing a period for rapid reading during school time, is the best guarantee of reading outside of school time. All schools that have tried this plan, report enthusiastically of its success.

During the library period, which was held for twenty-five minutes every afternoon, each child of the experimental group read in a book of his direct interest, and of difficulty suitable to his reading level. The free reading of many books, which the children were allowed to take home, and about which few questions were asked, aided comprehension and evaluation.

Dolch²⁹ has a twenty-minute free-reading period every day for the entire class. The teacher walks about and helps. The twenty-five minute daily period, employed as one of the classroom procedures in the present experimental study, was patterned after Dolch's suggestion.

Harris³⁰ claims that the free-reading period is the heart

28 Donald D. Durrell, op. cit., 75-76.

29 E. W. Dolch, op. cit., 101-102.

30 Albert J. Harris, op. cit., 363.

of most individualized instruction in reading. It is becoming increasingly popular. Extensive reading will in itself bring about enrichment of vocabulary, and improvement of comprehension, although free-reading alone is not enough. Provision was made in the morning remedial reading period for word recognition, vocabulary enrichment, and other skills necessary for successful silent and oral reading.

A desire for recreational or leisure-time reading must be developed. Providing the time, and assisting in the choice of suitable material, proved most helpful in establishing the habit with the present group.

The choice of books was not overlooked. Witty and Kopel claim that frequently remedial programs have only one basic aim, to provide worth-while reading matter on the child's level, for which function a teacher must be a competent student in the realm of children's books.³¹ The assistance of the public librarians was sought in the present study, and expert guidance was rendered by them.

The difficulty of a book was determined by having a child read a short section. The estimate of difficulty employed by Harris was used,³² a book intended to provide practice in fluent reading of easy material should not have more than two or three words in a hundred that are unknown to the child; in the work-

31 Paul Witty and David Kopel, op. cit., 34.

32 Albert J. Harris, op. cit., 204.

type not more than five in a hundred running.

A book club requiring a brief one-paragraph report for all books read was used. Harris recommends this aid.³³

Harris's idea of a wall-chart was also adopted.³⁴ Each child had an envelope on this large chart. When he finished reading a book from the class or the public library, he prepared his brief report, and inserted a slip with the name of the book and the author in his envelope.

In concluding this discussion of techniques used in the remedial reading program, let it be remarked that throughout the year the basic principles listed by Harris were used as a check against the process: (1) Base remedial instruction on diagnosis; (2) Arouse motivation; (3) Sustain interest and effort.³⁵

Adaptations were made from various authors in working out this program in reading. As Witty and Kopel³⁶ state, the most effective remedial reading program is developed in terms of particular individual needs. It employs those procedures from Fernald, Monroe, Gates, or any other method, which seems to meet the special problem of each individual child. In the upper grades it should be based on individual diagnosis, followed by appropriate guidance.

³³ Albert J. Harris, op. cit., 204

³⁴ Ibid., 367.

³⁵ Ibid., 167-171.

³⁶ Paul Witty and David Kopel, op. cit., 91.

CHAPTER IV

CLASSROOM PROCEDURE IN TESTING AND REMEDIAL READING PROGRAM

In preparation for the classroom project, previous to the opening of school, a history of the class promoted to sixth grade was obtained from the cumulative records on file in the school office. This history included an I Q rating, with the name of the test, and the grade in which it was taken, each semester's average reading grade from entrance until the present time, together with the same information regarding the subjects of arithmetic and spelling. The chronological age of the child, and the number and grades he repeated were also noted. This study of the ability, scholastic records, and handicaps of the children, saved much time in becoming acquainted with their needs at the beginning of the new year.

The first few days of school were devoted entirely to an intensive reading program of study, recreational and problem types, including oral and silent reading, with oral and written check-ups, with the experimental group. This was done in order that the testing program might be introduced as early as possible, and the remedial reading program accelerated.

Following this preparation, the Otis Quick-Scoring Test of Mental Ability, Beta A, was administered to a group of thirty-four sixth grade pupils enrolled at the time of the Sep-

tember testing. The Beta I Q's resulting therefrom ranged from 60 to 121.

As was pointed out in Chapter II, Beta scores are not found as ordinary I Q's, by dividing the mental age by the chronological age, but are found from the scores alone without mental age equivalents. The authors claim that these Beta ratings are in closer conformity to the original Binet idea than those found by the ordinary division method.

The norm corresponding to the pupil's chronological age is found. The difference between this score and the one he made on the test is called the Deviation of Score. It is added to 100 if it is above his chronological age score, or subtracted from 100 if it is below. The age given in the table for the derived score is his mental age.

Attention is again called to this difference between Beta scores and other I Q's because differences between the computations are illustrated in Table I. The range in the present study for I Q's found by the division method was 52.7 to 134.7, as compared to the Beta spread from 60 to 121. Extreme deviations are avoided in the Beta method, the authors claiming a closer clustering around 100, and more accurate prediction of scholastic achievement than with the ordinary I Q, which so often gives great geniuses who never perform with note-worthy originality.

The results of the Otis Test are given in Table I. As shown therein, eight pupils, or 23.5% of the class, were below the average group (90-110 I Q), or below normal intelligence,

TABLE I

RESULTS OF SEPTEMBER MENTAL TESTS

Number and pupil	Score	Deviation of score	Beta IQ	Mental age	Chronological age	Division IQ	Difference in IQs
1 J.Sh.	58	21	121	15- 6	11- 6	134.7	13.7
2 W.L.	54	20	120	14-10	11- 0	134.8	14.8
3 R.Pe.	50	16	116	14- 2	10-11	129.7	13.7
4 C.K.	50	13	113	14- 2	11- 6	123.1	10.1
5 L.M.	47	12	112	13- 5	11- 2	120.1	8.1
6 N.H.	46	13	113	13- 3	10- 9	123.2	10.2
7 J.F.	44	9	109	12-10	11- 2	114.9	5.9
8 J.Y.	43	0	100	12- 8	12- 8	100.0	0.0
9 R.B.	43	8	108	12- 8	11- 2	113.4	5.4
10 J.G.	43	7	107	12- 8	11- 3	112.6	5.6
11 J.K.	42	4	104	12- 5	11- 8	106.4	2.4
12 B.G.	41	1	101	12- 3	11-11	102.8	1.8
13 B.MC.	39	4	104	11-10	11- 2	105.9	1.9
14 T.K.	39	1	101	11-10	11- 7	102.1	1.1
15 J.Ke.	37	3	103	11- 6	11- 0	104.2	1.2
16 E.K.	37	2	102	11- 6	11- 2	103.0	-1.0
17 C.VG.	36	0	100	11- 4	11- 3	100.0	- .7
18 C.DL.	36	-4	96	11- 4	11-11	95.0	-1.0
19 L.P.	35	-5	95	11- 2	12- 0	93.5	-1.5
20 P.VR.	34	-10	90	11- 0	12- 9	86.3	-3.7
21 R.Fu.	33	-5	95	10-10	11- 8	92.8	-2.2
22 N.S.	31	-9	91	10- 7	12- 0	88.2	-2.8
23 T.W.	30	-8	92	10- 5	11- 8	89.3	-2.7
24 D.G.	29	-10	90	10- 3	11- 9	87.2	-2.8
25 G.C.	28	-13	87	10- 1	12- 3	84.2	-2.8
26 T.C.	28	-6	94	10- 1	11- 0	91.7	-2.3
27 J.St.	27	-12	88	10- 0	11- 9	85.1	-2.9
28 J.B.	25	-9	91	9- 8	11- 0	87.9	-3.1
29 T.MH.	25	-18	82	9- 8	12- 8	76.3	-5.7
30 N.K.	22	-15	85	9- 3	11- 5	81.0	-4.0
31 H.W.	20	-16	84	9- 0	11- 4	79.4	-4.6
32 V.B.	20	-27	73	9- 0	13- 7	66.3	-6.7
33 J.M.	16	-29	71	8- 5	13- 2	64.6	-6.4
34 A.M.	9	-40	60	7- 5	14- 1	52.7	-7.3
Class norm	36		98				

while six, or 17.7% of the class rated above normal. This left twenty pupils, or 58.8% of the class in the normal intellectual group. These results correspond very closely to Dr. Terman's claims for I Q's found by the Stanford Revision of the Binet-Simon tests, wherein the middle 50% falls within the range of I Q's from 92 to 108.¹

There were no extreme deviates above normal, but below there was one 60 I Q, and two in the 70 I Q group. The ability of the class as a whole, with these three lowest cases as doubtful, indicated that the children of the experimental group should be able to read at the level of their grade, unless other handicaps interfered with normal progress. Assuming at the outset that these results set forth in Table I were true recordings of the pupils' mental status, we looked for good reading results.

The Iowa Silent Reading Test, Form AM, was administered to the experimental group of sixth grade pupils as a second step in the diagnostic procedure. The results showed a range in reading grade from 3.3 to 7.8 level, with deviations in mental-age grade-expectancy ranging from minus four years and two months to over nine months. Only six pupils had reading scores at or above expectancy, while twenty-eight were below their in-

¹ A. S. Otis, Manual of Directions for Beta Test, World Book Co., New York, 1937, 9.

licated mental ability. It is interesting to compare this range of ability with Dolch's² remark about reading. He claims that it is very common to find among children of eighth grade, reading abilities which cover a range of five or more grades.

The reading test results are tabulated in Table II, arranged from highest to lowest median score, with reading age and grade equivalent, together with deviation from the mental-age grade-expectancy. In the following tables (III to XI), the separate test results will be found, and major class and individual weaknesses are apparent.

The results of Test I, Part A, Rate, are tabulated in Table III. It shows a range of ability from 21 to 72 scores, representing a grade range of below 2.9 to 9.6, or over six years. The class median was 44, or 4.9 grade level. The lowest rating on the table of the manual is 2.9 grade; three children rated below this. Eight pupils made third-grade scores, six made fourth-grade scores, three fifth-grade levels, ten sixth, two seventh, one eighth, and one a ninth-grade score. These results show that twenty were below sixth-grade level. The children who rated sixth-grade or above on the total reading score were up to grade or above expectancy in rate with three exceptions. From this group down, however, there was great variation indicating that their rate is not adjusted to their comprehen-

² E.W. Dolch, A Manual for Remedial Reading, The Garrard Press, Champaign, Ill., 1939, v.

TABLE II
 READING RESULTS IN SEPTEMBER TESTING

Number and pupil	Median score	Reading grade	Reading age	Mental age	Deviation from m.a. grade expectancy
1 J. Sh.	63 $\frac{1}{2}$	7.8	12-6	15-6	-2.7
2 C. K.	62 $\frac{1}{2}$	7.6	12-5	14-2	-1.6
3 N. H.	61 $\frac{1}{2}$	7.5	12-4	13-3	-0.8
4 R. Pe.	61	7.5	12-4	14-2	-1.7
5 L. M.	60 $\frac{1}{2}$	7.3	12-2	13-5	-1.1
6 B. M. C.	58	6.9	11-10	11-10	0.1
7 J. G.	57 $\frac{1}{2}$	6.8	11-8	12-8	-0.9
8 J. K.	55	6.5	11-5	12-5	-0.9
9 J. Y.	54 $\frac{1}{2}$	6.4	11-4	12-8	-1.3
10 J. F.	53 $\frac{3}{4}$	6.2	11-1	12-10	-1.6
11 B. G.	53 $\frac{1}{2}$	6.2	11-1	12-3	-1.1
12 T. K.	51	5.9	10-10	11-10	-0.9
13 P. V. R.	49	5.6	10-8	11-00	-0.4
14 W. L.	48 $\frac{3}{4}$	5.6	10-8	14-10	-4.2
15 J. Ke.	47 $\frac{1}{2}$	5.4	10-3	11-6	-1.1
16 R. B.	44 $\frac{1}{2}$	4.9	10-0	12-8	-2.8
17 C. V. G.	43 $\frac{1}{2}$	4.9	10-0	12-4	-1.4
18 R. Fu.	43	4.8	9-11	11-4	-1.5
19 E. K.	43	4.8	9-11	11-6	-1.7
20 T. W.	42 $\frac{1}{2}$	4.7	9-10	10-5	-0.7
21 D. G.	42	4.7	9-10	10-3	-0.6
22 L. F.	40 $\frac{1}{2}$	4.5	9-6	11-2	-1.7
23 N. S.	40 $\frac{1}{2}$	4.5	9-6	10-7	-1.1
24 V. B.	40	4.5	9-6	9-0	0.5
25 N. K.	40	4.5	9-6	9-3	0.2
26 H. W.	39 $\frac{1}{2}$	4.4	9-5	9-0	0.4
27 J. St.	39 $\frac{1}{2}$	4.4	9-5	10-0	-0.6
28 J. M.	38 $\frac{1}{2}$	4.3	9-4	8-5	0.8
29 T. C.	38	4.2	9-3	10-1	-0.9
30 C. D. L.	35	3.9	8-10	11-4	-3.4
31 T. M. H.	32 $\frac{1}{2}$	3.6	8-7	9-8	-0.9
32 J. B.	31 $\frac{1}{2}$	3.5	8-5	9-8	-1.2
33 G. C.	30 $\frac{1}{2}$	3.4	8-4	10-1	-1.7
34 A. M.	29 $\frac{1}{2}$	3.3	8-3	7-5	0.9
Gr. md.	52	6.0	11-7		
Cl. md.	43 $\frac{3}{4}$	4.8 $\frac{1}{2}$	10-0		

TABLE III

RESULTS OF TEST I, PART A, RATE, IN SEPTEMBER READING TEST

Number and pupil	Score in reading	Grade equivalent of rate	Total score	Total reading grade equivalent
1 J. Sh.	72	9.6	63 $\frac{1}{4}$	7.8
2 C.K.	64	8.0	62 $\frac{1}{4}$	7.6
3 J.G.	62	7.6	57 $\frac{1}{4}$	6.8
4 R. Pe.	59	7.1	61 $\frac{1}{4}$	7.5
5 N.H.	58	6.9	61 $\frac{1}{4}$	7.5
6 B.MC.	56	6.6	58 $\frac{3}{4}$	6.9
7 W.L.	56	6.6	48 $\frac{3}{4}$	5.6
8 J.Ko.	55	6.5	55	6.5
9 T.K.	55	6.5	51	5.9
10 J.Ke.	55	6.5	47 $\frac{1}{4}$	5.4
11 H.W.	53	6.2	39 $\frac{3}{4}$	4.4
12 J.F.	52	6.0	53 $\frac{3}{4}$	6.2
13 R.B.	52	6.0	44 $\frac{3}{4}$	4.9
14 N.K.	52	6.0	40	4.5
15 V.B.	50	5.7	40	4.5
16 T.C.	48	5.5	38	4.2
17 J.Y.	46	5.2	54 $\frac{1}{2}$	6.4
18 P.VR.	42	4.7	49	5.6
19 L.M.	40	4.5	60 $\frac{1}{4}$	7.3
20 E.K.	38	4.2	43	4.8
21 D.G.	38	4.2	42	4.7
22 R.Fu.	36	4.0	43	4.8
23 C.DL.	36	4.0	35	3.9
24 B.G.	34	3.8	53 $\frac{1}{4}$	6.2
25 T.W.	34	3.8	42 $\frac{3}{4}$	4.7
26 L.P.	34	3.8	40 $\frac{3}{4}$	4.5
27 N.S.	34	3.8	40 $\frac{3}{4}$	4.5
28 J.St.	32	3.6	39 $\frac{3}{4}$	4.4
29 J.M.	32	3.6	38 $\frac{3}{4}$	4.3
30 C.VG.	30	3.4	43 $\frac{3}{4}$	4.9
31 A.M.	28	3.2	29 $\frac{3}{4}$	3.3
32 G.C.	25	2.9	30 $\frac{3}{4}$	3.4
33 T.MH.	23	-2.9	32 $\frac{3}{4}$	3.6
34 J.B.	21	-2.9	31 $\frac{1}{4}$	3.5
Gr. md.	52	6.0		
Cl. md.	44	4.8 $\frac{1}{2}$		

sion ability.

Test I, Part B, Comprehension, (Table IV) shows a range of scores from 23 to 78, which covers a grade range from below 2.9 to 11.1. Three of the group with up-to-grade total reading ability made only fifth-grade ratings on this test, while one in the lower quartile of the class made a sixth-grade-level. Two pupils were below third-grade level, six were third-grade level, eleven fourth, three sixth, five seventh, two ninth, and one eleventh-grade level. There were in all twenty-three below grade. The distribution in this test was over more than eight years. The class median was 44, or 4.9 grade level.

Test II, Directed Reading, (Table V) had a distribution of scores between 24 and 86, or third-grade equivalent to beyond twelfth-grade level, more than nine years. Two of the pupils who rated up to grade or above in total scores were below in Directed Reading, while twenty-two of the thirty-four students were below sixth-grade level. The class median was 46, or 5.2 grade equivalent. The distribution of scores was: one below third-grade level; seven third-grade; eight fourth-grade; six fifth; one sixth; five seventh; four eighth; one tenth-grade; and one above twelfth-grade level. Two pupils in the upper level of the class rated below grade in this test.

In Test III, Word Meaning, (Table VI) the scores did not soar to the heights of those in Tests I and II, the scatter being from 22 to 62, or below third-grade to above eighth. The scores ranged as follows: one below third-grade level; eight

TABLE IV

RESULTS OF TEST I, PART B, COMPREHENSION,
IN SEPTEMBER READING TEST

Number and pupil	Score in comprehension	Grade equiv. in comprehension	Total reading score	Total reading grade equiv.
1 W.L.	78	11.1	48 $\frac{1}{2}$	5.6
2 L.M.	69	9.0	60 $\frac{1}{2}$	7.3
3 J.Y.	69	9.0	54 $\frac{1}{2}$	6.4
4 J.Sh.	61	7.5	63 $\frac{1}{2}$	7.8
5 C.K.	61	7.5	62 $\frac{1}{2}$	7.6
6 N.H.	61	7.5	61 $\frac{1}{2}$	7.5
7 J.G.	61	7.5	57 $\frac{1}{2}$	6.8
8 J.Ko.	61	7.5	55	6.5
9 P.VR.	58	6.9	49	5.6
10 J.F.	54	6.3	53 $\frac{1}{2}$	6.2
11 J.M.	54	6.3	38 $\frac{1}{2}$	4.3
12 R.Pe.	47	5.3	61	7.5
13 B.G.	47	5.3	53 $\frac{1}{2}$	6.2
14 T.K.	47	5.3	51	5.9
15 N.S.	47	5.3	40 $\frac{1}{2}$	4.5
16 R.Pu.	44	4.9	43	4.8
17 T.W.	44	4.9	42 $\frac{1}{2}$	4.7
18 D.G.	44	4.9	42	4.7
19 J.St.	44	4.9	39 $\frac{1}{2}$	4.4
20 B.MC.	40	4.5	58	6.9
21 J.Ke.	40	4.5	47 $\frac{1}{2}$	5.4
22 N.K.	40	4.5	40	4.5
23 R.B.	37	4.1	44 $\frac{1}{2}$	4.9
24 C.VB.	37	4.1	43 $\frac{1}{2}$	4.9
25 E.K.	37	4.1	43	4.8
26 V.B.	37	4.1	40	4.5
27 H.W.	30	3.4	39 $\frac{1}{2}$	4.4
28 T.MH.	30	3.4	32 $\frac{1}{2}$	3.6
29 J.B.	30	3.4	31 $\frac{1}{2}$	3.5
30 G.C.	30	3.4	30 $\frac{1}{2}$	3.4
31 A.M.	30	3.4	29 $\frac{1}{2}$	3.3
32 I.P.	27	3.1	40 $\frac{1}{2}$	4.5
33 T.C.	23	-2.9	38	4.2
34 C.DL.	23	-2.9	35	3.9
Gr. md.	52	6.0		
Cl. md.	44	4.9		

TABLE V

RESULTS OF TEST II, DIRECTED READING,
IN SEPTEMBER READING TEST

Number and pupil	Score in directed reading	Grade equiv. in directed reading	Total reading score	Total reading grade equiv.
1 J. Sh.	86	12.0	63 $\frac{1}{4}$	7.8
2 N. H.	74	10.1	61 $\frac{1}{4}$	7.5
3 L. M.	66	8.4	60 $\frac{1}{2}$	7.3
4 J. Ko.	66	8.4	55	6.5
5 B. G.	66	8.4	53 $\frac{1}{2}$	6.2
6 R. Pe.	64	8.0	61	7.5
7 C. K.	62	7.6	62 $\frac{1}{4}$	7.6
8 B. M. C.	62	7.6	58	6.9
9 J. G.	62	7.6	57 $\frac{1}{2}$	6.8
10 T. K.	62	7.6	51	5.9
11 R. B.	59	7.1	44 $\frac{1}{2}$	4.9
12 P. V. R.	57	6.8	49	5.6
13 E. K.	50	5.7	43	4.8
14 J. Y.	48	5.5	54 $\frac{1}{2}$	6.4
15 D. G.	48	5.5	42	4.7
16 L. P.	46	5.2	40 $\frac{1}{2}$	4.5
17 V. B.	46	5.2	40	4.5
18 N. K.	46	5.2	40	4.5
19 J. St.	44	4.9	39 $\frac{1}{2}$	4.4
20 J. F.	42	4.7	53 $\frac{3}{4}$	6.2
21 W. L.	42	4.7	48 $\frac{3}{4}$	5.6
22 H. W.	42	4.7	39 $\frac{3}{4}$	4.4
23 J. M.	42	4.7	38 $\frac{3}{4}$	4.3
24 T. W.	40	4.5	42 $\frac{3}{4}$	4.7
25 T. C.	40	4.5	38	4.2
26 G. C.	40	4.5	30 $\frac{1}{2}$	3.4
27 R. Pu.	35	3.9	43	4.8
28 C. D. L.	35	3.9	35	3.9
29 T. M. H.	33	3.7	32 $\frac{1}{2}$	3.6
30 J. B.	33	3.7	31 $\frac{1}{4}$	3.5
31 N. S.	30	3.4	40 $\frac{3}{4}$	4.5
32 A. M.	30	3.4	29 $\frac{3}{4}$	3.3
33 C. V. G.	30	3.4	43 $\frac{3}{4}$	4.9
34 J. Ke.	24	-2.9	47 $\frac{1}{2}$	5.4
Gr. md.	52	6.0		
Cl. md.	46	5.2		

TABLE VI

RESULTS OF TEST III, WORD MEANING,
IN SEPTEMBER READING TEST

Number and pupil	Score in word meaning	Grade equiv. in word meaning	Total reading score	Total reading grade equiv.
1 C.K.	65	8.2	62 $\frac{1}{2}$	7.6
2 N.H.	63	7.8	61 $\frac{1}{2}$	7.5
3 R.Fe.	63	7.8	61	7.5
4 B.MC.	56	6.6	58	6.9
5 J.Y.	55	6.5	54 $\frac{1}{2}$	6.4
6 J.F.	55	6.5	53 $\frac{1}{2}$	6.2
7 J.G.	53	6.2	53	6.8
8 J.Sh.	51	5.9	57 $\frac{1}{2}$	6.8
9 L.M.	49	5.6	60 $\frac{1}{2}$	7.3
10 B.G.	49	5.6	53 $\frac{1}{2}$	6.2
11 C.VG.	49	5.6	43 $\frac{1}{2}$	4.9
12 E.K.	49	5.6	43	4.8
13 J.Ke.	48	5.5	47 $\frac{1}{2}$	5.4
14 T.K.	48	5.5	51	5.9
15 R.Pu.	46	5.2	43	4.8
16 T.W.	45	5.1	42 $\frac{1}{2}$	4.7
17 J.Ko.	43	4.8	55	6.5
18 W.L.	43	4.8	48 $\frac{1}{2}$	5.6
19 R.B.	43	4.8	44 $\frac{1}{2}$	4.9
20 P.VR.	41	4.6	49	5.6
21 H.W.	41	4.6	39 $\frac{1}{2}$	4.4
22 J.St.	41	4.6	39 $\frac{1}{2}$	4.4
23 N.S.	37	4.1	40 $\frac{1}{2}$	4.5
24 N.K.	37	4.1	40	4.5
25 T.C.	36	4.0	38	4.2
26 J.M.	35	3.9	38 $\frac{1}{2}$	4.3
27 D.G.	33	3.7	42	4.7
28 C.DL.	33	3.7	35	3.9
29 L.P.	30	3.4	40 $\frac{1}{2}$	4.5
30 T.MH.	30	3.4	32 $\frac{1}{2}$	3.6
31 G.C.	29	3.3	30 $\frac{1}{2}$	3.4
32 J.B.	27	3.1	31 $\frac{1}{2}$	3.5
33 V.B.	26	3.0	40	4.5
34 A.M.	22	-2.9	29 $\frac{1}{2}$	3.3
Gr. md.	52	6.0		
Cl. md.	43	4.8		

third-grade; nine fourth-grade; nine fifth-grade; four sixth-grade; two seventh-grade; one eighth-grade equivalent. Twenty-seven were below sixth-grade ability. Three of the upper group were below in this test.

In the first part of Test IV, The Central Idea of a Paragraph, the following results were obtained, as shown in Table VII: The scores were spread from 0 to 76, or from a minus rating to 10.6 grade level; Nineteen rated below sixth grade, one of whom had zero, five made third-grade scores, seven fourth-grade, and six fifth-grade scores; Fifteen pupils were scattered from sixth to tenth grades as follows: eight seventh, three tenth, four eighth; The spread was more than ten years and six months; The median was 51, the closest approach to that for 6.0 grade level (52) that was reached in the entire test. Three of the children who were of sixth-grade level or above in total reading ability, were below in Test IV, two of them rating 51, and the other only 35.

Test IV, Part B, Paragraph Development, (Table VIII) showed a range of ability from 16 to 79, a distribution of over nine years. The median for the class was 48, or 5.5 level of ability. Sixteen pupils rated sixth-grade or above, eight sixth grade, three seventh-grade, four eighth-grade, one eleventh-grade, while eighteen were below sixth-grade, of whom one was below third, seven third-grade, six fourth-grade, and four fifth grade level. None of the sixth-grade ability readers were below in this test.

TABLE VII

RESULTS OF TEST IV, PART A, CENTRAL IDEA OF A
PARAGRAPH, IN SEPTEMBER READING TEST

Number and pupil	Score in central idea	Grade equiv. in central idea	Total reading score	Total reading grade equiv.
1 C.K.	76	10.6	62 $\frac{1}{2}$	7.6
2 L.M.	76	10.6	60 $\frac{1}{2}$	7.3
3 J.F.	76	10.6	53 $\frac{1}{2}$	6.2
4 J.Sh.	68	8.7	63 $\frac{1}{2}$	7.8
5 N.H.	68	8.7	61 $\frac{1}{2}$	7.5
6 R.Pe.	68	8.7	61	7.5
7 B.MC.	68	8.7	58	6.9
8 J.G.	60	7.3	57 $\frac{1}{2}$	6.8
9 P.VR.	60	7.3	49	5.6
10 W.L.	60	7.3	48 $\frac{1}{2}$	5.6
11 R.B.	60	7.3	44 $\frac{1}{2}$	4.9
12 C.VG.	60	7.3	43 $\frac{1}{2}$	4.9
13 R.Pu.	60	7.3	43	4.8
14 E.K.	60	7.3	43	4.8
15 N.S.	60	7.3	40 $\frac{1}{2}$	4.5
16 J.Kc.	51	5.9	55	6.5
17 J.Y.	51	5.9	54 $\frac{1}{2}$	6.4
18 T.K.	51	5.9	51	5.9
19 T.W.	51	5.9	42 $\frac{1}{2}$	4.7
20 L.P.	51	5.9	40 $\frac{1}{2}$	4.5
21 T.C.	51	5.9	38	4.2
22 J.Ke.	43	4.8	47 $\frac{1}{2}$	5.4
23 D.G.	43	4.8	42	4.7
24 V.B.	43	4.8	40	4.5
25 N.K.	43	4.8	40	4.5
26 J.St.	43	4.8	39 $\frac{1}{2}$	4.4
27 T.MH.	43	4.8	32	3.6
28 J.B.	43	4.8	31 $\frac{1}{2}$	3.5
29 B.G.	35	3.9	53	6.2
30 H.W.	35	3.9	39	4.4
31 J.M.	35	3.9	38	4.3
32 C.DL.	35	3.9	35	3.9
33 A.M.	35	3.9	29	3.3
34 G.C.	0	-2.9	30	3.4
Gr.md.	52	6.0		
Cl.md.	51	5.9		

TABLE VIII

RESULTS OF READING TEST IV, PART B, PARAGRAPH
DEVELOPMENT, IN SEPTEMBER READING TEST

Number and pupil	Score in paragraph dev.	Gr. equiv. in paragraph dev.	Total reading score	Total reading grade equiv.
1 J. Sh.	79	11.3	63 $\frac{1}{4}$	7.8
2 R. Pe.	68	8.7	61	7.5
3 N. H.	64	8.0	61 $\frac{1}{4}$	7.5
4 L. M.	64	8.0	60 $\frac{1}{4}$	7.3
5 J. G.	64	8.0	57 $\frac{1}{4}$	6.8
6 C. K.	60	7.3	62 $\frac{1}{4}$	7.6
7 J. Y.	60	7.3	54 $\frac{1}{4}$	6.4
8 B. G.	60	7.3	53 $\frac{1}{4}$	6.2
9 B. M. C.	56	6.6	58	6.9
10 J. F.	56	6.6	53 $\frac{1}{2}$	6.2
11 T. K.	56	6.6	51	5.9
12 P. V. R.	56	6.6	49	5.6
13 J. Ko.	52	6.0	55	6.5
14 J. Ke.	52	6.0	47 $\frac{1}{4}$	5.4
15 R. B.	52	6.0	44 $\frac{1}{4}$	4.9
16 T. W.	52	6.0	42 $\frac{1}{4}$	4.7
17 R. Fu.	48	5.5	43	4.8
18 E. K.	48	5.5	43	4.8
19 L. P.	48	5.5	40 $\frac{1}{4}$	4.5
20 G. C.	48	5.5	30 $\frac{1}{4}$	3.4
21 D. G.	43	4.8	42	4.7
22 N. K.	43	4.8	50	4.5
23 W. L.	39	4.4	48 $\frac{1}{4}$	5.6
24 C. V. G.	39	4.4	43 $\frac{1}{4}$	4.9
25 V. B.	39	4.4	40	4.5
26 C. D. L.	39	4.4	35	3.9
27 N. S.	34	3.8	40 $\frac{1}{4}$	4.5
28 J. M.	34	3.8	38 $\frac{1}{4}$	4.3
29 T. C.	34	3.8	38	4.2
30 A. M.	34	3.8	29 $\frac{1}{4}$	3.3
31 J. St.	30	3.4	39 $\frac{1}{4}$	4.4
32 H. W.	27	3.1	39 $\frac{1}{4}$	4.4
33 T. M. H.	27	3.1	32 $\frac{1}{4}$	3.6
34 J. B.	16	-2.9	31 $\frac{1}{4}$	3.5
Gr. md.	52	6.0		
Cl. md.	48	5.5		

Table IX shows the results of Test V, Sentence Meaning. This was the poorest of all six tests, the median being only 39, a 4.4 grade reading level. The spread was not so great, being only a little over four years, omitting the extreme deviate, 72, but the clustering of scores was in third, fourth, and fifth grades. Two pupils had sixth-grade ratings, three seventh, and one ninth. Five of the upper group in total ratings were below grade in Sentence Meaning, the fourth highest in the class rating only 36, a fourth-grade level, while his total reading equivalent was 7.5 grade level.

There are two parts to Test VI, Locating Information, of which Part A is Alphabetizing, or using the dictionary. The results of this test are given in Table X. Discounting the two "zeros", the spread was from 35 to 83. The class median was 46, or 5.2 grade level. Twenty-one were below sixth grade, two of whom were below third grade, three were third-grade level, seven fourth-grade, and nine fifth-grade. Those pupils who scored above were: two sixth-grade; five seventh-grade; three eighth-grade; one ninth-grade; one tenth-grade; and one above twelfth-grade level. Within the 35-83 spread, the ability to use the dictionary ranged from 3.9 to college level. Three pupils in the highest quartile were below grade. The pupil who made the highest total score with a grade equivalent in reading of 7.8 made only 40, or 4.5 grade level in this test.

Table XI shows the findings in the second part of Test VI, Using the Index. The class median was 49, or 5.6 grade

TABLE IX

RESULTS OF READING TEST V, SENTENCE MEANING,
IN SEPTEMBER READING TEST

Number and pupil	Score in sentence meaning	Grade equiv. in sentence meaning	Total reading score	Total reading grade equiv.
1 B.G.	72	9.6	53 ¹ / ₂	6.2
2 J.Sh.	60	7.3	63 ¹ / ₂	7.8
3 C.K.	60	7.3	62 ¹ / ₂	7.6
4 J.Ko.	60	7.3	55	6.5
5 N.H.	56	6.6	61 ¹ / ₂	7.5
6 J.Y.	54	6.3	54 ¹ / ₂	6.4
7 N.S.	50	5.7	40 ¹ / ₂	4.5
8 L.M.	48	5.5	60 ¹ / ₂	7.3
9 P.VR.	48	5.5	49	5.6
10 W.L.	48	5.5	48 ¹ / ₂	5.6
11 T.K.	46	5.2	51	5.9
12 J.G.	45	5.1	57 ¹ / ₂	6.8
13 C.VG.	43	4.8	43 ¹ / ₂	4.9
14 J.St.	43	4.8	39 ¹ / ₂	4.4
15 B.MC.	41	4.6	58	6.9
16 J.Ke.	40	4.5	47 ¹ / ₂	5.4
17 R.B.	40	4.5	44 ¹ / ₂	4.9
18 H.W.	38	4.2	39 ¹ / ₂	4.4
19 R.Pe.	36	4.0	61	7.5
20 R.Pu.	36	4.0	43	4.8
21 E.K.	36	4.0	43	4.8
22 T.W.	35	3.9	42 ¹ / ₂	4.7
23 L.P.	35	3.9	40 ¹ / ₂	4.5
24 C.DL.	35	3.9	35	3.9
25 J.B.	35	3.9	31 ¹ / ₂	3.5
26 D.G.	33	3.7	42	4.7
27 J.M.	33	3.7	38 ¹ / ₂	4.2
28 J.F.	32	3.6	53 ¹ / ₂	6.2
29 T.MH.	32	3.6	32 ¹ / ₂	3.6
30 G.O.	32	3.6	30 ¹ / ₂	3.4
31 T.C.	30	3.4	38	4.2
32 V.B.	27	3.1	40	4.5
33 N.K.	27	3.1	40	4.5
34 A.M.	27	3.1	29 ¹ / ₂	3.3
Gr. md.	52	6.0		
Cl. md.	39	4.3 ¹ / ₂		

TABLE X

RESULTS OF READING TEST VI, PART A, ALPHABETIZING,
IN SEPTEMBER READING TEST

Number and pupil	Score in alpha-betizing	Grade equiv. in alpha-betizing	Total reading score	Total reading grade equiv.
1 L.M.	83	12 plus	60 $\frac{1}{2}$	7.3
2 W.L.	74	10.1	48 $\frac{1}{2}$	5.6
3 D.G.	70	9.2	42	4.7
4 G.C.	67	8.6	30 $\frac{1}{2}$	3.4
5 B.MC.	64	8.0	58	6.9
6 R.Pu.	64	8.0	43	4.8
7 R.Pe.	62	7.6	61	7.5
8 J.G.	62	7.6	57 $\frac{1}{2}$	6.8
9 T.W.	62	7.6	42 $\frac{1}{2}$	4.7
10 J.F.	60	7.3	60	6.2
11 B.G.	60	7.3	53 $\frac{1}{2}$	6.2
12 C.K.	57	6.8	62 $\frac{1}{2}$	7.6
13 N.H.	57	6.8	61 $\frac{1}{2}$	7.5
14 J.Y.	48	5.5	54 $\frac{1}{2}$	6.4
15 J.M.	48	5.5	38 $\frac{1}{2}$	4.3
16 A.M.	48	5.5	29 $\frac{1}{2}$	3.3
17 T.K.	46	5.2	51	5.9
18 P.VR.	46	5.2	49	5.6
19 J.Ke.	46	5.2	47 $\frac{1}{2}$	5.4
20 C.VG.	46	5.2	43 $\frac{1}{2}$	4.9
21 L.P.	46	5.2	40 $\frac{1}{2}$	4.5
22 J.B.	46	5.2	31 $\frac{1}{2}$	3.5
23 T.C.	44	4.9	38	4.2
24 J.Ko.	42	4.7	55	6.5
25 V.B.	42	4.7	40	4.5
26 J.Sh.	40	4.5	63 $\frac{1}{2}$	7.8
27 E.B.	40	4.5	44 $\frac{1}{2}$	4.9
28 E.K.	40	4.5	43	4.8
29 H.W.	37	4.1	39 $\frac{1}{2}$	4.4
30 N.S.	35	3.9	40 $\frac{1}{2}$	4.5
31 C.DL.	35	3.9	35	3.9
32 T.MH.	35	3.9	32 $\frac{1}{2}$	3.6
33 N.K.	0	0.0	40	4.5
34 J.St.	0	0.0	39 $\frac{1}{2}$	4.4
Gr. md.	52	6.0		
Cl. md.	46	5.2		

TABLE XI

RESULTS OF READING TEST VI, PART B, USING THE INDEX,
IN SEPTEMBER READING TEST

Number and pupil	Score in using the index	Gr. equiv. using the index	Total reading score	Total reading grade equiv.
1 L.M.	77	10.8	60 $\frac{1}{2}$	7.3
2 J.Sh.	73	9.8	63 $\frac{1}{2}$	7.8
3 C.K.	65	8.2	62 $\frac{1}{2}$	7.6
4 J.Ko.	62	7.6	55	6.5
5 N.H.	59	7.1	61 $\frac{1}{2}$	7.5
6 R.Pe.	56	6.6	61	7.5
7 B.MC.	56	6.6	58	6.9
8 B.G.	56	6.6	53 $\frac{1}{2}$	6.2
9 T.K.	56	6.6	51	5.9
10 D.G.	56	6.6	42	4.7
11 L.P.	56	6.6	40 $\frac{1}{2}$	4.5
12 J.B.	56	6.6	31 $\frac{1}{2}$	3.5
13 J.Ke.	53	6.2	47 $\frac{1}{2}$	5.4
14 J.St.	53	6.2	39	4.4
15 J.Y.	49	5.6	54 $\frac{1}{2}$	6.4
16 J.F.	49	5.6	53 $\frac{1}{2}$	6.2
17 P.VR.	49	5.6	49	5.6
18 R.B.	49	5.6	44 $\frac{1}{2}$	4.9
19 T.C.	49	5.6	38	4.2
20 R.Fu.	46	5.2	43	4.8
21 N.S.	46	5.2	40 $\frac{1}{2}$	4.5
22 G.C.	46	5.2	30 $\frac{1}{2}$	3.4
23 J.G.	43	4.8	57 $\frac{1}{2}$	6.8
24 W.L.	43	4.8	48	5.6
25 C.VG.	43	4.8	43 $\frac{1}{2}$	4.9
26 J.M.	43	4.8	38 $\frac{1}{2}$	4.3
27 T.W.	40	4.5	42 $\frac{1}{2}$	4.7
28 N.K.	40	4.5	40	4.5
29 V.B.	36	4.0	40	4.5
30 H.W.	36	4.0	39 $\frac{1}{2}$	4.4
31 C.DL.	36	4.0	35	3.9
32 A.M.	36	4.0	29 $\frac{1}{2}$	3.3
33 E.K.	33	3.7	43	4.8
34 T.MH.	33	3.7	32 $\frac{1}{2}$	3.6
Gr. md.	52	6.0		
Cl. md.	49	5.6		

level. The distribution of scores extended from 33 to 77, or 3.7 grade level to 10.8 level. Fourteen pupils made sixth-grade scores or above, spread as follows: nine sixth; two seventh; one eighth; one ninth; one tenth; while twenty pupils below grade made scores as follows: two third grade; ten fourth; and eight fifth-grade scores. Three of the pupils, rating sixth-grade in the total reading ability, were below grade in this skill.

In comparing the separate tests with the medians of the total reading ability, we find that Test V, Sentence Meaning, resembles these totals more than any of the other tests, with a spread from $29\frac{1}{2}$ to $63\frac{1}{4}$, or four years and five months, as compared with the Test V spread of over four years and two months.

The spread of reading ability over the various grade levels is summarized in Table XII, where one can see at a glance the medians, distributions, and clusterings, and where comparisons between the different reading skills can easily be made.

The children were told their reading test results. The results of the analytic study of weaknesses were told to each individual, stressing the points upon which he should strive for improvement. The pupils were not told their mental status, but it was explained to them that the test which told "how well you can think," showed that practically everyone in the class was working far below the best that was in him. Every encouragement was given them to improve their work. They were told that

TABLE XII

SUMMARY OF DISTRIBUTION OF SCORES IN SEPTEMBER READING TEST

Reading skills	Distribution of cases over the following grade levels												Class median score	Gr.lev. of median	Years of spread
	-3	3	4	5	6	7	8	9	10	11	12	12+			
IA Rate	3	8	6	3	10	2	1	1					44	4.9	6.7
IB Comprehension	2	6	11	4	3	5		2		1			44	4.9	8.4
II Directed reading	1	7	8	6	1	5	4		1			1	46	5.2	9.2
III Word-meaning	1	8	9	9	4	2	1	1					43	4.8	5.6
IVA Central idea	1	5	7	6		8	4		3				51	5.9	7.7
IVB Development of Paragraph	1	7	6	4	8	3	4			1			48	5.5	8.4
V Sentence meaning		13	9	6	2	3		1					39	4.4	4.2
VIA Alphabetizing	2	3	7	9	2	5	3	1	1			1	46	5.2	9.3
VIB Use of index		2	10	8	9	2	1	1	1				49	5.6	7.1
Median Total reading		5	14	4	6	5							43 $\frac{3}{4}$	4.8	4.5
Totals	11	64	87	59	45	40	18	6	6	2		2			

they would be retested, and all entered enthusiastically into the task of improving as much as possible before the next testing program.

Individuals who were more than a year below ability, were told so privately, and were urged to make supreme effort. This latter procedure was very happily accepted in the top group especially. They accepted it as a challenge.

It is often helpful to explain to a pupil that the intelligence tests show that he is normal or bright, and not stupid as he may have thought. Explaining that the pupil has developed bad habits that have prevented him from reading well, and that he can learn better habits, is also helpful.³

In the Forty-First Yearbook⁴ we are told that knowledge of the results of progress serves to motivate learning. Monroe and Engelhart⁵ include in their list of motivating devices, "Informing the pupil of success in learning." Briggs⁶ found friendly conferences among his most effective motivations.

Witty and Kopel⁷ recommend that the children be told what the teacher is trying to do, and their cooperation obtained. He⁸

³ A. J. Harris, How to Increase Reading Ability, Longman Green and Co., New York, 1940, 171.

⁴ The Forty-First Yearbook, National Society for the Study of Education, Part II: "The Psychology of Learning," Public School Publishing Co., Bloomington, Ill., 1942, 316.

⁵ Ibid., 323.

⁶ Ibid., 324.

⁷ Paul Witty and David Kopel, Reading and the Educative Process, Ginn and Co., Chicago, Ill., 1939, 108.

⁸ Ibid., 114.

further states that a child's own appraisal of his development is important.

While it was the point of this experimental study to show that I Q ratings are very dependent upon reading ability, at the outset, the problem of mental ratings far in excess of reading ability was met. According to the intelligence test results, all pupils of the class participating in the classroom experiment, had indicated ability sufficient for satisfactory reading on sixth-grade level, but few exceptions having been located, and these only in the event that remedial reading failed to raise their I Q scores.

The important function of reading in a group test is brought out in the following quotation from Fernald, which emphasizes the first point in the above paragraph:

Most of the group tests used extensively, except in the case of small children, require reading throughout the test. Consequently the subject's mental age in many cases will be the same as his reading age, and in all cases will be lowered because of his reading disability. Even with individual tests such as the Revised Stanford-Binet Scale the language disability will seriously affect the results. The subject will fail on such tests as the reading of a selection, the code tests, the vocabulary tests, the dissected sentences, before reading disability is removed, and pass all these tests easily after he has acquired normal reading skill.

The three lowest ratings, 60, 71, and 73, would fall within Kirk's group of mentally retarded pupils.¹⁰ Of these he

⁹ Grace M. Fernald, Remedial Techniques in Basic School Subjects, McGraw-Hill Book Co., New York, 1943, 70-71.

¹⁰ Samuel A. Kirk, Teaching Reading to Slow-Learning Children, Houghton, Mifflin Co., Boston, Mass., 1940, 137.

says:

Few mentally retarded children with I Q's between 60 and 75 advance further than the fifth grade. For the most part they remain between third and fifth grade, and hence this level may be considered advanced for them.

Four of those with I Q's in the 80-85 group, together with two in the 70's, would come within Witty and Kopel's¹¹ group of 70-85 I Q, which he claims to be about 15% of the pupils, who classed as "dull", can achieve fifth, sixth, or seventh grade levels in a school equipped for individual differences. The other two scores in the 80's, - 87 and 88, - should do as well or better. No reading problems should exist outside this small group, unless other deficiencies or handicaps exist.

Children who, with reading retardation so marked, were able to make the intelligence ratings as indicated by the September scores, should, with improved reading ability, be able to bring their mental ratings to close indications of their maximum capacity. The goal in the classroom experiment was, not only to remove the stigma of "dullard" from the very poor, but also to help every pupil working below his capacity as indicated, or below that part of his capacity which was too crippled to function to its full extent in the first testing.

With a great hope of discovering the full realization of God's mental gift to each, and to bring about a more closely correlated appreciation and utilization of this mental heritage,

¹¹ Paul Witty and David Kopel, op. cit., 227-228.

books as one determinant. This latter consideration had an important bearing on the present study.

Four groups was decided upon as the best division for handling the spread of ability, and the utilization of available material.

Those children who were reading at 6.5 grade level or above were grouped together. This included the eight highest from 6.5 to 7.8 grade levels.

The next group was made up of seven pupils in the lower half of sixth grade reading level, and all those who rated fifth grade, or from 5.1 to 6.4 grade levels.

The third group of nine pupils consisted of part of the fourth grade level, splitting the group of 4.5 ratings, taking those with the highest I Q's at this level. One boy who had a grade equivalent of 4.3 was also placed here in order to separate him from his brother, who, though older, was at the bottom of both the reading (3.3) and the intelligence (60 I Q) ladders, and suffered from an inferiority complex aggravated by his younger brother's somewhat better accomplishments (4.3 reading, and 70 I Q).

The fourth group was composed of the lower range of fourth-grade readers, and the five third-grade readers, making a group of ten pupils, distributed from 3.3 to 4.5 reading grade levels.

The materials on hand influenced to no small degree the numbers in the groups.

Readers and diagnostic reading workbooks from third, fourth, and fifth grades were solicited and generously loaned for the worthy cause. Only books which were new and had not been read by the children were utilized. Three sets of books were purchased, and with the material already in the classroom, a selection suitable to the grade range of pupil-ability was at hand. The new material was chosen from the newer remedial books that are coming on the market, with lower reading grade vocabulary, and intermediate interest appeal.

The list of materials is as follows:

<u>Adventuring for God</u> (Fourth Grade Level with study questions)	James Fitzgerald and Patricia Fitzgerald	Hall and McCreary Chicago, 1938
<u>Busy World</u> (Easy Third-Grade Level)	Myrtle Banks Quinlan	Allyn and Bacon, Boston, 1940
<u>Child-Library Readers, Book VI</u>	Elson Extension Series	Scott, Foresman Co., Chicago, 1923
<u>Exploring Today</u> (Diagnostic Work- book, Grade V)	Eleanor M. Johnson	American Ed. Press, Columbus, 1937
<u>Forty Famous Stories</u> With Study Questions (Fourth-Grade Level)	H. A. Merty	Hall and McCreary Chicago, 1936
<u>Fun and Frolic</u> (Third-grade Level)	Witty-Nolen-Brum- baugh	D.C. Heath and Co., Boston, 1942
<u>In a Green Valley</u> (Fifth-Grade Level)	Compiled by B. R. Buckingham	Ginn and Company Boston, 1934
<u>If I Were Going</u> (Difficult Third Reader)	Mabel O'Donnell and Alice Carey	Row Peterson Co., New York, 1936
<u>Learn to Study</u> <u>Readers, Grade VI</u>	E. Horn, M. Snedaker, B. Goodykoontz	Ginn and Company Boston, 1926

<u>Looking Ahead</u> (Diagnostic Work- book, Grade VI)	Rosalie F. Greenwood James Williams	American Ed. Press, Columbus, 1940
<u>Lorna Doone</u> (Fourth Grade Vocabulary)	Adapted by R. Jordan, A. Berglund, and C. Washburne	Scott, Foresman and Co., Chicago, 1942
<u>Merry Hearts and</u> <u>Bold</u> (Fifth Grade Reader)	Witty-Nolen-Fenner	D.C. Heath and Co., Boston, 1942
<u>My Activity Book in</u> <u>Reading</u> (Workbook, Fourth Grade)	Fred D. Cram	American Ed. Press, Columbus, 1939
<u>Reaching Our Goals</u> (Sixth Grade Level)	E. Horn, B. Goddy- koontz, and N. Snedaker	Ginn and Company, Boston, 1940
<u>The Boxcar Children</u> (Third Grade Level)	Gertrude Chandler Warner	Scott, Foresman and Co., Chicago, 1942
<u>Cathedral Basic Read-</u> <u>er, Grade Six</u>	W. Elson and W. Gray	Scott, Foresman and Co., Chicago, 1932
<u>The Rosary Reader,</u> <u>Grade Six</u>	Sr. Henry, Sr. Magdalen, Sr. Anysia	Ginn and Company, Boston, 1930
<u>Six Great Stories</u> (Fourth Grade Vocabulary)	Moderow, Sandrus, Mitchell, Noyes	Scott, Foresman and Co., Chicago, 1937
<u>When Washington</u> <u>Danced</u> (Fourth Grade Vocabulary)	Clarence Stratton	Scott, Foresman and Co., Chicago, 1939
<u>Without Machinery</u> (Fourth Grade Vo- cabulary)	Hanna, Potter, and Gray	Scott, Foresman and Co., Chicago, 1939

Group I read the following books in the order given: The Cathedral Basic Reader (text), The Rosary Reader, VI, Learn to Study Readers, VI, Child Library Readers, VI, (using only those stories correlated with class interests during the first semester), Reaching Our Goals. Besides these books the children pre-

pared individual assignments for audience reading to the class, using the room library and the public library for this purpose.

Group II read When Washington Danced, In a Green Valley, and selections from Child Library Readers VI, and Learn to Study Readers, VI.

Group III began with If I Were Going, a difficult third-grade reader. They also read When Washington Danced, and a few selections from Child Library Readers.

Group IV read The Boxcar Children, an easy third-grade-vocabulary-level story, with upper grade interest; Busy World, a third-grade reader; and If I Were Going, a more difficult third-grade reader.

All the children in the experimental group read The Junior Catholic Messenger, a weekly reader for third, fourth, and fifth grades. It was more appropriate to use this in preference to The Young Catholic Messenger intended for sixth grade and higher, as most of the class were reading below sixth grade level. "Different books for different groups is such an easy way of prevention that it can be adopted anywhere with immediate good results."¹⁵

In order to better understand the characteristic weaknesses of each individual and his general level of achievement, the Gray's Oral Reading Paragraph Test was given, and the

¹⁵ E. W. Dolch, op. cit., 147.

Metropolitan Achievement Tests in arithmetic fundamentals, arithmetic reasoning, and spelling. These results are not included in the study, but were necessary for adequate diagnostic study. These results functioned in planning the remedial steps to be followed.

The reading grade equivalents gained in The Iowa Silent Reading Test were verified by having the children read selections from readers one grade below the grade level gained in the test, the level gained, and one grade above. This reading was done individually to the teacher. If a child needed help with more than one word in twenty, the material was considered too difficult, as suggested by Durrell.¹⁶

The Junior Catholic Messenger Reading Test was given as a mid-semester check. The children were told their reading grade ratings, and compared them with the September results.

The names of the pupils of each group were written on cards, and after each name the particular weaknesses of each was indicated by a check in that column. The individual needs were given at least a minimum amount of attention in this way. For example, the children who rated low in finding the central idea of a paragraph were called on to answer questions requiring this skill, and were given help in finding the answers. Those pupils weak in dictionary work were given the task of looking up words from the lesson. Other students were assigned to help them to

¹⁶ Donald D. Durrell, op. cit., 23.

increase their skill by proper use of guide words.

Pupil-teachers were used through the year in all groups. They were taken from the group to which they were regularly assigned. In Group I, the first choice made was the one who rated highest in the reading test. The second highest was chosen in Group II because the highest was not self-controlled enough to keep his group in order. In Group III, the highest was the first student teacher, and in the lowest group, the third lowest was the one chosen first because she sensed the inferiority of her group, and was very discouraged.

The function of the pupil-teachers was explained to the entire class, and also that they would be changed from time to time. The ones who showed most improvement in results or in effort would have an opportunity to be pupil-teachers in their groups. During the first semester Group I had three pupil-teachers, Group II had three, Group III had two, and Group IV had three. Other children were given opportunities to substitute during the absence of monitors.

This method of using pupil-teachers in individual or group reading is recommended as highly successful by many writers. In Kirk¹⁷ the suggestion of having an advanced pupil help the retarded child is made. This suggestion differs from the method used in the present classroom procedure in that each tutor was helping only one child, and was chosen from the best

¹⁷ Samuel A. Kirk, op. cit., 106.

pupils in the class.

One of the considerations which Durrell says should be kept in mind in organizing small group instruction refers to pupil-teachers. Each group should be in charge of a pupil who ordinarily is a member of the group. Pupil-teachers must learn how to work with their groups. They should have private instruction, examine the lesson plan beforehand, and ask the teacher questions. Some prefer to have superior pupils to direct the groups. They grow in sympathy, leadership, understanding of other's difficulties, oral expression, patience, and additional mastery of material. This growth, he claims, will offset loss of time otherwise devoted to independent learning.¹⁸

Dolch¹⁹ recommends turning over a slow group of children to a mature pupil, who will have them read little stories and tell them the words they do not know, claiming that repeating will cause learning. They can conduct word-games, and help the slower pupils. During library reading periods, the good pupils and poor pupils can be seated in alternate rows, all reading different books. When a pupil needs help he points to the word, and the good pupil across from him tells him. In word games the good pupil can be called "helper" and the poor pupil "player".

¹⁸ Donald D. Durrell, op. cit., 69-70.

¹⁹ E. W. Dolch, op. cit., 47.

Harris also suggests pupil assistants, and recommends the good pupils as leaders. He says:

This plan can be successfully employed provided that the teacher explains clearly to the pupil assistant before each lesson exactly what he is to do and supervises his work until he becomes proficient at it. This plan is more likely to work in the upper than in the lower grades.²⁰

Harris also reviews Donnelly's fourth grade grouping plan in which pupils acted as group leaders. Five groups were used, the teacher spending most of the time with the poorest group. The privilege of being leader was rotated so that most of the pupils had a chance at being leader at some time.²¹

Gertrude Kellogg's²² experiment, in which she had good pupils help poorer ones, the teacher keeping order and helping the tutors, resulted in the development of poise and self-possession on the part of the tutors who learned while they taught.

Durrell's first suggestion of choosing the pupil-teachers from their regular group was utilized. Special preparation was given to these pupil-teachers. One lesson in advance of their class was prepared with them. The questions for the oral and written check-ups at the end of lessons were carefully gone over with them, even telling them in many instances on whom to call

20 A. J. Harris, op. cit., 353-354.

21 Loc. cit.

22 Gertrude Kellogg, "Remedial Reading through Pupil-Teachers," The Instructor, Owen Publishing Co., Dansville, N.Y., (November, 1943), 27-28.

for certain questions. The difficult words were listed and prepared for drill. In the two upper groups, the pupil-teachers were very resourceful, often going far afield from the procedure outlined for them, but getting good results. The two lower groups showed less initiative, but were not entirely lacking in it.

All the children, pupil-teachers and their pupils, enjoyed being "left on their own." The instructor observed that the pupils had less reserve with the pupil-teacher, asked more questions, expressed their opinions more freely, and entered into very worth-while discussions over answers given, or points raised, and finding proof for their statements in the reading. The period became one of joy for everyone in the class. There was little reserve, and yet no disciplinary problems.

Much attention was given to sight vocabulary. The children of all groups were given try-outs on Dolch's 220 Basic Sight Vocabulary Word List, which contains over 50% of all the words found in elementary school texts. They were mastered with more than average speed by Groups I and II within a few recitations, but were taken for drill at frequent intervals throughout the semester by the two lower groups. At the end of this time, some of the experimental group still confused words, and were slow in recognition of others.

Several of the readers employed in the project had page-by-page vocabularies in the back. These lists were used. For such readers as did not contain a list, compilations were made,

lesson by lesson, using the typed copies for review, and for more rapid word recognition. The groups were so seated that a section of the blackboard was available to each group. Movable desks facilitated this utility, and gave another way to vary the vocabulary study.

All writers stress the need for building up an adequate sight vocabulary in remedial reading work. Many other word-lists are described and recommended besides Dolch's 220 Basic Words. The Durrell-Sullivan Reading Vocabularies for Grades Four, Five, and Six, given in the appendix of his book, and also selections for the poor group taken from the Remedial Vocabulary for Primary Grades, were used for drill during the experiment.

Need for adequate sight vocabulary is apparent in all poor readers. As Durrell says:

Difficulties with individual words constitute a chief handicap of poor readers . . . Prompt word recognition is essential for smooth phrase reading . . . Recognition must be immediate to avoid extra eye movements.²³

The place of vocabulary drill in the remedial reading program, Durrell points out, is intended for immediate use, and should therefore be used daily in connection with the regular reading lesson.

Individual lists in the form of vocabulary notebooks were

²³ Donald D. Durrell, op. cit., 162.

kept, and the pupil-teachers used them for review at intervals, hearing each child on the recognition and meaning of those words he had listed. Durrell²⁴ suggests the vocabulary notebook as a very helpful device in vocabulary instruction. It was not popular with the class, and continual urging and reminders were needed. They were given special periods in which to look up in the dictionary such words as they could not adequately define from the context. This means of improving their notebooks was met with better success, and led to a more regular use of them.

The better readers took much more pride in learning the meaning of new words in order to incorporate them into their own speaking and writing vocabularies. All the children enjoyed guessing the meaning from the context, supplying synonyms and reading the sentence, putting in different words without changing the meaning, but using the dictionary was unpopular. The pupil-teachers wrote a few new words on the blackboard, choosing them from those which two or three pupils asked for during the silent reading. The pronunciation and meaning of these words were gone over during the last few minutes of the period. During the free-reading period, the pupils were encouraged to ask for the meaning as well as the pronunciation of any word not known. It took time to develop this habit in them, but much urging not to pass over a single unfamiliar word was showing results before the end of the semester. Those who did not ask

²⁴ Donald D. Durrell, op. cit., 163.

were questioned by the instructor on the page where they were reading until they were fully conscious that they were reading carelessly. This procedure was used in the regular reading groups and in the free-reading period with success.

Word meaning was also correlated with spelling. Both definitions and synonyms were taught. In all the content subjects, all but the unusual or seldom-used words were defined. Several approaches were used to avoid monotony.

Phonics and syllabication as a specific study were correlated with spelling. A review of all the sounds was given to the entire class at the beginning of the year. Durrell's phonic lessons were followed.²⁵ Lists from Dolch were also supplemented. In the work with the different groups, the phonics given in the teacher's manuals, or specially prepared for the lesson when no manual was available, were used. After the regular spelling lesson, word-building with prefixes and suffixes was given a few minutes time. Opened and closed syllables were taught, and attention was called to these points in the reading preparation. Building up lists of words from root words was assigned to the better pupils in the class, while those who needed extra phonetic training were receiving drill. A few children who did not profit by phonics, spent this time with a pupil-teacher, gaining speed in the recognition of their own sight-vocabulary words. Sometimes phonics was incorporated into the oral and

²⁵ Donald D. Durrell, op. cit., 197-230.

written check-ups, requiring the group to find words in the lesson built upon given root words, rhyming words, words containing certain phonetic elements, and similar devices. There were many excellent helps found in teacher's manuals, especially the one for use with If I Were Going.²⁶

Provision for scanning was supplied by motivated oral reading. After answering fact questions, or thought questions, the children were asked to find their answers, or proof for their statements in the reading. This procedure was carried over into history and geography with the experimental group. Places, dates, and names supplied an easy starting-point, whereas thought-questions required greater skill and more drill. In the group work when children answered thought questions in a check-up after silent reading without referring to the reading, lively discussions would sometimes result, and pages would fly as confident individuals sought written proof of their convictions.

Special out-of-class help was given to the five poorest readers in Group IV during the noon hour. Special emphasis was placed upon developing a greater sight vocabulary, and upon increasing speed by the elimination of such faulty habits as lip-movements, head-movements, and pointing.

Most of these poor readers were word-callers. Invariably

²⁶ Mabel O'Donnell and Alice Carey, Manual for: If I Were Going, Row Peterson and Co., New York, 1936.

after silent reading they could not answer even very simple fact questions without rereading. Short stories were read, and then, with closed books, questions were discussed, which were gradually increased in difficulty from simple facts to thought questions. For oral reading, answers were found in the story and read, thus checking the accuracy of the first answers.

One child in the poorest division of the experimental group had no phonetic sense. She was taken individually as often as time permitted. The kinesthetic method was tried with her, but she resented it so much that worth-while results could not be accomplished. It was finally given up, and recourse was had to using the same methods applied to the others in the group, resorting to more frequent repetition, and more sight-vocabulary drill. Besides the word-lists already mentioned, a list of needed words built up from content subjects was drilled upon with her.

The September rating made by this pupil seemed very high in the light of other achievement, and also as compared with her school history. In checking her reading-grade-equivalent by oral reading from graded books, it was found that she handled third-grade material with difficulty, whereas she rated 4.5 grade level on the Iowa test.

All oral reading in the remedial reading groups, or in the reading of content subjects throughout the day, was to find answers to questions, or reading selections carefully prepared for audience situations, composed of either a single group, or

of the class as a whole. The highest group prepared special reports in their enrichment reading program, correlating them with history, geography, or language classes. Supplementary books and encyclopedias were used for these reports. Many of the reports were prepared and read to the class, while others were given orally from an outline.

Harris²⁷ recommends that not more than one-fourth of the time in fifth grade and above be devoted to oral reading. In second and third grade, less than half, and in fourth grade, not more than one-third of the reading should be oral. Each oral lesson should be planned to contribute a definite value to the reading program as a whole. Those types he regards as having real value are: (1) Audience reading, preferably something that is not familiar to the other pupils; (A weekly period of audience reading is the practice of many good teachers.) (2) Choral reading which gives poor pupils a better appreciation of pronunciation, phrasing, rhythm, and interpretation; (3) Finding and reading answers to questions; (4) Individual reading for the teacher.

According to Durrell, oral reading is important for poor readers at all grade levels:

Oral reading is a major consideration in the primary grades, and it is of special importance at any level for children with reading difficulties. This is because faulty habits, difficulties, and confusions become immediately apparent in oral reading in a way to reveal reasons for a child's lack of progress and difficulties

²⁷ A. J. Harris, op. cit., 43-45.

in comprehension . . . It motivates reading . . . With a true audience situation, it induces exchange of ideas and a feeling of group unity.²⁸

The only time the children read paragraph after paragraph was when a group carefully prepared and read a story to the class in a true audience situation. The story was divided up, and each child prepared his portion. The oral reading that was used most frequently, however, was finding and reading the answers to questions.

A library, or free-reading period was held each day besides the daily remedial reading period of thirty minutes. At this time the children worked in their respective places, each reading a book of his own choice, for a period of twenty-five minutes.

The kind and very efficient services of two librarians in the children's department of the public library were solicited and very generously given. A list of the children's names, reading grade equivalents, and mental ages was given to them. The pupils were instructed to go to one of the librarians for assistance in finding appropriate books, or for approval of their own selections, in order to insure the reading of proper-level and age-interest material. Very good results were obtained in this way. The books the children brought for this period of silent reading, chosen by experts in the field, were not so difficult as to rob them of the pleasure of leisure-time

²⁸ Donald D. Durrell, op. cit., 115.

reading, nor yet so easy that they were learning nothing.

The pupils had the idea that only slow pupils need help, and it took much encouragement to get them to ask for words. By getting the best group in the class aroused to the point where no word, the meaning or pronunciation of which was unknown, should be passed over, the hands of all the experimental group were soon waving as a signal for help. Once the stigma was removed, the library period was an extremely busy one for the instructor.

As the instructor walked among the children, different ones were requested to read a paragraph quietly for her. An effort was made to have each child read at least once from each book he had. In this way, the type, the difficulty of material, and the interest appeal were checked. By the end of the semester, hands were raised when anything especially interesting or amusing, or related to some group or class interest, was found. The instructor was often entertained by a whispered reading of some "find".

There is much in current literature on the topic of extensive individual reading, and the gratifying results of free reading on school time. Durrell²⁹ states that rapid learners and superior readers gain more from extensive individual reading than from instruction which is perhaps beneath their present attainment. He also relates that Zirbes, Field, and Boney have

²⁹ Donald D. Durrell, op. cit., 75.

shown that in the elementary school gains resulting from individual reading are comparable to those resulting from class instruction, even without special remedial exercises for slow learners.³⁰

Durrell gives a plan which is very useful in guiding individual reading programs. Briefly it is as follows: The teacher should keep a record of the amount and type of each pupil's leisure reading. One suggestion under this point was the use of a wall chart with a pocket for each child. In this are placed slips with the titles of the books read by each child. Some report on the books read should be required. Questions and comments introduced informally in conversation with pupils before school or at recess stimulate more interest than formal book reports. He further states the necessity of guidance for the child in choosing books suited to him.

Regarding this special period for rapid reading, Dolch³¹ remarks that easy reading should be provided, and that the period must be every day, and not just once a week as it sometimes provided. He suggests twenty minutes a day as a minimum, and thirty minutes as much better. The teacher circulates about the room to see that everybody is busy, and may have a child read a little to her in a low voice.

³⁰ Donald D. Durrell, op. cit., 75.

³¹ E. W. Dolch, op. cit., 81-82.

Harris gives the following comments on individual reading

The heart of most programs in individualized instruction in reading is what is generally called free reading. This means silent reading periods in which each pupil is reading something that he has selected for himself. Plans based upon free reading as a core have been employed from the first grade up to the last year of high school. In some programs, entire reliance is placed on free reading; in most, it is combined with other reading activities.³²

The use of the wall chart prepared with an individual envelope for each pupil is also recommended by Harris.

Dolch describes the extensive reading for high school. Two very appropriate remarks made by him can be applied to library reading at any level: "The purpose is 'Every child reading with interest at his present reading level',"³³ and, "Much reading leads to better reading. No reading obviously leads to nothing."³⁴

For the recording of free-reading, a wall chart was made, whereon each pupil had an envelope. The class elected to have it composed of patriotic designs, and to make little slips in the shape of bombs. Each book carefully read was aimed to rout the great enemy of progress, reading difficulties. The name of a book and the author were written on each "bomb", and they were placed in the respective pockets, pointing downward with the tails protruding for easy counting.

32 A. J. Harris, op. cit., 362.

33 E. W. Dolch, op. cit., 99.

34 Loc. cit.

At the beginning of our reading project, only a few children had library cards, and fewer still were using them. By the end of two weeks, 100% of the class had cards, and were using them.

Our classroom library, though small, served to fill in when a child finished a book before he had an opportunity to get another from the public library.

At the end of the first semester, each child removed his slips from his envelope, and made a list of the books read. The following summary was made from these lists:

The number of books read during the first semester ranged from three to twenty-one. The median for the class was seven. On the whole, the brighter pupils read most, although the numbers are not accurately comparable because of the differences in length and in the difficulty of the books read.

Interest in reading was definitely awakened. The knowledge and enjoyment gained therefrom won a more favorable attitude toward reading, which is in itself a great gain, and should have permanent value in the intellectual life of these children.

A library club was formed, and meetings were held every Friday afternoon. Brief book reports were given, consisting of the following form: Title; Author; Publisher; Date of Copyright; Principal Characters; Kind of Story; and The Part I Liked Best.

While brevity of written reports was emphasized in order

not to detract from the enjoyment of library reading, the children were encouraged to give other interesting incidents orally. Not more than one paragraph was necessary in the written report. Reports were written for every book read.

At the beginning of the experiment, the club meetings were very uninteresting, but with help in the preparation of their talks it grew into a very interesting story hour. They tried to make their "sales talk" so effective that someone else in the class would read the same book.

By the end of the first semester, every marginal moment was being used for a few snatches from their library books which were kept close at hand throughout the day.

Other diagnostic studies made during the first semester were eye and ear tests. These tests were administered by the school nurse. All but one child had normal hearing, as revealed by the whisper test. This boy received an examination with the audiometer, but no serious difficulty was revealed. Three children needed glasses according to the examination of the eyes, using the Snellen Chart. Only two received the needed attention.

The backgrounds and handicaps of the three lowest findings were given careful attention. The two lowest mental rating cases were those of brothers with a nervous disorder which affected the muscles of the eyes in such a way that the eyeballs move from right to left constantly, and it is only by moving the head in the opposite direction, that the eyes can be brought to focus on the page.

At the end of three months of remedial work with a great deal of individual attention, these two boys were given the individual Stanford-Binet Test, Form L. An extract from the letter of the examiner, Doctor E. D. Kane, to the principal of the school follows:

They were seen in the Winnebago County Guidance Center on December 7, 1943. All the children were cheerful, friendly, well-mannered, and cooperative. You have made them feel secure and have kept them happy . . . J. whose chronological age was 13 yr. 5 mo., had on the Binet Form L a mental age of 12 yr. 6 mo. and an I Q of 94, his judgment and reasoning were above average and his failures were verbal. He passed all eleven year tests and failed all average adult tests. His general intelligence level would be above that indicated by the I Q of 94. A. whose chronological age was 14 yr. 4 mo. had on the Binet Form L a mental age of 9 yr. 0 mo. and an I Q of 62. He passed all 8-year tests and failed all 12-year tests. Judgment was just as poor as verbal ability. He read fairly well but is decidedly dull and backward.

All the children are under the care of a competent physician - . . . J. seems to have the same problems as B. (His eye condition has made him lose desire to read and, therefore, his reaction to language tests was poor, also, his associates, his family, being somewhat dull and backward, his environment has in all probability not stimulated him to enlarge his vocabulary) but seems to be considerably brighter than B. . . A. is, of course, very dull and backward. The fact that you have placed him with those who are of his own age and size has kept him from realizing his dullness. You have made a happy stable boy.

This examination was given in Neenah, Wisconsin, by Elizabeth Kane, M. D., Medical Specialist in Mental Health for the Winnebago County Demonstration Guidance Center.

Classroom observation of J. is in agreement with Dr. Kane's test findings as regards his I Q. With improved reading, he could without doubt raise his mental rating above 100, as Dr.

Kane suggests: "His general intelligence level would be above that indicated by the I Q of 94."

A. did not do his best. Classroom diagnosis and study would make the instructor hesitate to class him as a dullard. He has shown instances of very good judgment. He is the oldest of a large family, is much smaller physically than his younger brother in the same grade, and is extremely timid, while his brother is arrogant. Another child specialist who interviewed A. (no formal test being administered) judged him slightly below normal, possibly about 85 I Q, handicapped because of serious eye trouble, very self-conscious, and suffering from an inferiority complex.

The student with the 73 I Q has not been given the opportunity of an individual I Q test. The only physical defect revealed by examination was neglected teeth, which, however, the school nurse considered serious enough to be a handicap. Further examinations were postponed because of family conditions. There are illiterates and feeble-minded members in her immediate family.

What this student accomplishes in one lesson is forgotten before the next. In written work she tries to appear bright by finishing before the others, attracting attention to the fact of her completion by noisily getting out some other work. In oral reading she guesses words, slurs over them, and is very impatient during vocabulary drill.

This pupil is receiving individual study and help. From

handling her, the examiner considers her far inferior mentally to the lowest in the class. Her reading grade of 4.5 is inconsistent with her classwork, as she was unable to handle work at a higher than third-grade level. After a study of the test results at the end of the first semester, further investigation into her difficulties will be mentioned.

The January testing program began with the administering of the Otis Self-Administering Test of Mental Ability, Form A, which was given on January 14 for the purpose of studying the progress of the children in the experimental group. The results of this test are tabulated in Table XIII, and compared therein with the results of the Otis Quick-Scoring Test of Mental Ability, Form A, given in September.

Provision in the Manual of Directions for Beta Test: Forms A and B, is made for practice effect when two forms of the same test are used within a short time. If the tests are taken two days apart, four points should be subtracted from the second score; three points for a week's interval; two points for a month's interval, and one point if the interval were three months or more. Correction for practice effect was made on all scores before comparing them with the norm for the pupil's age in the table of the manual; that is, before finding either the I Q or the mental age. The scores appearing in Table XIII are in the corrected form. The maximum correction of four points was made because a few items appearing in both above-mentioned forms are identical, and it was brought to the examiner's atten-

TABLE XIII

RESULTS OF JANUARY MENTAL TEST COMPARED WITH
SEPTEMBER MENTAL TEST RESULTS

No. and pupil	Jan. so.	Sept. so.	Ch. in so.	Jan. men. age	Sept. men. age	Ch. in men. age	Jan. Beta IQ	Sept. Beta IQ	Ch. in Beta IQ
1 L.M.	64	47	17	16- 6	13- 5	3- 1	129	112	17
2 R.Fe.	62	50	8	16- 1	14- 2	1-11	129	116	13
3 N.H.	58	46	12	15- 2	13- 3	1-11	127	113	14
4 C.VG.	60	36	24	15- 8	11- 4	4- 4	125	100	25
5 C.K.	59	50	9	15- 5	14- 2	1- 3	122	113	9
6 J.SH.	58	58	0	15- 2	15- 6	- 4	121	121	0
7 W.L.	55	54	1	14- 8	14-10	- 2	121	120	1
8 J.G.	55	43	12	14- 8	12- 8	2- 0	120	107	13
9 J.Ke.	54	37	17	14- 6	11- 6	3- 0	120	103	17
10 J.F.	54	44	10	14- 6	12-10	1- 8	119	109	10
11 T.K.	54	39	15	14- 6	11-10	2- 8	117	101	16
12 E.K.	46	37	9	13- 1	11- 6	1- 7	111	102	9
13 B.MC.	45	39	6	12-11	11-10	1- 1	110	104	6
14 J.Ko.	48	42	6	13- 5	12- 5	1- 0	110	104	6
15 R.B.	43	43	0	12- 8	12- 8	0	108	108	0
16 J.Y.	50	43	7	13-10	13- 8	1- 2	106	100	6
17 T.W.	43	30	13	12- 8	10- 5	2- 3	106	92	14
18 D.G.	44	29	15	12-10	10- 3	2- 7	106	90	16
19 B.G.	45	41	4	12-11	12- 3	8	105	101	4
20 P.VR.	49	34	15	13- 7	11- 0	2- 7	105	90	15
21 H.W.	40	20	20	12- 2	9- 0	3- 2	104	84	20
22 T.C.	37	28	9	11-10	10- 1	1- 9	103	94	9
23 G.C.	44	28	16	12-10	10- 1	2- 9	102	87	15
24 L.F.	40	35	5	12- 2	11- 2	1- 0	100	95	5
25 J.B.	34	25	9	11- 5	9- 8	1- 9	100	91	9
26 N.S.	39	31	8	12-1	10- 7	1- 6	99	91	8
27 R.Fu.	35	33	2	11- 6	11- 4	2	97	96	1
28 J.St.	36	27	9	11- 8	10- 0	1- 8	97	88	9
29 C.DL.	36	36	0	11- 8	11- 4	4	96	96	0
30 N.K.	31	22	9	11- 0	9- 3	1- 9	95	85	10
31 J.M.	36	16	20	11- 8	8- 5	3- 3	90	71	19
32 T.MH.	35	25	10	11- 0	9- 8	1- 4	88	82	6
33 A.M.	21	9	12	9- 8	7- 5	2- 3	70	60	10
34 V.B.	16	20	- 4	9- 0	9- 0	0	67	73	- 6
Cl. Md.	43 $\frac{1}{2}$	36		12- 9	10- 4		106	98	9

tion that some of the bright children had discussed among themselves answers about which they were doubtful or puzzled, and it was the desire of the examiner to give no unearned or doubtful credit.

Three inconsistencies occur in the mental ages for January. J. Sh., who has the same I Q in both tests, has 15-2 M.A. for January, whereas he had 15-6 in September. W. L., who changed from 120 I Q to 121 I Q has a January M. A. of 14-8, and a September M. A. of 14-10. R. B. made no change in I Q, but has the same M. A. for January as for September, whereas he should have advanced in accordance with his chronological age. These inconsistencies are probably due to the imperfect correlation between the two tests. The first contains 80 questions, and the second 75 questions; therefore, there is a difference in the tables in the manuals for mental ages. For example, J. Sh. made 58 in his score for both tests. The first manual gives 15-6 for the M. A. corresponding to this score, and the second manual gives 15-2 for the same score, although the I Q's are the same.

The scores obtained in the January test range from 16 to 64, with a Beta I Q range from 67 to 129, as compared with the September score distribution of 9 to 58, and the I Q's from 60 to 121. The changes in I Q's vary from minus 6 to plus 25. Children in the upper quartile rated from 0 to 25, while those in the lowest quartile rated from a minus 6 to plus 19; the

scatter in the middle half was similar. However, the coefficient of correlation between the September and January I Q's was plus .906. Some pupils, below the mean in September, were still below in January in spite of their gains, because of the advanced class mean.

The mean or average change in score was 9.64, while 9 was both the median and the mode. Two children made changes in scores between 20 and 25 points, while seven changed between 15 and 19 points; seven changed between 10 and 14 points; eleven between 5 and 9 points; three between one and four; and three made no change; one rated below the September level (-6). Half the class made between 9 and 17 points of gain, and 48% changed ten points or more, which can be compared with Lincoln's study in which 40% of the class changed 10 points or more.³⁵

In discussing the conclusions reached by Thorndike and others, Stoddard says:

The phenomenon of I Q variation for the best ranges of Binet testing amounting to 20 points, or more, in 16 per cent of the cases. This then becomes the normal expectancy for the I Q; that it may vary widely, and that we have no guarantee whatever that the obtained I Q for a child will represent his mental status at any later period of his life. We observe that a child can pass from the dull category to the bright, or that a bright child can become dull. Under certain circumstances, a tendency to move upward on the average is discernible, and it may be significant.³⁶

³⁵ George D. Stoddard, The Meaning of Intelligence, The Macmillan Co., New York, 1943, 224.

³⁶ Ibid., 222.

In an experiment carried on by Thorndike, Flemming, Hildreth, and Stranger, in three schools, while two showed a negligible average gain, in the third the average gain was over six points.³⁷ The retesting in these experiments was over $2\frac{1}{2}$ years after the first testing. The average gain in the present retesting program was somewhat higher, being 9.64 points after four months.

Goodenough sums up the matter thus:

Considering all the evidence, it is safe to say that 50% of elementary-school children will change their standing by more than 5 points of I Q in either direction, while the remaining 50% will show somewhat greater variation.³⁸

Terman gives a number of predictions regarding the chances that an I Q will either increase or decrease, in which he remarks that the mathematical complications involved in the study of these changes are so many and varied, that only a statistician of the first rank is equipped to deal with them.

According to Kuhlman-Anderson:

It has been known for some time that, for tests that give correct mental ages at all mental levels, intelligence quotients below 1.00 tend to decrease, and above 1.00 they tend to increase as the child grows older. The amount of change per year depends on the initial I.Q. and on the chronological age.

³⁷ Thirty-Ninth Yearbook, National Society for the Study of Education, "Intelligence: Its Nature and Nurture; Part II, Original Studies and Experiments," Public School Publishing Co., Bloomington, Ill., 1940, 361.

³⁸ Ibid., 357.

The total change during the mental growth period may exceed 25 I.Q. points. The change is due to the fact that the rate of normal, or average, mental development slows up with increasing years.³⁹

The fact that the results of the present study do not agree with the above conclusions, - those above 100 increasing, and those below 100 decreasing, - but shows great variation of change both above and below, seems to indicate that the September results were not true measures of mental ability, due, as it is hoped to be discovered, to reading disability.

There is one study given in Educational Method which is a challenge to greater growth:

Wellman found changes in I Q in a genetic study of individual children who attended a superior type of school. Growth in I Q was rather general with one 55-point increase being recorded, and gains of twenty points were rather common.⁴⁰

These results are far in excess of those found in the present retesting, but indicate that further increases can and have been made.

The above quotations and comparisons serve to show that changes made in the present study are neither unprecedented nor unique. As Goodenough says:

The point of all this is that changes in intelligence quotients, even of considerable magnitude are by no means the unique phenomena that many poorly in-

³⁹ Kuhlman-Anderson, Instruction Manual for Kuhlman-Anderson Intelligence Tests, The Educational Test Bureau, Minneapolis and Philadelphia, 1942, 17.

⁴⁰ M. J. Cohler, "Some Educational Implications of the Changing I Q," Educational Method, XIX (November, 1939), 113-117.

formed advocates of intelligence testing have assumed them to be.⁴¹

One of the three children listed in Table XIII as having made no gain (R.B.), was absent more than a month just prior to the date of testing. As will be noted later, his reading advanced considerably, as he was able to do an appreciable amount of reading under guidance at home, but practice for all types of reading necessary for a gain in a group mental test was not provided for in this way. The reading test was given to him under more ideal conditions than the mental test.

C.D.L., who made 96 I Q in both tests, has a feeling of inferiority, and gets very discouraged as soon as she meets a problem which she cannot solve immediately. She has no arithmetical sense, is in the poorest reading group, and while she advanced one year in reading, is still far below sixth grade level. She is conscious of her inferiority to others in the class.

The third child who made no gain (J.Sh.) was the highest in the September test. His I Q in both September and January was 121, which may be his ultimate limit, as he was not reading at his mental-age grade-expectancy, and while making considerable advancement in his reading grade, has failed to change his I Q. On the school records, he is listed as "86 I Q" on an individual mental test, and there is every evidence that good

⁴¹ Thirty-Ninth Yearbook II, op. cit., 359.

influence and proper motivation have been provided to bring him up to his present good standing, which, as shall be better indicated in the May results, may be his capacity. Because of deafness, he has been dealt with individually since first grade. His reading level was 7.8 in September, and 9.5 in January, which is only seven months below ability.

The pupil who scored six points lower on the January test may be an example of the unpredictable human element, but more likely her poor showing in January was due to maladjustment in personality, and very unfavorable and unstimulating home conditions. She is in the adolescent age, with ideas and interests older than others of the class, interested in the opposite sex, and maladjusted with other girls of her class.

Stoddard tells us that maladjustments in personality and behavior will affect the progress, and also the final level of intelligence, because ratings of intelligence involve a resistance to emotional interference. When the adolescent becomes illogical or irrational, this will contribute to a lowering of his general mental adequacy.⁴²

In regard to the cases mentioned individually above, the findings of Pritchard and others may throw light upon the reliability of these findings:

In a school devoted to inferior deviates Pritchard and others found no appreciable rise in I Q as a result of two years of special education. This

⁴² George D. Stoddard, op. cit., 420.

confirms the results of Lamson and others.⁴³

Pritchard, Horan, and Hollingworth⁴⁴ report their inability to raise the I Q's of dull children in special classes in which the most stimulating program they were able to provide was employed. Hollingworth was unable to increase the learning ability of children with 130 I Q to the learning ability at 160 under special class instruction, probably unequalled in the country. Were the I Q's of this study derived by the division method, the 121 I Q referred to above would be the equivalent of 134, which makes it comparable to the above reference.

In none of the studies quoted above has the matter of cause of change been discussed here. None of them is identical to the present project.

It has already been pointed out that a definite aim has been established to bring about a change in I Q ratings through improvement in the study-type reading skills that are utilized in group tests of mental ability. Relationship between these changes herein tabulated, and those gains made in reading will be taken up in the following pages.

On January 13, Form BM of The Iowa Silent Reading Test was administered to the sixth-grade group of thirty-four children who were present for the September testing.

43 Thirty-Ninth Yearbook I, op. cit., 54.

44 Thirty-Ninth Yearbook II, op. cit., 465.

TABLE XIV

JANUARY READING TEST RESULTS OF TOTAL ABILITY COMPARED
WITH SEPTEMBER READING GRADE EQUIVALENTS

Number and pupil	Jan. md. score	Jan. r. age equiv.	Jan. r. gr. equiv.	Jan. men. age	Jan. men. age gr. eq.	Jan. dev. of m. a. gr. eq.	Sept. r. gr. equiv.	Ch. in r. gr. equiv.
1 C.K.	74	14-6	10.1	15-5	10-4	-.3	7.6	2.5
2 J.Sh.	71 $\frac{1}{4}$	14-1 $\frac{1}{2}$	9.5	15-2	10-2	-.7	7.8	1.7
3 H.H.	70 $\frac{3}{4}$	13-11	9.3	15-2	10-2	-.9	7.5	1.8
4 R.Pe.	70 $\frac{3}{4}$	13-11	9.3	16-1	*	*	7.5	1.8
5 L.M.	66 $\frac{1}{2}$	13-2 $\frac{1}{2}$	8.5	16-6	*	*	7.3	1.2
6 J.G.	64	12-10	8.0	14-8	9-7	-1.7	6.8	1.2
7 J.F.	64	12-10	8.0	14-6	9-5	-1.5	6.2	1.8
8 R.B.	61 $\frac{3}{4}$	12-4	7.5	12-8	7-6	-.2	4.9	2.6
9 J.Y.	61	12-3	7.5	13-10	8-8	-1.3	6.4	1.1
10 P.VR.	60 $\frac{1}{4}$	12-3	7.4	13-7	8-6	-1.2	5.6	1.8
11 B.MC.	57 $\frac{1}{2}$	11-9	6.9	12-11	7-9	-1.0	6.9	0.0
12 J.Ke.	57	11-8	6.8	14-6	9-5	-2.7	5.4	1.4
13 W.L.	56	11-5	6.6	14-8	9-7	-3.1	5.6	1.0
14 B.G.	55 $\frac{1}{2}$	11-5	6.6	12-11	7-9	-1.3	6.2	0.4
15 T.K.	55	11-5	6.6	14-6	9-5	-3.0	5.9	0.6
16 R.Pu.	54 $\frac{1}{2}$	11-4 $\frac{1}{2}$	6.4	11-6	6-5	-.1	4.8	1.6
17 T.W.	54	11-4	6.3	12-8	7-7	-1.4	4.7	1.6
18 J.Ko.	53 $\frac{1}{2}$	11-1	6.2	13-5	8-4	-2.2	6.5	-0.3
19 N.S.	53	11-1	6.2	12-1	7-1	-.9	4.5	1.7
20 C.DL.	52	11-0	6.0	15-8	10-7	-4.7	4.9	1.1
21 E.K.	52	11-0	6.0	13-1	8-1	-2.1	4.8	1.2
22 J.St.	51	10-10	5.9	11-8	6-7	-.8	4.4	1.5
23 T.C.	48 $\frac{1}{2}$	10-7	5.6	11-10	6-8	-1.2	4.2	1.4
24 L.P.	46	10-2	5.2	12-2	7-2	-2.0	4.5	0.7
25 H.W.	45	10-1	5.1	12-2	7-2	-2.1	4.4	0.7
26 C.DL.	44 $\frac{1}{2}$	10-0 $\frac{1}{2}$	4.9	11-8	6-7	-1.8	3.9	1.0
27 J.M.	44	10-0	4.9	11-8	6-7	-1.8	4.3	0.6
28 D.G.	43	9-11	4.8	12-10	7-8	-3.0	4.7	0.1
29 N.K.	42	9-10	4.7	11-0	6-0	-1.3	4.5	0.2
30 J.B.	42	9-10	4.7	11-5	6-4	-1.7	3.5	1.2
31 G.C.	41 $\frac{1}{2}$	9-8 $\frac{1}{2}$	4.7	12-10	7-8	-3.1	3.4	1.3
32 T.MH.	40 $\frac{3}{4}$	9-6 $\frac{1}{2}$	4.6	11-0	6-0	-1.4	3.6	1.0
33 A.M.	38	9-3	4.2	9-8	4-7	-.5	3.3	0.9
34 V.B.	33	8-8	3.7	9-0	4-0	-.3	4.5	-0.8
Gr.md.	54 $\frac{1}{4}$	11-11	6.4					
Cl.md.	53 $\frac{3}{4}$	11-3 $\frac{1}{2}$	6.3					

* Mental-age grade-expectancy is not figured above 16 years M.A.

hence mental ages) have pushed this expectancy higher, so that all were still below their ability ratings in January. Deviations ranged from one month to four years seven months after re-testing. These deficiencies indicated that much improvement could still be made during the remaining months in order to eradicate the inconsistencies which existed between ability and accomplishment.

Test I, Part A, Rate, the first separate tabulation of the subtests is given in Table XV, together with the comparisons with September findings. The scores in this test have a spread from 19 to 78. In September the range was from 21 to 72. The January grade range was from 2.9 to 9.6. In January only eleven pupils, or approximately one-third of the class, were reading at 6.4 grade level, or above, while in September fourteen were up to their grade median, or above. Two pupils rated below 2.9 grade level, three second-grade level, four third-grade, five fourth-grade, eight fifth-grade, six sixth-grade, four eighth-grade, one tenth, and one eleventh-grade level.

More careful reading, to avoid rereading to answer questions, may be partly the cause of the lowering of rates during the first semester, and of four making no change. The changes in rate scores varied from -16 to 29 points, or interpreted in terms of years and months, from a drop of one year and nine months to a gain of four years and two months. The January grade median was 48, or 5.5 grade level, whereas the September median was 44, or $4.9\frac{1}{2}$ grade level.

TABLE XV

RESULTS OF JANUARY READING TEST I, PART A, RATE, COMPARED WITH SEPTEMBER TEST I, PART A, RATE

Number and pupil	Jan. score in rate	Jan. gr. eq. in rate	Sept. score in rate	Sept. gr. eq. in rate	Change in score	Change in grade
1 R Pe.	78	11.1	59	7.1	19	4.0
2 J.Sh.	74	10.1	72	9.6	2	0.5
3 N.H.	66	8.4	58	6.9	8	1.5
4 W.L.	65	8.2	56	6.6	9	1.6
5 R.Pu.	65	8.2	36	4.0	29	4.2
6 R.B.	64	8.0	52	6.0	12	2.0
7 J.G.	58	6.9	62	7.6	- 4	-0.7
8 J.M.	56	6.6	32	3.6	24	3.0
9 J.F.	56	6.6	52	6.0	4	0.6
10 B.MC.	55	6.5	56	6.6	- 1	-0.1
11 J.Ko.	55	6.5	55	6.5	0	0.0
12 C.K.	52	6.0	64	8.0	-12	-2.0
13 P.VR.	50	5.7	42	4.7	8	1.0
14 E.K.	50	5.7	38	4.2	12	1.5
15 N.S.	50	5.7	34	3.8	16	1.9
16 J.Y.	48	5.5	46	6.2	2	0.3
17 T.K.	48	5.5	55	6.5	- 7	-1.0
18 T.C.	48	5.5	48	5.5	0	0.0
19 J.Ke.	46	5.2	55	6.5	- 9	-1.3
20 N.K.	46	5.2	52	6.0	- 6	-0.8
21 H.W.	44	4.9	53	6.2	- 9	-1.3
22 L.M.	42	4.7	40	4.5	2	0.2
23 J.B.	42	4.7	21	-2.9	21	1.8
24 C.VG.	38	4.2	30	3.4	8	0.8
25 J.St.	36	4.0	32	3.6	4	0.4
26 V.B.	34	3.8	50	5.7	-16	-1.9
27 C.DL.	30	3.4	36	4.0	- 6	0.6
28 A.M.	30	3.4	28	3.2	2	0.2
29 L.P.	28	3.2	34	3.8	- 6	-0.6
30 B.G.	25	2.9	34	3.8	- 9	-0.9
31 T.W.	25	2.9	34	3.8	- 9	-0.9
32 D.G.	25	2.9	38	4.2	-13	-1.3
33 G.C.	21	-2.9	25	2.9	- 4	0.0
34 T.MH.	19	-2.9	23	-2.9	- 4	0.0
Gr. md.	54 $\frac{1}{2}$	6.4	52	6.0		
Cl. md.	48	5.5	44	4.9		

Lowering of rate for such readers as are poor in comprehension is desirable, until a speed with accuracy is found. While rate is the easiest reading need to develop, it must vary with different types of reading. Recognition of this adjustment of rate to reading type must be taught.

Six of the twenty-three rating below the January grade median were in the upper half of the class, while several in the lower half made significant gains.

During the second semester a closer watch over the rates of different types of reading, and more frequent check-ups where rate and comprehension were tested together, were carried out in the various groups, in an effort to bring all up to their highest rate without impairing comprehension. The results of these check-ups were kept by the children and compared from test to test in order that they might see the correlation, and study the need for adjustment.

Table XVI shows the January Test results of Test I, Part B, Comprehension, with a score distribution from 35 to 78, spread from grade 3.9 to 11.1, or 7.2 years. The class median was 60, the median for 6.3 grade level. In September the comprehension scores ranged from 23 to 78, or -2.9 to 11.1 grade level. The median was that of 4.9 grade, or one year and one month below grade. Fifteen rated sixth-grade scores in September, while sixteen were up to grade level in January, with three others just one month below. The class median was only one month below grade expectancy, whereas in September it was more

TABLE XVI

RESULTS OF JANUARY READING TEST I, PART B, COMPREHENSION, COMPARED WITH SEPTEMBER READING TEST I, PART B, COMPREHENSION

Number and pupil	Jan. score in comprehension	Jan. gr. eq. in comprehension	Sept. score in comprehension	Sept. gr. eq. in comprehension	Change in comprehension score	Change in comprehension grade
1 C.K.	78	11.1	61	7.5	17	3.6
2 R.Pe.	73	9.8	47	5.3	27	4.5
3 J.G.	69	9.0	61	7.5	8	1.5
4 J.Sh.	65	8.2	61	7.5	4	0.7
5 N.H.	65	8.2	61	7.5	4	0.7
6 T.K.	65	8.2	47	5.3	18	2.9
7 J.Ke.	65	8.2	40	4.5	25	3.7
8 L.M.	62	7.6	69	9.0	- 7	-1.4
9 J.Y.	62	7.6	69	9.0	- 7	-1.4
10 P.VR.	62	7.6	58	6.9	4	0.7
11 W.L.	62	7.6	78	11.1	- 6	-3.5
12 B.MC.	60	7.3	40	4.5	20	2.8
13 J.Ko.	60	7.3	61	7.5	- 1	-0.2
14 B.G.	60	7.3	47	5.3	13	2.0
15 R.B.	60	7.3	37	4.1	23	3.2
16 N.S.	60	7.3	47	5.3	13	2.0
17 J.F.	54	6.3	54	6.3	0	0.0
18 E.K.	54	6.3	37	4.1	17	2.2
19 T.C.	54	6.3	23	-2.9	31	3.4
20 R.Pu.	50	5.7	44	4.9	6	0.8
21 T.W.	50	5.7	44	4.9	6	0.8
22 N.K.	47	5.3	40	4.5	7	0.8
23 H.W.	47	5.3	30	3.4	17	1.9
24 J.St.	47	5.3	44	4.9	3	0.4
25 C.VG.	44	4.9	37	4.1	7	0.8
26 T.MH.	44	4.9	30	3.4	14	1.5
27 D.G.	40	4.5	44	4.9	- 4	-0.4
28 L.P.	40	4.5	27	3.1	13	1.4
29 J.B.	40	4.5	30	3.4	10	1.1
30 V.B.	35	3.9	37	4.1	- 2	-0.2
31 J.M.	35	3.9	54	6.3	-19	-2.4
32 C.DL.	35	3.9	23	-2.9	12	1.0
33 G.C.	35	3.9	30	3.4	5	0.5
34 A.M.	35	3.9	30	3.4	5	0.5
Gr. md.	54½	6.4	52	6.0		
Cl. md.	54	6.3	44	4.9		

than a year below. In January five pupils made fourth-grade scores, five made fifth-grade scores, three sixth, and nine seventh, while four made eighth, two ninth, and one eleventh-grade scores.

Seven children lost in comprehension, the changes in grade equivalents ranging from minus three years and five months to more than four years and five months. This wide range was further indication that rate and comprehension were not properly correlated, and a need for more careful study of individual accomplishments in order to equalize these skills was needed.

The children who rated high were: six who made between one and two year's gain; four between two years and three years; four between three years and four years; and one gained four and one half years. Those who made scores indicating gains of four months to a year were nine in number. There were ten who made less than four months' gain, seven of whom, as before mentioned, lost in grade level.

Test II, Directed Reading, was more encouraging in the January results. Table XVII gives the tabulation. The scores were distributed over seven years and three months, or from 4.7 to above 12 grade level, and between 42 and 91 scores. The change in grade equivalent was from minus three months to four years and four months. Only one child made a minus change. Comparing these results with those of September, we found improvement in this reading skill. The grade distribution then

TABLE XVII

RESULTS OF JANUARY READING TEST II, DIRECTED READING, COMPARED
WITH SEPTEMBER READING TEST II, DIRECTED READING

Number and pupil	Jan. score in dir.rdg.	Jan. gr.eq. in dir.rdg.	Sept. score in dir.rdg.	Sept. gr. eq. in dir.rdg.	Change in score	Change in grade
1 L.M.	91	12 plus	66	8.4	25	3.6
2 J.Sh.	89	12 plus	86	12.0	3	0.3
3 R.Fe.	88	12 plus	64	8.0	24	4.0
4 N.H.	86	12 plus	74	10.1	12	1.9
5 C.K.	83	12 plus	62	7.6	21	4.4
6 B.G.	77	10.8	66	8.4	11	2.4
7 B.MC.	72	9.6	62	7.6	10	2.0
8 F.VR.	72	9.6	57	6.8	15	2.8
9 W.L.	72	9.6	42	4.7	30	4.9
10 J.G.	69	9.0	62	7.6	7	1.4
11 J.Ke.	67	8.6	24	-2.9	43	5.7
12 J.Ko.	66	8.4	66	8.4	0	0.0
13 J.F.	66	8.4	42	4.7	24	3.7
14 J.Y.	64	8.0	48	5.5	16	2.5
15 T.C.	64	8.0	40	4.5	24	3.5
16 T.K.	62	7.6	62	7.6	0	0.0
17 C.VG.	62	7.6	30	3.4	32	4.2
18 D.G.	62	7.6	48	5.5	14	2.1
19 R.B.	60	7.3	59	7.1	1	0.2
20 E.K.	59	7.1	50	5.7	9	1.4
21 T.W.	59	7.1	40	4.5	19	2.6
22 L.P.	59	7.1	46	5.2	13	1.9
23 N.S.	59	7.1	30	3.4	29	3.7
24 N.K.	57	6.8	46	5.2	11	1.6
25 H.W.	57	6.8	42	4.7	15	2.1
26 J.St.	57	6.8	44	4.9	13	1.9
27 G.C.	57	6.8	40	4.5	17	2.3
28 J.B.	55	6.5	33	3.7	22	2.8
29 C.DL.	53	6.2	35	3.9	18	2.3
30 J.M.	50	5.7	42	4.7	8	1.0
31 R.Pu.	48	5.5	35	3.9	13	1.6
32 V.B.	44	4.9	46	5.2	- 2	-0.3
33 T.MH.	42	4.7	33	3.7	9	1.0
34 A.M.	42	4.7	30	3.4	12	1.3
Gr. md.	54 $\frac{1}{2}$	6.4	52	6.0		
Cl. md.	62	7.6	46	5.2		

was -2.9 to 12 plus, and between 24 and 86 scores. The September median was only 46, fifth grade two months' level, whereas the January median was above grade, or 62, the 7.6 grade level, showing a median gain of two years and four months.

In the January results only six pupils rated below the 6.4 grade level, these making the following grade levels: three fourth-grade; two fifth-grade; and one sixth-grade two months. Six others made sixth-grade levels, eight seventh-grade, five eighth-grade, four ninth-grade, one tenth, and five scored above twelfth-grade level.

Regarding the change in grade equivalent, one pupil made a minus or three months' loss, two made no change, two made less than four months, ten gained between one and two years, ten made between two and three years, four between three and four years, and four between four and five years.

The results of this test were gratifying enough to let the emphasis be shifted to weaker points in the total structure. Carry-over into content subjects aided greatly in the improvement indicated in this reading skill.

Table XVIII shows the comparative study of the January and September accomplishments in Word Meaning. While improvement was positive in all but a few cases, as a class their standing was still about five months below grade. The scores ranged from 26 to 79, or a grade range of 3.0 to 11.3, the median being 51, or 5.9 grade level. The changes in grade equivalent from -1.9 to 3.2 years show an improvement. In Sep-

TABLE XVIII

RESULTS OF JANUARY READING TEST III, WORD MEANING, COMPARED
WITH SEPTEMBER READING TEST III, WORD MEANING

Number and pupil	Jan. score in word meaning	Jan. gr. eq. in word meaning	Sept. score in word meaning	Sept. gr. eq. in word meaning	Change in score	Change in grade
1 C.K.	79	11.3	65	8.2	14	2.1
2 R.Fe.	72	9.6	63	7.8	9	1.8
3 N.H.	69	9.0	63	7.8	6	1.2
4 J.Sh.	66	8.4	51	5.9	15	2.5
5 R.Fu.	66	8.4	46	5.2	20	3.2
6 J.Y.	65	8.2	55	6.5	10	1.7
7 B.G.	65	8.2	49	5.6	16	2.6
8 L.M.	63	7.8	49	5.6	14	2.2
9 W.L.	60	7.3	43	4.8	17	2.5
10 J.F.	58	6.9	55	6.5	3	0.4
11 J.Ke.	58	6.9	48	5.5	10	1.4
12 J.G.	56	6.6	53	6.2	3	0.4
13 P.VR.	53	6.2	41	4.6	12	1.6
14 J.St.	51	5.9	41	4.6	10	1.3
15 R.B.	51	5.9	43	4.8	8	1.1
16 C.VG.	51	5.9	49	5.6	2	0.3
17 E.K.	51	5.9	49	5.6	2	0.3
18 T.W.	51	5.9	45	5.1	6	0.8
19 H.W.	49	5.1	41	4.6	8	1.0
20 T.K.	48	5.5	48	5.5	0	0.0
21 J.Ko.	46	5.2	43	4.8	3	0.4
22 T.C.	46	5.2	36	4.0	10	1.2
23 C.DL.	46	5.2	33	3.7	13	1.5
24 L.P.	43	4.8	30	3.4	13	1.4
25 N.K.	43	4.8	37	4.1	6	0.7
26 B.MC.	42	4.7	56	6.6	-14	-1.9
27 N.S.	42	4.7	37	4.1	5	0.6
28 J.M.	35	3.9	35	3.9	0	0.0
29 D.G.	33	3.7	33	3.7	0	0.0
30 J.B.	33	3.7	27	3.1	6	0.6
31 V.B.	32	3.6	26	3.0	6	0.6
32 G.C.	32	3.6	29	3.3	3	0.3
33 A.M.	32	3.6	22	-2.9	10	0.7
34 T.MH.	26	3.0	30	3.4	-4	-0.4
Gr. md.	54½	6.4	52	6.0		
Cl. md.	51	5.9	43	4.8		

tember the scores were between 22 and 65, or -2.9 to 8.2 grades, with a median of 43, or 4.8 grade level. The gain was one year and one month in median grade level, although all but twelve were still below the 6.4 grade expectancy of January. Seven made third-grade scores, ten fifth-grade, four sixth, two seventh, four eighth, two ninth, and one eleventh-grade level.

Much effort was still needed in this field, as word-meaning is one of the most important factors in an intelligence test. Stoddard quotes from Terman and Merrill on this point as follows:

We have found the vocabulary test to be the most valuable single test in the scale. Its interest value is high, it represents a familiar task to the subjects, and the fact that it begins with words in common use and increases rapidly in difficulty gives the examiner a rapid survey method of estimating the subject's ability. It agrees to a high degree with the mental age rating on the scale as a whole, correlations for single age groups range from .65 to .91 with an average of .81.⁴⁵

Statistics show, he claims, that in a large majority of cases the vocabulary test alone will give us an intelligence quotient within 10% of that secured by the entire scale.⁴⁶

Joseph Miller makes the following statement:

During the present study it was found that 23 children out of 48 members of the special class were scoring low on intelligence tests because, due to their environment and limited experience, they

45 George D. Stoddard, op. cit., 109-110.

46 Loc. cit.

lacked the vocabulary or the conceptions necessary for correct solutions.⁴⁷

More successful methods of motivation were sought during the second semester for such aids as the vocabulary notebook, in order to develop a pride in better reading, speaking, and writing vocabularies.

Test IV, Part A, according to the results tabulated in Table XIX, indicates that the Central Idea of a Paragraph, was another weak point in the reading ability of the experimental class. Nine children rated lower than in September, and ten made no change since the September test. Those fifteen pupils who made improvement in this skill raised their grade levels from eight months to six year and seven months over their September ratings, while those with minus changes lowered their September grade levels as much as three years and nine months.

The class median was 51, or 5.9 grade level, which is exactly the same as the September median. This indicates a loss of four months, as no improvement took place during the period of remedial training. The wide range of ability, and the diversity of grade change, indicated the need for careful analysis and correction through proper diagnosis and remedial measures.

In the January test, two children rated third-grade scores, ten fourth, eleven fifth, five seventh, three eighth, and two 10.6 grade level.

⁴⁷ Joseph Miller, "The Retarded Child and the Special Class," Educational Method, XI (February, 1932), 267.

TABLE XIX

RESULTS OF JANUARY READING TEST IV, PART A, CENTRAL IDEA OF
A PARAGRAPH, COMPARED WITH SEPTEMBER READING TEST
PART A, CENTRAL IDEA OF A PARAGRAPH

Number and pupil	Jan. score in cent. idea	Jan. gr. eq. in cent. idea	Sept. score in cent. idea	Sept gr. eq. in cent. idea	Change in score	Change in grade
1 J. Sh.	76	10.6	68	8.7	8	1.8
2 B. G.	76	10.6	35	3.9	41	6.7
3 C. K.	68	8.7	76	10.6	- 8	1.9
4 J. G.	68	8.7	60	7.3	8	1.4
5 P. VR.	68	8.7	60	7.3	8	1.4
6 N. H.	60	7.3	68	8.7	- 8	-1.4
7 L. M.	60	7.3	76	10.6	-16	3.3
8 J. F.	60	7.3	76	10.6	-16	3.3
9 R. B.	60	7.3	60	7.3	0	0.0
10 E. K.	60	7.3	60	7.3	0	0.0
11 B. MC.	51	5.9	68	8.7	17	2.8
12 J. Ko.	51	5.9	51	5.9	0	0.0
13 J. Y.	51	5.9	51	5.9	0	0.0
14 T. K.	51	5.9	51	5.9	0	0.0
15 J. Ke.	51	5.9	43	4.8	8	.8
16 C. VG.	51	5.9	60	7.3	- 9	-1.4
17 T. W.	51	5.9	51	5.9	0	0.0
18 L. P.	51	5.9	51	5.9	0	0.0
19 J. St.	51	5.9	43	4.8	8	0.9
20 J. M.	51	5.9	35	3.9	16	2.0
21 G. C.	51	5.9	0	-2.9	51	3.0
22 R. Pe.	43	4.8	68	8.7	25	-3.9
23 W. L.	43	4.8	60	7.3	-17	-2.5
24 D. G.	43	4.8	43	4.8	0	0.0
25 N. S.	43	4.8	60	7.3	-17	-2.5
26 H. W.	43	4.8	35	3.9	8	0.9
27 T. C.	43	4.8	51	5.9	- 8	-0.9
28 C. DL.	43	4.8	35	3.9	8	0.9
29 T. MH.	43	4.8	43	4.8	0	0.0
30 J. B.	43	4.8	43	4.8	0	0.0
31 A. M.	43	4.8	35	3.9	8	0.9
32 N. K.	35	3.9	43	4.8	- 8	-0.9
33 R. Pu.	35	3.9	60	7.3	-25	-3.4
34 V. B.	0	-2.9	43	4.8	-43	-1.9
Gr. md.	54 $\frac{1}{2}$	6.4	52	6.0		
Cl. md.	57	6.7 $\frac{1}{2}$	51	5.9		

Table XX shows that in Test IV, Part B, Development of a paragraph, better results were obtained than in the Central Idea of a Paragraph. The class median for January was 57, or $6.7\frac{1}{2}$ level, three and one half months above the January level. In september this reading skill was poorer than ability in finding the central idea. The September median in Paragraph Development was 48 at that time, or 5.5 grade level, compared to 51, or 5.9 grade level in the former test.

Advancement in Development of a Paragraph since September amounted to one year and two months. The September median was 48, or 5.5 grade level, compared with January's median of 57, or $6.7\frac{1}{2}$ grade level.

Three children decreased their scores and consequently lowered their grade levels, while eight made no change. The positive gains were spread from four months to four years. One child made third-grade level, seven rated fourth, four fifth, six sixth, four seventh, ten eighth, and two eleventh-grade level.

In the light of these results, the emphasis was shifted to Central Idea in paragraph study during the second semester. Durrell tells us that paragraph comprehension is a basic skill in thorough reading.⁴⁸ The importance of the two skills tested in Test IV emphasizes the need to apply the best remedial mea-

48 Donald D. Durrell, op. cit., 234.

TABLE XX

RESULTS OF JANUARY READING TEST IV, PART B, DEVELOP-
 MENT OF A PARAGRAPH, COMPARED WITH SEPTEMBER
 TEST IV, PART B, DEVELOPMENT OF A PARAGRAPH

Number and pupil	Jan. score in par.dev.	Jan. gr.eq. in par.dev.	Sept. score in par.dev.	Sept. gr. eq. in par.dev.	Change in score	Change in grade
1 J. Sh.	79	11.3	79	11.3	0	0.0
2 B. G.	79	11.3	60	7.3	19	4.0
3 R. Fe.	68	8.7	68	8.7	0	0.0
4 L. M.	68	8.7	64	8.0	4	0.7
5 R. Fu.	68	8.7	48	5.5	20	3.2
6 T. W.	64	8.0	52	6.0	12	2.0
7 N. H.	64	8.0	64	8.0	0	0.0
8 B. M. C.	64	8.0	56	6.6	8	1.4
9 J. G.	64	8.0	64	8.0	0	0.0
10 J. Y.	64	8.0	60	7.3	4	0.7
11 J. F.	64	8.0	56	6.6	8	1.4
12 R. B.	64	8.0	52	6.0	12	2.0
13 W. L.	60	7.3	39	4.4	21	2.9
14 J. Ke.	60	7.3	52	6.0	8	1.3
15 E. K.	60	7.3	48	5.5	12	1.8
16 N. S.	60	7.3	34	3.8	26	3.5
17 C. K.	58	6.9	60	7.3	- 2	-0.4
18 T. K.	56	6.6	56	6.6	0	0.0
19 P. V. R.	56	6.6	56	6.6	0	0.0
20 C. V. G.	56	6.6	39	4.4	17	2.2
21 V. B.	56	6.6	39	4.4	17	2.2
22 J. St.	52	6.0	30	3.4	22	2.6
23 J. Ko.	48	5.5	52	6.0	- 4	-0.5
24 D. G.	48	5.5	43	4.8	5	0.7
25 L. P.	48	5.5	48	5.5	0	0.0
26 N. K.	48	5.5	43	4.8	5	0.7
27 H. W.	43	4.8	27	3.1	16	1.7
28 T. C.	43	4.8	34	3.8	9	1.0
29 C. D. L.	43	4.8	39	4.4	4	0.4
30 J. B.	43	4.8	16	-2.9	27	1.9
31 G. C.	43	4.8	48	5.5	- 5	-0.7
32 T. M. H.	39	4.4	27	3.1	12	1.3
33 A. M.	39	4.4	34	3.8	5	0.6
34 J. M.	34	3.8	34	3.8	0	0.0
Gr. md.	54½	6.4	52	6.0		
Cl. md.	57	6.7½	48	5.5		

asures to assure successful reading in both these abilities. The usefulness of these abilities in content subjects makes them adaptable criteria in the establishing of proper study skills, by applying them as techniques to the preparation of such studies as history, geography, and English, which provide excellent opportunities for the development of thorough reading habits.

The results of Sentence Meaning, Test V, are given in Table XXI. This table shows that even in January after four months of remedial work, the children were still considerably below the median of their grade. There was a small but positive change since the September testing, however, as the class median then was 39, the $4.3\frac{1}{2}$ grade level, while the January median was 43, or 4.8 grade level. The September scores were scattered from 27 to 72, a grade spread from 3.1 to 9.6, while the January scores ranged from 0 to 77, covering a grade level range from -3 to 10.8.

Eight children scored below September ratings, while three made no change. Those children with positive changes gained between three months, and seven years and two months. The January grade distribution was as follows: one pupil rated below second grade; three made third-grade scores; one sixth; one seventh; one eighth; five ninth; and two the tenth-grade level.

This is the only one of the reading tests that is of the true-false type, with right-minus-wrong element. The class as a whole never does well on this type of test, and needs more ex-

TABLE XXI

RESULTS OF JANUARY READING TEST V, SENTENCE MEANING,
 COMPARED WITH RESULTS OF SEPTEMBER READING
 TEST V, SENTENCE MEANING

Number and pupil	Jan. score in s.m.	Jan. gr. eq. in s. m.	Sept. score in s. m.	Sept. gr. eq. in s. m.	Change in score	Change in grade
1 C.K.	77	10.8	60	7.3	17	3.5
2 J.F.	77	10.8	32	3.6	45	7.2
3 N.H.	72	9.6	56	6.6	16	3.0
4 J.Sh.	69	9.0	60	7.3	9	1.7
5 R.Pe.	69	9.0	36	4.0	33	5.0
6 L.M.	69	9.0	48	5.5	21	3.5
7 J.Y.	69	9.0	54	6.3	15	2.7
8 R.B.	66	8.4	40	4.5	26	3.9
9 P.VR.	59	7.1	48	5.5	11	1.6
10 W.L.	52	6.0	48	5.5	4	0.5
11 R.Pu.	48	5.5	36	4.0	12	1.5
12 N.S.	48	5.5	50	5.7	- 2	-0.2
13 B.G.	46	5.2	72	9.6	-26	-4.4
14 J.G.	45	5.1	45	5.1	0	0.0
15 T.C.	45	5.1	30	3.4	15	1.7
16 J.Ke.	43	4.8	40	4.5	3	0.3
17 C.VG.	43	4.8	43	4.8	0	0.0
18 E.K.	43	4.8	36	4.0	7	0.8
19 H.W.	43	4.8	38	4.2	5	0.6
20 C.DL.	43	4.8	35	3.9	8	0.9
21 J.Ko.	41	4.6	60	7.3	-19	-2.7
22 D.G.	41	4.6	33	3.7	8	0.9
23 J.M.	41	4.6	33	3.7	8	0.9
24 N.K.	40	4.5	27	3.0	13	1.5
25 J.St.	40	4.5	43	4.8	- 3	-0.3
26 T.MH.	40	4.5	32	3.6	8	0.9
27 B.MC.	38	4.2	41	4.6	- 3	-0.4
28 T.K.	38	4.2	46	5.2	- 8	-1.0
29 L.P.	38	4.2	35	3.9	3	0.3
30 G.C.	36	4.0	32	3.6	4	0.4
31 J.B.	35	3.9	35	3.9	0	0.0
32 A.M.	35	3.9	27	3.1	8	0.8
33 T.W.	32	3.6	35	3.9	- 3	-0.3
34 V.B.	0	-2.9	27	3.1	-27	-0.2
Gr. md.	54½	6.4	52	6.0		
Cl. md.	43	4.8	39	4.3½		

perience with it in order to eliminate the guessing.

Hawkes, Lindquist and Mann make the following comment regarding this type of test:

Test technicians in general have steadily been losing confidence in this technique, and at present it is employed in very few standardized achievement tests.⁴⁹

As word recognition and vocabulary increase, the ability to read sentences should improve. Usually nothing more is needed than to give the pupils practice in reading sentences, and answering questions to test their comprehension. Word meaning was the cause of many errors made. During the second semester more use was made of the "yes-no" and "true-false" type of test in history and geography check-ups, as well as in reading.

Only nine children were at or above grade level, and twenty-five were below; therefore, it was most evident that this reading skill needed careful study and remedial drill.

The results of drill can readily be seen by a study of Table XXII, Test VI, Part A, Alphabetizing, which shows that in September the median score was 48, the 5.5 grade level, while in January it was 62, or 7.6 grade level, a gain in class median of two years and one month. The scores in September were spread from 0 to 83, and in January from 0 to 88, which gave the same grade ability distribution, -2.9 to 12 plus. Five of the children lowered their scores, although three of

⁴⁹ Hawkes, Lindquist, Mann, The Construction and Use of Achievement Examinations, Houghton Mifflin Co., N. Y., 1936, 153.

TABLE XXII

RESULTS OF JANUARY TEST VI, PART A, ALPHABETIZING,
 COMPARED WITH RESULTS OF SEPTEMBER TEST
 VI, PART A, ALPHABETIZING

Number and pupil	Jan. score in alpha.	Jan. gr. eq. in alpha.	Sept. score in alpha.	Sept. gr. eq. in alpha.	Change in score	Change in grade
1 L.M.	88	12 plus	83	12 plus	5	0.0
2 D.G.	88	12 plus	70	9.2	18	2.8
3 G.C.	88	12 plus	67	8.6	21	3.4
4 N.S.	83	12 plus	35	3.9	48	8.3
5 T.C.	83	12 plus	44	4.9	39	7.3
6 N.H.	78	11.1	57	6.8	21	4.3
7 J.Sh.	74	10.1	40	4.5	24	5.6
8 B.MC.	74	10.1	64	8.0	10	2.1
9 J.F.	70	9.2	60	7.3	10	1.9
10 T.K.	67	8.6	46	5.2	21	3.4
11 R.Pu.	67	8.6	64	8.0	3	0.6
12 T.W.	67	8.6	62	7.6	5	1.0
13 P.VR.	64	8.0	46	5.2	18	2.8
14 R.B.	64	8.0	40	4.5	24	3.5
15 L.P.	64	8.0	46	5.2	18	2.8
16 J.B.	64	8.0	46	5.2	18	2.8
17 C.K.	62	7.6	57	6.8	5	0.8
18 J.Ko.	62	7.6	42	4.7	20	2.9
19 C.VG.	62	7.6	46	5.2	16	2.4
20 B.G.	60	7.3	60	7.3	0	0.0
21 J.Ke.	60	7.3	46	5.2	14	2.1
22 J.G.	57	6.8	62	7.6	- 5	-0.8
23 W.L.	57	6.8	74	10.1	17	-3.3
24 R.Fe.	55	6.5	62	7.6	- 7	-1.1
25 A.M.	55	6.5	48	5.5	7	1.0
26 H.W.	53	6.2	37	4.1	16	2.1
27 J.M.	53	6.2	48	5.5	5	0.7
28 C.DL.	53	6.2	35	3.9	18	2.3
29 T.MH.	51	5.9	35	3.9	16	2.0
30 E.K.	48	5.5	40	4.5	8	1.0
31 J.St.	48	5.5	0	-2.9	48	2.6
32 J.Y.	46	5.2	48	5.5	- 2	-0.3
33 V.B.	35	3.9	42	4.7	- 7	-0.8
34 N.K.	0	-2.9	0	-2.9	0	0.0
Gr. md.	54½	6.4	52	6.0		
Cl. md.	62	7.6	46	5.2		

these five were still above the January grade expectancy. The improved ratings showed increases from six months to eight years and three months.

The scatter of grade ability was as follows: one pupil scored below 2.9 level; one third-grade; four fourth-grade; seven sixth grade; five seventh grade; seven eighth; one ninth; two tenth; one eleventh; and five above twelfth-grade level.

As much attention was given to the use of the dictionary, and transfer of this skill over into content subjects was extensively carried on, special help by pupil-teachers being supplied to those who needed training in the proper use of guide-words, with the exception of the few remaining slow pupils, emphasis during the second semester shifted from this to other more need-ful habits. Word-meaning and sentence-meaning, however, make dictionary work indispensable.

Table XXIII gives the results of the final test, Part B of Test VI, The Use of the Index. This important reading skill showed the following results in the January testing: the median was $57\frac{1}{2}$ with grade level of $6.8\frac{1}{2}$; the September results were lower, the median score being 49, and the grade level 5.6, which indicates that by January a gain in class median of one year and two and one-half months had been made; the scores in January were scattered from 30 to 81, or 3.4 grade level to above 12 grade level; two lost in grade change, one, the highest in the September rating losing over four years, and the other loss being six months, by one in the lowest quartile; three

TABLE XXIII

RESULTS OF JANUARY TEST VI, PART B, USE OF INDEX,
 COMPARED WITH RESULTS OF SEPTEMBER TEST
 VI, PART B, USE OF INDEX

Number and pupil	Jan. score in use of index	Jan. gr. eq. in use of index	Sept. score in use of index	Sept. gr. eq. in use of index	Change in score	Change in grade
1 C.K.	81	12 plus	65	8.2	16	3.8
2 N.H.	81	12 plus	59	7.1	22	4.9
3 J.F.	77	10.8	49	5.6	28	5.2
4 J.Sh.	73	9.8	73	9.8	0	0.0
5 J.G.	73	9.8	43	4.8	30	5.0
6 P.VR.	73	9.8	49	5.6	24	4.2
7 D.G.	69	9.0	56	6.6	13	2.4
8 B.MC.	65	8.2	56	6.6	9	1.5
9 J.B.	65	8.2	56	6.6	9	1.6
10 R.Be.	62	7.6	56	6.6	6	1.0
11 T.K.	62	7.6	56	6.6	6	1.0
12 C.VG.	62	7.6	43	4.8	19	2.8
13 T.C.	62	7.6	49	5.6	13	2.0
14 R.Pu.	59	7.1	46	5.2	13	1.9
15 J.Ko.	59	7.1	62	7.6	- 3	-0.5
16 J.Ke.	59	7.1	53	6.2	6	0.9
17 R.B.	59	7.1	49	5.6	10	1.5
18 L.M.	56	6.6	77	10.8	-21	-4.2
19 J.Y.	56	6.6	49	5.6	7	1.0
20 B.G.	56	6.6	56	6.6	0	0.0
21 E.K.	56	6.6	33	3.7	23	2.9
22 L.P.	56	6.6	56	6.6	0	0.0
23 J.St.	56	6.6	53	6.2	3	0.4
24 N.K.	53	6.2	40	4.5	13	1.7
25 J.M.	53	6.2	43	4.8	10	1.4
26 G.C.	53	6.2	46	5.2	7	1.0
27 T.W.	49	5.6	40	4.5	9	1.1
28 N.S.	49	5.6	46	5.2	3	0.4
29 W.L.	46	5.2	43	4.8	3	0.4
30 T.MH.	46	5.2	33	3.7	13	1.5
31 C.DL.	43	4.8	36	4.0	7	0.8
32 V.B.	40	4.5	36	4.0	4	0.5
33 H.W.	36	4.0	36	4.0	0	0.0
34 A.M.	30	3.4	36	4.0	- 6	-0.6
Gr. md.	54 $\frac{1}{2}$	6.4	52	6.0		
Cl. md.	57 $\frac{1}{2}$	6.8 $\frac{1}{2}$	49	5.6		

made no gains, while those who raised their grade levels improved from four months to five years and two months.

About one-third of the class was still below the January grade expectancy, one of whom was third-grade level, three fourth grade, four fifth-grade, and three sixth-grade level of ability. Much emphasis was still needed on this skill during the second semester because of this one-third, and because of the great value of the Use of Index in study habits.

In discussing the Iowa Silent Reading Tests, Greene and Jorgensen say of this section of it:

One of the more valuable reading skills measured by these tests is the ability to use the index for the purpose of locating information. This test, which is Part B of Test VI, is reproduced here in order to give a suggestion of how this ability may be measured. It should also give to many teachers hints for the development of similar material for instructional purposes.⁵⁰

A summary of reading comparisons is contained on the graph at the end of this chapter which shows a comparative study of medians. Those of the September tests are shown in solid black, and those of January in red. (See page 173).

There was a rise in all class medians except Test IV, Part A, Central Idea of a Paragraph. Test I, Part A, Rate, changed only four points as did Test V, Sentence Meaning. The next test in order of improvement was Test III, Word Meaning,

⁵⁰ Greene and Jorgensen, The Use and Interpretation of Elementary School Tests, Longsman, Green and Co., N.Y., 1939, 331.

which was raised eight points, and Test VI, Part B, the Use of the Index, was close to it, with eight and one-half points of improvement. The gain in Test IV, Part B, Development of a Paragraph, was nine points, while Test I B, Comprehension, ranked next with ten points of gain. Test II, Directed Reading, and Test V, Sentence Meaning, both showed sixteen-point increases. The total reading ability of the class was raised ten points.

As no change indicated a loss equivalent to the period of instruction, (four months) Test IV, Part A, Central Idea of a Paragraph, became the major concern in the classroom experiment during the second semester, with the other skills arranged in the order of difficulty as determined by the amounts of change made during the first semester.

A summary of the grade levels over which the ability of the class is spread in each of the reading skills and in the class medians is shown in Table XXIV. A comparison of this table with Table XII indicates a decided shift upward, although the years of scatter in some of the tests is greater.

Several changes in the remedial reading program were necessary after the second test results were ascertained. The first step in this readjustment program was to regroup the children of the experimental group according to the January reading grade equivalents.

The class was evenly divided into four groups of nine pupils each, not only because this was a convenient grade-level division, but also because of the number of books in sets avail-

TABLE XXIV

SUMMARY OF DISTRIBUTION OF SCORES IN JANUARY READING TEST

Reading skills	Distribution of cases over the following grade levels												Class median score	Gr.lev. of median	Years of spread
	-3	3	4	5	6	7	8	9	10	11	12	12+			
IA Rate	5	4	5	8	6		4		1	1			44	5.5	8.7
IB Comprehension		5	5	5	3	9	4	2		1			54	6.3	7.2
II Directed reading			3	2	6	8	5	4	1			5	62	7.6	7.3
III Word-meaning		7	4	10	4	2	4	2		1			51	5.9	8.3
IVA Central idea	1	2	10	11		5	5		2				51	5.9	7.7
IVB Development of paragraph		1	7	4	6	4	10			2			57	6.7½	7.5
V Sentence meaning	1	3	15	5	1	1	5	2					43	4.8	7.9
VIA Alphabetizing	1	1		4	7	5	7	1	2	1	5		62	7.6	9.0
VIB Use of index		1	3	4	9	8	2	4	1		2		57½	6.8½	8.6
Median total reading		1	8	4	11	3	3	3	1				53½	6.2½	6.4
Totals	8	25	60	57	53	45	43	21	10	6	7	5			

able for our use during the second semester.

Group I contained two pupils who entered late in the fall and are not included in this study. The range of reading ability in this group was from 8.0 grade level to 10.1 grade level. The second group was composed of the next nine in grade level, with a spread from 6.4 to 7.5 grade level. Group III was composed of children rating from 5.1 to 6.3 grade level, while Group IV was made up of the nine lowest, from 3.7 to 4.9 grade ability. No exceptions were made in the January distributions into groups, as the children's attitudes had changed for the better regarding their reading, and all were most anxious to be where they could improve most. No mention, of course, was made that any group was inferior to the others.

Check-lists were made out for use in the preparation of the reading lessons. After each child's name those skills in which remedial work was needed were checked.

Diagnostic workbooks were read at the beginning of the second semester. They were used as ordinary readers, and not independently as workbooks are sometimes used.

Looking Ahead,⁵¹ a sixth-grade ability workbook, and Exploring Today,⁵² a fifth-grade level book, are designed for si-

⁵¹ R. F. Greenwood and J. Williams, Looking Ahead, American Educational Press, Columbus, Ohio, 1940.

⁵² E.M. Johnson, Exploring Today, American Educational Press, Columbus, Ohio, 1937.

Group III read this book as its second reader. It was then read by I as its third, and later by Group II as its fourth book. Group IV read a few selections from it, but found it difficult.

Forty Famous Stories⁵⁶ is an easy fourth-grade level silent reader with speed and comprehension tests, which proved very valuable in the establishment of good reading habits.

While the book is intended primarily for class work in fourth and fifth grades, it will be found useful for remedial work with pupils in higher grades especially in developing the habit of reading speedily.⁵⁷

The tests are arranged in the back of the book in the same sequence as the stories. The questions bring out facts, central ideas, details, word-meanings, and some judgment questions. In the story, speed tests are facilitated by having the word totals given at the end of each paragraph.

Even the lowest group had no difficulty with the vocabulary in this book, and, as with all four groups, it was used to bring up speed, endeavoring to keep 100% accuracy in comprehension. The children enjoyed these short stories, and, it is hoped, were made more conscious of the need for adjustment of their speed to the type of reading matter. It was read by Group III as its first book of the semester, by Group II as its sec-

⁵⁶ H. A. Merty, Forty Famous Stories, Hall and McCreary Company, Chicago, 1936.

⁵⁷ Ibid., 3.

ond, by Group IV as its second, and by Group I as its last.

My Activity Book in Reading⁵⁸ is a very easy fourth grade workbook. The author says:

This silent reading workbook is intended for use in the third or fourth grade, but may be used with a weak fifth or even sixth grade. The vocabulary has been carefully chosen and checked with the Gates, Thorndike, and Horn lists . . . The aim is to instruct and entertain with words already in the word stock of the children . . . Timing is provided for specifically in only two exercises, but by use of the table of rates the teacher may time pupils on any other exercises.⁵⁹

The tests are given at the end of each lesson, in which facts from the story and word meanings are included. Paragraph study is provided for in some of the lessons where each paragraph is followed by questions about it. In many of the tests throughout the book, opinions calling for judgments based on facts in the story are included. Synonyms and antonyms are provided for specifically in stories about them.

This book was used only by Group IV, as it was found too easy to provide advancement for the other groups. The synonyms and antonyms were studied by all in the period of word analysis taken as part of the spelling period each day.

Books read by the groups besides these workbooks (See pages 71 and 72 of this study.) were: Lorna Doone; Six Great

⁵⁸ Fred C. Cram, My Activity Book in Reading, American Educational Press, Columbus, Ohio, 1939.

⁵⁹ Ibid., 2.

stories; and Without Machinery. Additional selections were taken from The Cathedral Basic Reader. Groups I and II read all of these, while Group III read Lorna Doone, Without Machinery, and most of the basic text, The Cathedral Basic Reader. Group IV read Without Machinery, and a few of the easier selections in The Cathedral Basic Reader.

All the groups read some selections from the sets of readers in the room (See pages 71 and 72.). Much time in the two upper groups was given to independent enrichment reading in the preparation for audience reading, or reports to be given to the class.

The foregoing brief review of the diagnostic workbooks has been given in order to point out how remedies for the individual deficiencies indicated by the January tests, and discussed in this chapter, had been provided for. They served not only as ready-made check-ups, but also as models in preparing oral and written recall exercises, word-meaning, central idea, development, judgment, comprehension, and speed exercises for books used which did not have tests.

Instead of writing all these tests, often the answers were found and read orally from the story. This provided motivated oral reading. With the two upper groups, this method was used on all but one day a week, when a written check was required. The lowest group wrote the answers, exchanged and corrected the papers, as the answers were found and read aloud from the story.

The check-lists were in the hands of the instructor daily. Whatever opportunity presented itself for practice in a specific skill was directed to the child weak in that capacity. These lists were used daily in the very careful preparation of the group lessons, and in the preparation of the pupil-teachers for their functions.

All the other devices outlined for the first semester were continued during the second. Pupil-teachers were changed with the advent of each new book; vocabulary notebooks were more appreciated and used; the free-reading period extended beyond its twenty-five minute period to fill up every free moment of the day. The enjoyment manifested by the increased amount of independent reading was most gratifying. The library club meetings consumed a large part of Friday afternoons, as the number of individual reports increased, and the audience situations became more numerous.

Skills which were ever in the foreground for emphasis were: Finding the Central Idea of a Paragraph, Rate, Sentence-Meaning, Using "yes-no" Checkups, Word-Meaning, and Use of the Index. When the reading lessons planned for the day did not provide for these needs, additional questions were made out to include them. In the content subjects, word meanings were required, true-false questions were resorted to, outlining, naming the paragraphs, using reference materials, encyclopedias, etc. were brought in in such a way that by careful planning

scarcely a day went by when all of these skills did not receive attention either in the reading class or in the content subjects.

Progress charts were kept, and given more prominence than during the first semester, especially in watching the combined results of rate and achievement. Comparisons were never made between pupils, but only with each individual's previous rating.

The correlation between I Q gains and reading grade changes is negative as can be seen from the following page, Table XXV, which gives the comparison between I Q points gained, and the Reading Grade Changes. The coefficient of correlation is $-.059$.

It must be taken into consideration, however, that children in many of these cases raised their reading grade level by improvement in reading skills that least effected the types of reading involved in the mental test. For example, Alphabetizing is employed in a few of the items in the mental tests used, whereas Sight Vocabulary, Word-Meaning, and Sentence-Meaning were necessary for correct interpretation of every one of the mental test items.

The child's original I Q must also be taken into account, as well as the mental-age grade-expectancy. All but four of the children were reading below expectancy in September, which indicated that adjustment had to be made in this regard before the effect of reading improvement could be expected to influence

TABLE XXV

COMPARISON BETWEEN I Q CHANGES AND READING CHANGES
FROM SEPTEMBER TO JANUARY

Changes in I Q		Changes in reading grade
25	. . . . .	1.1
20	. . . . .	0.7
19	. . . . .	0.6
17	. . . . .	1.2
17	. . . . .	1.4
16	. . . . .	0.6
16	. . . . .	0.1
15	. . . . .	1.8
15	. . . . .	1.3
14	. . . . .	1.8
14	. . . . .	1.6
13	. . . . .	1.8
13	. . . . .	1.2
10	. . . . .	1.8
10	. . . . .	0.2
10	. . . . .	0.9
9	. . . . .	2.5
9	. . . . .	1.2
9	. . . . .	1.4
9	. . . . .	1.2
9	. . . . .	1.5
8	. . . . .	1.7
6	. . . . .	0.0
6	. . . . .	-0.3
6	. . . . .	1.1
6	. . . . .	1.0
5	. . . . .	0.7
4	. . . . .	0.4
1	. . . . .	1.0
1	. . . . .	1.6
0	. . . . .	1.7
0	. . . . .	2.6
0	. . . . .	1.0
-6	. . . . .	-0.8

TABLE XXVI

COMPARISON BETWEEN MENTAL TEST CHANGES AND READING
TEST CHANGES FROM SEPTEMBER TO JANUARY

Number and pupil	Jan. Beta IQ	Sept. Beta IQ	Jan. r. gr. equiv.	Sept. r.gr. equiv.	Change in IQ	Change in r.gr.	Sept. dev.in m.a.gr. equiv.	Jan. dev.in m.a.gr. equiv.
1 L.M.	129	112	8.5	7.2	17	1.2	-1.1	*
2 R.Pe.	129	116	9.5	7.5	13	1.8	-1.7	*
3 N.H.	127	113	9.3	7.5	14	1.8	-0.8	-0.9
4 C.VG.	125	100	6.0	4.9	25	1.1	-1.4	-4.7
5 C.K.	122	113	10.1	7.6	9	2.5	-1.6	-0.3
6 J.Sh.	121	121	9.5	7.8	0	1.7	-2.7	-0.7
7 W.L.	121	120	6.6	5.6	1	1.0	-4.2	-3.1
8 J.G.	120	107	8.0	6.8	13	1.2	-0.9	-1.7
9 J.Ke.	120	103	6.8	5.4	17	1.4	-1.1	-2.7
10 J.F.	119	109	8.0	6.2	10	1.8	-1.6	-1.5
11 T.K.	117	101	6.5	5.9	16	0.6	-0.9	-3.0
12 E.K.	111	102	6.0	4.8	9	1.2	-1.7	-2.1
13 B.MG.	110	104	6.9	6.9	6	0.0	0.1	-1.0
14 J.Ko.	110	104	6.2	6.5	6	-0.3	-0.9	-2.2
15 R.B.	108	108	7.5	4.9	0	2.6	-2.8	-0.2
16 J.Y.	106	100	7.5	6.4	6	1.1	-1.3	-1.3
17 T.W.	106	92	6.3	4.7	14	1.6	-0.7	-1.4
18 D.G.	106	90	4.8	4.7	16	0.1	-0.6	-3.0
19 B.G.	105	101	6.6	6.2	4	0.4	-1.1	-1.3
20 P.VR.	105	90	7.4	5.6	15	1.8	-0.4	-1.2
21 H.W.	104	84	5.1	4.4	20	0.7	0.4	-2.1
22 T.C.	103	94	5.6	4.2	9	1.4	-0.9	-1.2
23 G.C.	102	87	4.7	3.4	15	1.3	-1.7	-3.1
24 L.P.	100	95	5.2	4.5	5	0.7	-1.7	-2.0
25 J.B.	100	91	4.7	3.5	9	1.2	-1.2	-1.7
26 N.S.	99	91	6.2	4.5	8	1.7	-1.1	-0.9
27 R.Pu.	97	96	6.4	4.8	1	1.6	-1.5	-0.1
28 J.St.	97	88	5.9	4.4	9	1.5	-0.6	-0.8
29 C.DL.	96	96	4.9	3.9	0	1.0	-2.4	-1.8
30 N.K.	95	85	4.7	4.5	10	0.2	0.2	-1.3
31 J.M.	90	71	4.9	4.3	19	0.6	0.9	-1.8
32 T.MH.	88	82	4.6	3.6	6	1.0	-0.9	-1.4
33 A.M.	70	60	4.2	3.3	10	0.9	0.9	-0.5
34 V.B.	67	73	3.7	4.5	- 6	-0.8	0.5	-0.3

* Mental-age grade-equivalent is not figured above sixteen years mental age.

test, and applied more careful attention to the comprehension element. The tests were administered on different days, so that uncontrollable reliability factors have probably been involved.

J. Ko. had been absent for a long period just previous to the retesting program, and was not well during the testing. Her daily work showed every indication that improvement was taking place, so the gains of January, representing only six I Q points, with a loss of three months in reading were both disappointments which, it is hoped, the June gains will show unreliable.

Of those cases where much more gain was made in I Q than in reading, Rate was an important factor. In the first testing, many of the children had rate much too high in comparison with their comprehension. More careful habits of thought-getting at the sacrifice of speed resulted in their not completing the subtests in the short time allotments, while the thirty-minute time limit in the I Q test was sufficient for practically all the class. When Sight Vocabulary, Word-Meaning and Sentence Meaning skills are sufficiently improved, this slow rate will automatically be raised.

C.DL. made no change in I Q, but gained one year in reading. Her case was discussed on page 99. Her reading gains were made in those skills that weigh least in the mental ability group test.

J.Sh. (page 99), with an I Q of 121 in September, made

no I Q change, but improved 1.7 years in reading. The January tests indicate improvement of two years toward the equalization of ability and accomplishment, leaving him only seven months below his mental-age grade-expectancy in January. Unless the June test shows an I Q change, the 121 rating probably is his mental level, as he has already indicated improved I Q standing over his lower-grade mental rating of 86.

The pupil who lost six I Q points in her mental test, and eight months loss in reading grade equivalent, was also discussed on page 99. She needed careful individual diagnosis and individual remedial reading help. An individual mental test was arranged for her, the results of which will be discussed later in this study.

The median I Q was 9 points, while the median reading gain was 1 year 2 months. Twenty-eight pupils made more than normal (four months) advancement in reading, while twenty-eight pupils advanced more than four months in mental age.

The greatest I Q gains were 25 and 20 points, while the greatest reading gains were 2.6 years and 2.5 years. 48% of the class changed 10 points or more in I Q, and 76.5% changed more than 5 points. 67.6% of the class gained more than a year in reading, and 82.3% made more than the normal four months' progress.

While the correlation of changes is negative (-.059), the comparison of results in the reading tests shows that improved ability in reading definitely resulted in improved ratings in

the mental tests for the great majority of cases studied.

No mention has been made of the gains in attitudes and interest as the consciousness of progress, and the lessening of effort needed to "keep pace" in content subjects, as well as in reading, was enjoyed. All the pupils felt confident of their ability to learn, and the animation and interest manifested, especially during the reading periods, is reward sufficient for the effort expended and the discouragements encountered in investigating the program.

The third part of the testing program was begun on May 9 with the administration of the Otis Quick-Scoring Test of Mental Ability, Form B, to the thirty-four members of the class who were present for the September and January testings. The results of this third mental rating are tabulated in Table XXVII, wherein scores, and Beta I Q's for September, January, and May, together with changes made from September to May are given. The pupils are listed according to May I Q's from highest to lowest.

The scores obtained in the May test range from 26 to 72, with a Beta I Q range from 75 to 134. In September the scores were spread from 9 to 58, with I Q's from 60 to 121, while in January the distribution of scores was between 16 and 64, and I Q's from 67 to 129. These results indicate a change in Beta I Q's ranging from -6 to 25 from September to January, and from 0 to 15 from January to May, giving a range of total I Q points gained during the eight-months' period distributed between 0 and 26 I Q points.

TABLE XXVII

RESULTS OF MAY MENTAL TEST RESULTS COMPARED WITH
JANUARY AND SEPTEMBER MENTAL TEST RESULTS

Number and pupil	Scores				Beta I Qs			
	May	Jan.	Sept.	Change	May	Jan.	Sept.	Change
1 E. Fe.	72	62	50	18	134	129	116	18
2 J. F.	71	54	44	27	132	119	109	23
3 L. M.	69	64	47	22	129	129	112	17
4 C. K.	69	59	50	19	128	122	113	15
5 N. H.	64	58	46	18	128	127	113	15
6 C. V. G.	65	60	36	29	125	125	100	25
7 J. G.	64	55	43	21	124	120	107	17
8 W. L.	62	55	54	8	124	121	120	4
9 E. K.	61	46	37	24	122	111	102	20
10 J. Sh.	62	58	58	4	121	121	121	0
11 R. B.	60	43	43	17	121	108	108	13
12 J. Ke.	58	54	37	21	120	120	103	17
13 B. M. C.	58	45	39	19	119	110	104	15
14 J. Y.	65	50	43	22	119	105	100	19
15 T. K.	58	54	39	19	117	117	101	16
16 J. Ko.	59	48	42	17	115	110	104	11
17 B. G.	58	45	41	17	115	105	101	14
18 R. Fu.	48	35	33	15	112	97	96	16
19 T. W.	53	43	30	23	112	106	92	20
20 H. W.	50	40	20	30	110	104	84	26
21 T. C.	48	37	28	20	110	103	94	16
22 J. B.	47	34	25	22	110	100	91	19
23 P. V. R.	54	49	34	20	108	105	90	18
24 D. G.	49	44	29	20	107	106	90	17
25 L. P.	48	40	35	13	105	100	95	10
26 G. C.	48	44	28	20	104	102	87	17
27 N. K.	42	31	22	18	102	95	85	17
28 N. S.	44	39	31	13	101	99	91	10
29 C. D. L.	43	36	36	7	100	96	96	4
30 J. St.	41	36	27	14	99	97	88	11
31 T. M. H.	39	35	25	14	93	88	82	11
32 J. M.	38	36	16	22	90	90	71	19
33 V. B.	28	16	20	8	79	67	73	6
34 A. M.	26	21	9	17	75	70	60	15
Class median	53	43½	36	19	113½	106	98	16

The median gain during the first half of the experiment was 9, with 9.64 for the mean or average point gain. The average number of points gained during the second half of the experiment was not so great, amounting to 5.44 with a median of five I Q points. In the September-to-January period, half of the class gained between 9 to 17 points, while 48% changed 10 points or more. In the period from January to May only 9 pupils, or 25.3% of the class changed nine points or more, while 22.2% changed ten points or more. This is an indication that the January intelligence quotients more nearly approached an expression of their true mental ability than did those of September.

Six children made no change during the latter part of the remedial period. Five of these pupils were in the upper half of the class, two of whom were in the upper quartile. These five pupils with I Q's from 117 to 129 (four above 120) sufficiently improved their reading by January so that the I Q obtained at that time was a true measure of ability, since further increase in reading grade equivalents during the second semester failed to affect the mental tests given in May. Hollingworth's failure to raise the I Q's of gifted children under the most stimulating program, was discussed previously (page 25) and substantiates these conclusions.

The child who failed to raise his I Q during the second semester had improved 19 points during the first semester. Because of constant movement of the eyeballs from right to left,

he is unable to focus his eyes without counter head-movements. This time-consuming and very physically-fatiguing handicap hindered him from completing a sufficient number of the test items to score higher. This was also true of his reading test, which indicated just normal improvement, whereas, when not under a timed pressure, he now handles all sixth-grade material with ease, indicating a much greater-than-normal progress, as this was impossible in September. Even his individual Stanford-Binet score of 94 seemed low for his achievement.

Nine children rated from 1 to 4 points of gain in I Q. Most of these pupils made greater gains the first semester and have significant total gains. Their lesser gains, therefore, are, like those who made no gain during this period, probably due to the fact that in January they obtained I Q's close to their true ability after one semester of intensive remedial work. Further effort will probably result in small gains until ability and accomplishment are equalized. As capacity is neared, little change in I Q can be brought about by the most stimulating remedial work.

The remaining 19, or 55.8% of the class, made from 5 to 15 points gain during the second semester, and all of these have significant total gains.

The coefficient of correlation between the January and May I Q ratings was .949. This highly significant correlation between two forms of a test is a further indication of the high validity of the tests. Pupils in all four quartiles had a dis-

tribution of gains quite similar, ranging from 0 to 10.

The total gains, as mentioned above, were distributed between 0 and 26. Only one pupil failed to change his I Q during the eight-month period of the experiment. His reading improved remarkably until it corresponded to his mental ability. In September he was the highest in the group in intelligence score, and maintained 121 I Q, while nine others of lower initial I Q score surpassed him.

Two pupils gained a total of four points, and one of six points. One of the pupils who gained 4 points was in the upper quartile, having an initial I Q of 120. One point was gained during the first semester, and three points during the second semester, which indicates that his initial I Q was fairly accurate. The other pupil who made a 4-point gain, and the pupil who made the six-point gain, were in the lowest quartile. They had improved in reading, but were still below sixth-grade level. This seems to indicate a slow but steady growth.

With the exception of the four above-mentioned cases, all the pupils of the group, or 88.2% of the class, made total gains of 10 I Q points or more during the remedial period. Two pupils made ten point gains, three eleven points, two thirteen, one fourteen, four fifteen, three sixteen, five seventeen, two eighteen, three nineteen points, two twenty points, one twenty-three, one twenty-five points, and one a twenty-six point gain.

Five pupils, or 14.4% of the class, gained 20 points or more. The median class gain was 16 I Q points, and the mean or

average was 15.5. The amount of gain was distributed rather generally, two small gains found in the upper half, and two in the lower half, while the highest pupil in the May I Q distribution made a total gain of only three points more than the lowest in the distribution (18 and 15 points). The coefficient of correlation between the September and May I Q ratings was .931, which is an additional point in favor of the validity of the tests.

The gains in reading grade level, and the relationship existing between I Q changes and improvement in reading ability, will be discussed in the following pages before an attempt is made to summarize their significance.

Form CM of the Iowa Silent Reading Test was administered on May 9 to the sixth-grade group of thirty-four pupils of the experimental group. The results of this test, together with comparisons between them and the September and January reading results, are given in Table XXVIII.

The system of standard scores in Form CM differs from that used in Form AM and Form BM. A table by which these scores can be converted into AMBM equivalents is given on page 8 of the revised manual, and was utilized in the scoring of the CM tests.

The May test resulted in a distribution of reading ages from 9.7 to above 16, representing reading grade equivalents from 4.6 to above 12 with a grade median of 7.6, and gains in reading grade equivalents ranging from 0 to 3 years 5 months.

The September grade-range was from 3.3 to 7.8 with a median of

TABLE XXVIII

MAY READING TEST RESULTS OF TOTAL ABILITY COMPARED WITH
JANUARY AND SEPTEMBER READING GRADE EQUIVALENTS

Number and pupil	May median score	May r.a. equiv.	May r.gr. equiv.	May men.a. grade equiv.	May devia. from men.a. gr.eq.	Jan. r. gr. equiv.	Sept. r. gr. equiv.	Total change in r.gr.
1 J. Sh.	83	16 pl.	12 pl.	*	*	9.5	7.8	4.4
2 N.H.	83	16 pl.	12 pl.	*	*	9.5	7.5	4.7
3 L.M.	82	16 pl.	12 pl.	*	*	8.5	7.3	4.7
4 C.K.	75	15- 0	10.6	*	*	10.1	7.6	3.0
5 R.Pe.	74	14- 6	10.1	*	*	9.3	7.5	2.6
6 J.F.	72	14- 3	9.6	*	*	8.0	6.2	3.4
7 J.Ko.	70	13-10	9.2	*	*	6.2	6.5	2.7
8 B.G.	67	13- 3	8.6	10.7	-2.1	6.6	6.2	2.4
9 J.G.	67	13- 3	8.6	*	*	8.0	6.8	1.8
10 T.K.	66	13- 2	8.4	10.5	-2.1	6.6	5.9	2.4
11 R.B.	65	13- 0	8.2	10.8	-2.6	7.5	4.9	3.3
12 W.L.	65	13- 0	8.2	*	*	6.6	5.6	2.6
13 J.Y.	63	12- 6	7.8	*	*	7.5	6.4	1.4
14 B.MC.	63	12- 6	7.8	0.5	-2.7	6.9	6.9	0.9
15 T.O.	63	12- 6	7.8	8.7	-0.9	5.6	4.2	3.6
16 P.VR.	62	12- 5	7.6	9.8	-2.2	7.4	5.6	2.0
17 J.St.	62	12- 5	7.6	7.3	0.3	5.9	4.4	3.2
18 J.Ke.	62	12- 5	7.6	10.5	-2.9	5.7	5.4	2.2
19 E.K.	61	12- 4	7.5	*	*	6.0	4.8	2.7
20 R.Pu.	59	12- 1	7.1	8.7	-1.6	6.4	4.8	2.3
21 C.VG.	59	12- 1	7.1	10.7	-3.6	6.0	4.9	2.2
22 N.S.	57	11- 8	6.8	7.8	-1.0	6.2	4.5	2.3
23 T.W.	56	11- 7	6.6	9.7	-3.1	6.3	4.7	1.9
24 H.W.	55	11- 5	6.5	9.2	-2.7	5.1	4.4	2.1
25 L.P.	53	11- 1	6.2	8.7	-2.5	5.2	4.5	1.7
26 V.B.	51	10-10	5.9	5.1	0.8	3.7	4.5	1.4
27 D.G.	50	10- 9	5.7	8.9	-3.2	4.8	4.7	1.0
28 N.K.	49	10- 8	5.6	7.4	-1.8	4.7	4.5	1.1
29 J.B.	48	10- 7	5.5	8.4	-2.9	4.7	3.5	2.0
30 C.DL.	48	10- 7	5.5	7.7	-2.2	4.9	3.9	1.6
31 G.C.	47	10- 5	5.3	7.4	-2.1	4.7	3.4	1.9
32 J.M.	45	10- 1	5.1	6.4	-1.3	4.9	4.3	0.8
33 A.M.	44	10- 0	4.9	4.8	0.1	4.2	3.3	1.6
34 T.MH.	41	9- 7	4.6	6.8	-2.2	4.6	3.6	1.3
Gr. md.	57	11- 8	6.8			6.4	6.0	
Cl. md.	62	12- 5	7.6			6.2½	4.9	

* Mental-age equivalent is not figured above sixteen years m.a.

4.8½, while the January grade equivalents were scattered from 3.7 to 10.1 with a median of 6.2½. The gains the first semester were from -.8 to 2.6. The total gains in reading, therefore, were spread from 8 months to 4.7 years.

Apart from any significance these results may or may not have upon the I Q's of the children concerned, they are very worth-while in themselves.

During the four months of the remedial period from January to May, the reading gains from 0 to 3 years 5 months were distributed as follows: one pupil made no gain; two gained only two months; and two gained three months. These five pupils made less than the normal four months' improvement during the second semester, although their total gains were significant. Three of these made considerable gain in rate, but failed to adjust their speed to the various types of reading, and lost in those reading skills where comprehension was of greater value than rate. The other two lost in speed, becoming too slow to finish enough items to score high in the other tests. Help in the adjustment of speed to reading needs of varying types should be given them next year.

Twelve pupils gained between five months and one year in reading during the second semester. The gains were as follows: one pupil made five months' gain; four made six months'; three seven months'; two eight months', or twice normal expectancy; and three made nine months' gain. Only one of this group was in the highest class, while the other eleven were distributed among

the second, third, and lowest groups. These gains represent effort on the part of all but the one in the upper group. His failure to cooperate to the extent of his ability may be attributed to improper or insufficient motivation.

Eight pupils gained between one year and two years during these four months, one having improved one year, and one a year and one month, one pupil a year and seven months, and one a year and eight months. As these improvements represent from $2\frac{1}{2}$ to $4\frac{1}{2}$ times normal expectancy, they are commendable, and representative of earnest effort.

The pupils who gained from 2 years to 3 years 5 months during the second semester, raised their grade equivalents as follows: one two years; two 2 years 2 months; one 2 years 5 months; two 2 years 7 months; one 3 years; and one 3 years 5 months. Four of these children were in the highest group, one in the second, three in the third, and one in the lowest. Their improvement was a result of earnest effort and determination to reach the level of their ability, and also of the increased interest and enjoyment brought about by properly graded material, and a well-motivated program.

The median class gain of 9 months from January to May represents $2\frac{1}{4}$ times normal advancement in reading, as compared with a median gain of 1 year 2 months the first semester, which was three times normal progress.

The total reading test results from September to May show the following indications of advancement in reading abil-

ity: the grade equivalents in September were from 3.3 to 7.5; in January they were from 4.2 to 9.3; and in May from 4.9 to above 12. In September five pupils were third-grade level, fourteen were fourth-grade, four fifth-grade, six sixth-grade, and five seventh-grade, with 23, or 67.9% rating below grade expectancy while only eleven, or 32.1% were at or above it.

In January the reading grade distribution was: one third-grade level; eight fourth-grade; four fifth; eleven sixth; six of whom were at or above the January expectancy; three made seventh-grade levels; three eighth; three ninth; and one tenth-grade level. The median was raised from $4.8\frac{1}{2}$ to $6.2\frac{1}{2}$ grade level. By May there were no third-grade-level readers, while only two rated fourth-grade, seven fifth-grade, four sixth-grade, nine seventh-grade, five eighth-grade, two ninth-grade, one tenth-grade, and three above twelfth. The class median in May was 7.6 grade level.

While twelve children were still below grade-expectancy, all have improved from normal gain to 4 years 7 months, with a median class gain from September to May of 2 years $7\frac{1}{2}$ months.

The scatter of total gains from September to May was: all but two pupils advanced more than one year in the remedial reading period, one of these two gaining just the chronological eight-months' equivalent of the period, and the other nine months' gain; ten pupils advanced between one and two years, of whom two advanced one year, one one year one month, two one

year four months, two one year six months, or twice normal gain; one advanced one year seven months; and two one year nine months. Fourteen made gains between two and three years as follows: two just two years; one two years one month; two two years two months; two two years three months; one two years four months; one two years five months; two two years six months; two two years seven months; one two years eight months. In the group of five who made three years or more gain, one made three years, one three years two months, one three years three months, one three years four months, and one three years six months. For the three who made above twelfth-grade equivalents in May, only approximate gains can be given, - one four years two months, one four years five months, and one four years seven months.

A graph of the medians made in the various sub-tests, and the medians of total reading ability for September, January, and May is given at the end of this chapter, and will be referred to again after a careful diagnosis of the comparisons between the September, January, and May sub-test results. (See page 173.)

The results of Test I, Part A, Rate, indicate that the class still needs remedial work in this reading skill more than in any other tested skill. The May distribution of scores was from 27 to 62, representing grade equivalents from 3.1 to 7.6, as compared with the September range from 21 to 72 scores, and -2.9 to 9.6 grade equivalents. In January the range was 19 to

78 scores, and -2.9 to 7.1 grade equivalents. The May median was 5.6, the January median 5.5, and the September medial 4.9 grade equivalent. Table XXIX shows these results.

Many of the children who made high scores in rate were low in comprehension in the initial test. For this reason, during both semesters, but especially during the second, a better correlation between these two skills was sought through the use of speed and comprehension checks. The work in this field has resulted in the least gains of the year, and much more remedial reading is needed to adjust this deficiency.

Only five pupils made scores equivalent to their grade levels in May, while in September fourteen were at or above the September grade level. This slowing up resulted in better results in all the comprehensive skills, but the rate was too slow for satisfactory work in all reading fields.

Drill exercises were given to the class wherein questions had to be answered on material read without referring to the selection (patterned after Test I). These questions required the children to remember, not only main ideas, but also many details. While their comprehension in this type of material improved, it resulted in too great a slowing up of their rate.

While sixteen children made improvement in rate over the eight-month period, all the others either made none or lost between two months and two years five months. The one who lost the most, however, gained over four years in his total reading score. A careful case study would indicate that several in-

TABLE XXIX

RESULTS OF MAY READING TEST I, PART A, RATE, COMPARED WITH
JANUARY AND SEPTEMBER READING TEST I, PART A, RATE

Number and pupil	Scores				Grade equivalents			
	May	Jan.	Sept.	Change	May	Jan.	Sept.	Change
1 W.L.	62	65	56	6	7.8	8.2	6.6	1.0
2 J.Sh.	59	74	72	-13	7.1	10.1	9.6	-2.5
3 N.H.	59	66	58	1	7.1	8.4	6.9	0.2
4 B.MC.	59	55	56	3	7.1	6.5	6.6	0.5
5 R.Fu.	58	65	36	22	6.9	8.2	4.0	2.7
6 C.K.	56	52	64	- 8	6.6	6.0	8.0	-1.4
7 J.F.	54	56	52	2	6.3	6.6	6.0	0.3
8 P.VR.	54	50	42	12	6.3	5.7	4.7	1.6
9 L.M.	52	42	40	12	6.0	4.7	4.5	1.5
10 R.Fe.	52	78	59	- 7	6.0	11.1	7.1	-1.1
11 R.B.	52	64	52	0	6.0	8.0	6.0	0.0
12 T.C.	52	48	48	4	6.0	5.5	5.5	0.5
13 J.Ko.	51	55	55	- 4	5.9	6.5	6.5	-0.6
14 J.G.	51	58	62	-11	5.9	6.9	7.6	-1.7
15 T.K.	51	48	55	- 4	5.9	5.5	6.5	-0.6
16 E.K.	51	50	38	13	5.9	5.7	4.2	1.7
17 T.W.	51	25	34	17	5.9	2.9	3.8	2.1
18 J.Ke.	46	46	55	- 9	5.2	5.2	6.5	-1.3
19 B.G.	44	25	34	10	4.9	2.9	3.8	1.1
20 J.Y.	44	48	46	- 2	4.9	5.5	5.2	-0.3
21 H.W.	44	44	53	- 9	4.9	4.9	6.2	-1.3
22 N.K.	44	46	52	- 8	4.9	5.2	6.0	-1.1
23 A.M.	44	30	28	-16	4.9	3.4	3.2	1.7
24 V.B.	41	34	50	- 9	4.6	3.8	5.7	-1.1
25 G.C.	41	21	25	16	4.6	-2.9	2.9	1.7
26 J.M.	41	56	32	9	4.6	6.6	3.6	1.0
27 T.MH.	38	19	23	15	4.2	-2.9	-2.9	1.3
28 C.DL.	38	38	30	8	4.2	4.2	3.4	0.8
29 L.P.	34	28	34	0	3.8	3.2	3.8	0.0
30 D.G.	34	25	38	- 4	3.8	2.9	4.2	-0.3
31 J.St.	33	36	32	1	3.7	4.0	3.6	0.1
32 J.B.	33	42	21	12	3.7	4.7	-2.9	0.8
33 N.S.	32	50	34	- 2	3.6	5.7	3.8	-0.2
34 C.DL.	27	30	36	- 9	3.1	3.4	4.0	-0.9
Gr. md.	57	54½	52	5	6.8	6.4	6.0	0.8
Cl. md.	48½	48	44	5½	5.6	5.5	4.9	0.7

stances of loss in rate were not entirely undesirable, although it is the wish of any teacher to have children up to the level of their grade. Comprehension, however, cannot be sacrificed to speed.

The spread of abilities as shown in this test were as follows: six children made third-grade scores; ten fourth; six fifth; eight sixth; and four made scores of seventh-grade level. The May median, as mentioned before, was only 5.6 grade level, a year and two months below the May grade expectancy.

Table XXX shows the results of Test I, Part B, Comprehension, in which the September grade range is indicated from -2.9 to 11.1, the January range from 3.9 to 11.1, and the May distribution of grades from 3.1 to above 12. The three medians were representative of 4.9, 6.3, and 6.8 grade equivalents respectively.

Seven pupils fell in the third-grade level group, one making a fourth-grade score, six fifth-grade scores, four sixth, nine seventh, three eighth, two ninth, one tenth, and two above twelfth. Thirteen children lost between one month and two years, although only six lost in the total eight-month period, which is a further indication that additional remedial work is needed in the adjustment between rate and comprehension.

Table XXXI shows the results of Test II, Directed Reading. The second greatest gain in the May testing was made in this skill. The class made an 8.4 median, with a grade range from 4.9 to above 12. In September the class median was below

TABLE XXX

RESULTS OF MAY READING TEST I, PART B, COMPREHENSION,
 COMPARED WITH JANUARY AND SEPTEMBER READING
 TEST I, PART B, COMPREHENSION

Number and pupil	Scores				Grade equivalents			
	May	Jan.	Sept.	Change	May	Jan.	Sept.	Change
1 L.M.	91	62	69	22	12 pl.	7.6	9.0	3.0
2 J.Sh.	82	65	61	21	12 pl.	8.2	7.5	5.5
3 J.G.	76	69	61	15	10.6	9.0	7.5	3.1
4 J.F.	71	54	54	17	9.4	6.3	6.3	3.1
5 D.G.	69	40	44	25	9.0	4.5	4.9	4.1
6 N.H.	66	65	61	5	8.4	8.2	7.5	0.9
7 C.K.	66	78	61	5	8.4	11.1	7.5	0.9
8 T.K.	66	65	47	19	8.4	8.2	5.3	4.1
9 R.Fe.	63	63	47	16	7.8	9.8	5.3	2.5
10 R.B.	63	60	37	26	7.8	7.3	4.1	4.7
11 J.Y.	63	62	69	- 6	7.8	7.6	9.0	-1.2
12 J.Ke.	63	65	40	23	7.8	8.2	4.5	3.3
13 N.S.	63	60	47	16	7.8	7.3	5.3	2.5
14 H.W.	63	47	30	33	7.8	5.3	3.4	4.4
15 B.G.	60	60	47	13	7.3	7.3	5.3	2.0
16 E.K.	60	54	37	23	7.3	6.3	4.1	3.2
17 B.MC.	59	60	40	29	7.2	7.3	4.5	2.7
18 T.C.	56	54	23	33	6.6	6.3	-2.9	3.7
19 F.VR.	56	62	58	- 2	6.6	7.6	6.9	-0.3
20 J.St.	56	47	44	12	6.6	5.3	4.9	1.7
21 T.W.	52	50	44	8	6.0	5.7	4.9	1.1
22 W.L.	49	62	78	-19	5.6	7.6	11.1	-5.5
23 R.Pu.	49	50	44	5	5.6	5.7	4.9	0.7
24 C.VG.	49	44	37	12	5.6	4.9	4.1	1.5
25 L.P.	49	40	27	27	5.6	4.5	3.1	2.5
26 J.B.	49	40	30	19	5.6	4.5	3.4	2.2
27 G.C.	46	35	30	16	5.2	3.9	3.4	1.8
28 C.DL.	36	35	23	13	4.0	-2.9	-2.9	1.1
29 V.B.	34	35	37	- 3	3.8	3.9	4.1	-0.3
30 J.M.	34	35	54	-20	3.8	3.9	6.3	-2.5
31 A.M.	34	35	30	4	3.8	3.9	3.4	0.4
32 T.MH.	34	44	30	4	3.8	4.9	3.4	0.4
33 J.Ko.	30	60	61	-31	3.4	7.3	7.5	-3.1
34 N.K.	27	47	40	-13	3.1	5.3	4.5	-1.4
Gr. md.	57	54½	52					
Cl. md.	57½	54	44					

RESULTS OF MAY READING TEST II, DIRECTED READING, COMPARED WITH
JANUARY AND SEPTEMBER READING TEST II, DIRECTED READING

Number and pupil	Scores				Grade equivalents			
	May	Jan.	Sept.	Change	May	Jan.	Sept.	Change
1 J. Sh.	83	89	86	- 3	12 pl.	12 pl.	12 pl.	0.0
2 N.H.	83	86	74	9	12 pl.	12 pl.	10.1	1.9
3 R. Pe.	83	88	64	19	12 pl.	12 pl.	8.0	4.0
4 L.M.	82	91	66	16	12 pl.	12 pl.	8.4	3.6
5 C.K.	82	83	62	20	12 pl.	12 pl.	7.6	4.4
6 B.G.	77	77	66	11	10.8	10.8	8.4	2.4
7 J.G.	76	69	62	14	10.6	9.0	7.6	3.0
8 T.K.	74	62	62	12	10.1	7.6	7.6	2.5
9 J. Ke.	74	67	24	50	10.1	8.6	-2.9	7.2
10 B.MC.	74	72	62	12	10.1	9.6	7.6	2.5
11 R.B.	72	60	59	13	9.6	7.3	7.1	2.5
12 J.F.	71	66	42	29	9.4	8.4	4.7	4.7
13 J. Ko.	71	66	66	5	9.4	8.4	8.4	1.0
14 W.L.	71	72	42	39	9.4	9.6	4.7	4.7
15 C.VG.	69	62	30	39	9.0	7.6	3.4	5.6
16 J.Y.	67	64	48	19	8.6	8.0	5.5	3.1
17 J. St.	67	57	44	23	8.6	6.8	4.9	3.7
18 L.P.	65	59	46	19	8.2	7.1	5.2	3.0
19 T.C.	65	64	40	25	8.2	8.0	4.5	3.7
20 P. VR.	63	72	57	6	7.8	9.6	6.8	1.0
21 E.K.	63	59	50	13	7.8	7.1	5.7	2.1
22 H.W.	63	57	42	21	7.8	6.8	4.7	3.1
23 T.W.	62	59	40	22	7.6	7.1	4.5	3.1
24 N.K.	62	57	46	16	7.6	6.8	5.2	2.4
25 R. Fu.	60	48	35	25	7.3	5.5	3.9	3.4
26 J.B.	60	55	33	27	7.3	6.5	3.7	3.6
27 D.G.	59	62	48	11	7.1	7.6	5.5	1.6
28 N.S.	55	59	30	25	6.5	7.1	3.4	3.1
29 V.B.	52	44	46	6	6.0	4.9	5.2	0.8
30 C. DL.	50	53	35	15	5.7	6.2	3.9	1.8
31 G.C.	48	57	40	8	5.5	6.8	4.5	1.0
32 J.M.	44	50	42	2	4.9	5.7	4.7	0.2
33 A.M.	44	42	30	14	4.9	4.7	3.4	1.5
34 T.MH.	44	42	33	11	4.9	4.7	3.7	1.2
Gr. md.	57	54 $\frac{1}{2}$	52		6.8	6.4	6.0	
Cl. md.	66	62	46		8.4	7.6	5.2	

grade, or 5.2 grade equivalent, while the spread was between -2.9 and above 12. The January test gave a median of 7.6, with a spread of grade equivalents between 4.7 and above 12.

In the AM and BM forms of the Iowa Silent Reading Test the same selections as appear in the two parts of Test I are used in the two parts of Test II. In CM different reading matter is used in both parts of Test II, which makes the changes between January and May smaller, but of greater discriminating value. Even with this new element in the test form, twice normal progress was made from January to May.

The distribution of scores in the May test was as follows: three pupils made fourth-grade scores; two fifth-grade; two sixth; eight seventh; four eighth; five ninth; five tenth; and five above twelfth. Those who fell below grade-expectancy, in all but one case, were in the lowest reading group, the one exception falling in the next highest group. As the vocabulary in this selection is difficult, the test results indicate that further effort in building up a sight vocabulary is needed with the poorest group, all of whom are still below grade in total reading ability, in spite of the significant gains already made by them. The skill tested in this section was used in history and geography as well as in the reading classes.

In Test III, Word Meaning, the semester gains were more even. The September median was 4.8 grade equivalent, with a range of grade levels from -2.9 to 8.2 as shown in Table XXXII. The May class median was 7.1, with 3.4 to above 12 grade-level

TABLE XXXII

RESULTS OF MAY READING TEST III, WORD MEANING, COMPARED WITH
JANUARY AND SEPTEMBER READING TEST III, WORD MEANING

Number and Pupil	Scores				Grade equivalents			
	May	Jan.	Sept.	Change	May	Jan.	Sept.	Change
1 N.H.	85	69	63	22	12 pl.	9.0	7.8	4.2
2 R.Fe.	77	72	63	14	10.8	9.6	7.8	3.0
3 C.K.	77	79	65	12	10.8	11.3	8.2	2.6
4 W.L.	72	60	43	29	9.6	7.3	4.8	4.8
5 L.M.	71	63	49	22	9.4	7.8	5.6	3.8
6 J.G.	69	56	53	16	9.0	6.6	6.2	2.8
7 J.Sh.	69	66	51	18	9.0	8.4	5.9	3.1
8 J.F.	67	58	55	12	8.6	6.9	6.5	2.1
9 B.G.	66	65	49	17	8.4	8.2	5.6	2.8
10 J.Ko.	66	46	43	23	8.4	5.2	4.8	3.6
11 R.B.	63	51	43	20	7.8	5.9	4.8	3.0
12 T.C.	63	46	36	27	7.8	5.2	4.0	3.8
13 P.VR.	62	53	41	21	7.6	6.2	4.6	3.0
14 J.Y.	60	65	55	5	7.3	8.2	6.5	0.8
15 R.Pu.	60	46	46	14	7.3	8.4	5.2	2.1
16 J.St.	59	51	41	18	7.1	5.9	4.6	2.5
17 J.Ke.	59	45	48	11	7.1	6.9	5.5	1.6
18 C.VG.	59	51	49	10	7.1	5.9	5.6	1.5
19 N.S.	59	42	37	22	7.1	4.7	4.1	3.0
20 H.W.	57	49	41	16	6.8	5.1	4.6	2.2
21 E.K.	56	51	49	7	6.6	5.9	5.6	1.0
22 T.W.	53	51	45	8	6.2	5.9	5.1	1.1
23 B.MC.	52	52	42	- 4	6.0	4.7	6.6	-0.6
24 T.K.	51	48	48	3	5.9	5.5	5.5	0.4
25 L.F.	45	43	30	15	5.1	4.8	3.4	1.7
26 N.K.	45	43	37	8	5.1	4.8	4.1	1.0
27 C.DL.	44	46	33	11	4.9	5.2	3.7	1.2
28 J.B.	42	33	27	15	4.7	3.7	3.1	1.6
29 J.M.	41	35	35	6	4.6	3.9	3.9	0.7
30 G.O.	39	32	29	10	4.4	3.6	3.3	1.1
31 D.G.	35	33	33	2	3.9	3.7	3.7	0.2
32 A.M.	32	32	22	10	3.6	3.6	-2.9	0.7
33 T.MH.	32	26	30	2	3.6	3.0	3.4	0.2
34 V.B.	30	32	26	4	3.4	3.6	3.0	0.4
Gr. md.	57	54½	52		6.8	6.4	6.0	
Cl. md.	59	51	43		7.1	5.9	4.8	

distribution. As the January median was still below grade expectancy, more pressure was brought to bear upon the improvement of this skill, resulting in the satisfactory results of the 7.1 grade equivalent of the May class median. The children in the lowest group were all at the lower end of this distribution, indicating once more their need for a more extensive vocabulary. Many items missed contained words as well as meanings unknown to them. Five of these children, however, made total gains of more than a year and a half. Extended effort in this skill will, without doubt, result in increased grade equivalents until all have reached the level of ability.

The distribution of May scores resulted in four pupils scoring third-grade level, four fourth, three fifth, four sixth, nine seventh, three eighth, four ninth, two tenth, and one twelfth-grade level, with total changes from September to May spread from -6 months to 4 years 2 months. The one child making a minus score was absent more than half the time during both semesters.

In Form CM of the Iowa test only one rating is given for Test IV, Central Idea and Development of a Paragraph, whereas, in Forms AM and BM separate scores and grade equivalents are given for each part. This difference makes comparisons of the May results with averages of Parts A and B in the September and January tests the only possible study. Averages were tabulated in Table XXXIII which shows the results of this test, and they were also used in the graph of median scores.

RESULTS OF MAY READING TEST IV, PARAGRAPH COMPREHENSION,
 COMPARED WITH JANUARY AND SEPTEMBER READING
 TEST IV, A AND B AVERAGES

Number and pupil	Scores				Grade equivalents			
	May	Jan.	Sept.	Change	May	Jan.	Sept.	Change
1 J. Sh.	93	77 $\frac{1}{2}$	73 $\frac{1}{2}$	19 $\frac{1}{2}$	12 pl.	10.9	9.9	2.1
2 J. F.	85	62	70	15	12 pl.	7.6	9.2	2.8
3 N. H.	83	62	66	7	12 pl.	7.6	8.4	3.6
4 L. M.	81	64	70	11	12 pl.	8.0	9.2	2.8
5 C. K.	81	63	68	13	12.0	7.8	8.7	3.3
6 B. G.	81	77 $\frac{1}{2}$	47 $\frac{1}{2}$	33 $\frac{1}{2}$	12.0	10.9	5.4	6.6
7 R. Fe.	76	55 $\frac{1}{2}$	68	8	10.6	6.5	8.7	1.9
8 B. M. C.	71	57 $\frac{1}{2}$	62	9	9.4	6.8	7.6	-0.8
9 T. K.	68	53	53 $\frac{1}{2}$	14 $\frac{1}{2}$	8.7	6.2	6.2	2.5
10 J. Ko.	66	49 $\frac{1}{2}$	51 $\frac{1}{2}$	14 $\frac{1}{2}$	8.4	5.6	5.9	5.5
11 T. C.	66	43	42 $\frac{1}{2}$	23	8.4	4.8	4.7	3.7
12 F. V. R.	66	62	58	8	8.4	7.6	6.9	1.5
13 E. K.	66	60	54	12	8.4	7.3	6.3	2.1
14 J. G.	63	66	62	1	7.8	8.4	7.6	0.2
15 R. B.	63	62	56	7	7.8	7.6	6.6	1.2
16 W. L.	63	51 $\frac{1}{2}$	49 $\frac{1}{2}$	13 $\frac{1}{2}$	7.8	5.9	5.6	2.2
17 R. Fu.	63	51 $\frac{1}{2}$	54	9	7.8	5.9	6.3	1.5
18 N. K.	63	41	43	20	7.8	4.6	4.8	3.0
19 J. Ke.	60	55 $\frac{1}{2}$	47 $\frac{1}{2}$	12 $\frac{1}{2}$	7.3	6.5	5.4	1.9
20 C. V. G.	60	53	49	10	7.3	6.2	5.6	1.7
21 T. W.	57	57 $\frac{1}{2}$	51 $\frac{1}{2}$	5 $\frac{1}{2}$	6.8	6.8	5.9	0.9
22 H. W.	57	43	31	26	6.8	4.8	3.5	3.3
23 J. Y.	54	57 $\frac{1}{2}$	55 $\frac{1}{2}$	- 1 $\frac{1}{2}$	6.3	6.8	6.5	-0.2
24 J. St.	54	51 $\frac{1}{2}$	36 $\frac{1}{2}$	17 $\frac{1}{2}$	6.3	5.9	4.0	2.3
25 L. P.	54	49 $\frac{1}{2}$	49 $\frac{1}{2}$	4 $\frac{1}{2}$	6.3	5.6	5.6	0.7
26 V. B.	54	28	41	13	6.3	3.2	4.6	1.7
27 N. S.	51	51 $\frac{1}{2}$	47	4	5.9	5.9	5.3	0.6
28 J. M.	47	42 $\frac{1}{2}$	34 $\frac{1}{2}$	12 $\frac{1}{2}$	5.3	4.7	3.8	1.5
29 J. B.	47	43	29 $\frac{1}{2}$	17 $\frac{1}{2}$	5.3	4.8	3.3	2.0
30 C. D. L.	45	43	37	8	5.1	4.8	4.1	1.0
31 A. M.	45	41	34 $\frac{1}{2}$	10 $\frac{1}{2}$	5.1	4.6	3.8	1.3
32 T. M. H.	45	41	35	10	5.1	4.6	3.9	1.2
33 G. C.	42	47	24	18	4.7	5.3	-2.9	1.8
34 D. G.	38	45 $\frac{1}{2}$	43	- 5	4.4	5.1	4.8	-0.4
Gr. md.	57	54 $\frac{1}{2}$	52		6.8	6.4	6.0	

The May results were distributed from 4.4 grade equivalent to above 12, with a class median of 7.8 grade level, one year above normal. The September average of A and B spread from -2.9 to 9.9 grade equivalent, with a class median of 5.7, while January's spread was from 3.2 to 10.9, with a class median of $6.7\frac{1}{2}$.

Special attention was devoted to the improvement in paragraph comprehension during the second semester, and the results were gratifying. The changes in scores from January to May ranged from -7 months to 4 years 4 months, while the total changes ranged from -8 months to 6 years 6 months.

The grade equivalents were distributed in May as follows: two pupils made fourth-grade scores; six fifth-grade; six sixth-grade, two of whom were 6.8 level; seven pupils made seventh-grade levels; five eighth; one ninth; one tenth; and six above twelfth. The median of 7.8 is one year above normal, and two years one month above the September median.

Table XXXIV gives the May results of Test V, Sentence Meaning, compared with the September and January results. Although not so low as Rate, this test was poor, the class median going below grade. The distribution of grade equivalents was from 4.0 to 11.6, with a median of 5.7 grade level. In spite of the total changes from -2.2 years to 6.7 years since September, the class as a whole was still low in May. The three pupils who made minus gains were absent a great deal.

Thirteen pupils rated grade level or above, two making

TABLE XXXIV

RESULTS OF MAY READING TEST V, SENTENCE MEANING, COMPARED WITH JANUARY AND SEPTEMBER READING TEST IV, SENTENCE MEANING

Number and pupil	Scores				Grade equivalents			
	May	Jan.	Sept.	Change	May	Jan.	Sept.	Change
1 J. Sh.	80	69	60	20	11.6	9.0	7.3	4.3
2 J. F.	75	77	32	43	10.3	10.8	3.6	6.7
3 R. Pe.	71	69	36	35	9.4	9.0	4.0	5.4
4 P. VR.	71	59	48	23	9.4	7.1	5.5	3.9
5 J. Y.	70	69	54	16	9.2	9.0	6.3	2.9
6 W. L.	68	52	48	20	8.7	6.0	5.5	3.2
7 N. H.	63	72	56	7	7.8	9.6	6.6	1.2
8 C. K.	63	77	60	3	7.8	10.8	7.3	0.5
9 B. G.	63	46	72	-9	7.8	5.2	9.6	-1.8
10 J. St.	63	40	43	20	7.8	4.5	4.8	3.0
11 L. M.	62	69	68	14	7.6	9.0	5.5	2.1
12 J. Ke.	58	43	40	18	6.9	4.8	4.5	2.4
13 R. Fu.	58	48	36	22	6.9	5.5	4.0	2.9
14 T. K.	54	38	46	8	6.3	4.2	5.2	1.1
15 R. B.	54	66	40	14	6.3	8.4	4.5	1.8
16 E. K.	54	43	36	18	6.3	4.8	4.0	2.3
17 J. G.	50	45	45	5	5.7	5.1	5.1	0.6
18 T. C.	50	45	30	20	5.7	3.1	3.4	2.3
19 H. W.	50	43	38	12	5.7	4.8	4.2	1.5
20 B. MC.	50	38	41	9	5.7	4.2	4.6	1.1
21 V. B.	50	0	27	23	5.7	-2.9	3.1	2.6
22 C. DL.	50	43	35	15	5.7	4.8	3.9	1.8
23 D. G.	46	41	33	13	5.2	4.6	3.7	1.5
24 T. MH.	46	40	32	14	5.2	4.5	3.6	1.6
25 J. Ko.	45	41	60	-15	5.1	4.6	7.3	-2.2
26 C. VG.	45	43	43	2	5.1	4.8	4.8	0.3
27 T. W.	43	32	35	8	4.8	3.6	3.9	0.9
28 J. B.	41	35	35	6	4.6	3.9	3.9	0.7
29 J. M.	41	41	33	8	4.6	4.6	3.7	0.9
30 G. C.	38	36	32	6	4.2	4.0	3.6	0.6
31 N. K.	37	40	27	10	4.1	4.5	3.0	1.1
32 A. M.	36	35	27	9	4.0	3.9	3.1	0.9
33 L. P.	36	38	35	1	4.0	4.2	3.9	0.1
34 N. S.	36	48	50	-14	4.0	5.5	5.7	-1.7
Gr. md.	57	54 $\frac{1}{2}$	52		6.8	6.4	6.0	
Cl. md.	50	43	39		5.7	4.8	4.3 $\frac{1}{2}$	

TABLE XXXV

RESULTS OF MAY READING TEST VI, PART A, ALPHABETIZING,
 COMPARED WITH JANUARY AND SEPTEMBER READING
 TEST VI, PART A, ALPHABETIZING

Number and pupil	Scores				Grade equivalents			
	May	Jan.	Sept.	Change	May	Jan.	Sept.	Change
1 J. Sh.	88	74	40	24	12 pl.	10.1	4.5	6.5
2 N. H.	88	78	57	31	12 pl.	11.1	6.8	5.2
3 L. M.	88	88	83	5	12 pl.	12 pl.	12 pl.	0.0
4 R. B.	88	64	40	48	12 pl.	8.0	4.5	7.5
5 T. C.	88	83	44	44	12 pl.	12 pl.	4.9	7.1
6 J. St.	88	48	0	88	12 pl.	5.5	-2.9	9.1
7 D. G.	88	88	70	18	12 pl.	12 pl.	9.2	2.3
8 J. F.	78	70	60	18	11.1	9.2	7.3	3.8
9 J. Ko.	78	62	42	36	11.1	7.6	4.7	6.4
10 J. Ke.	78	60	46	32	11.1	7.3	5.2	5.9
11 G. C.	78	88	67	11	11.1	12 pl.	8.6	2.5
12 B. G.	74	60	60	14	10.1	7.3	7.3	2.3
13 R. Fe.	74	55	62	12	10.1	6.5	7.6	2.5
14 T. K.	74	67	46	28	10.1	8.6	5.2	4.9
15 N. S.	74	83	35	39	10.1	12 pl.	3.9	6.2
16 J. M.	74	53	48	26	10.1	6.2	5.5	4.5
17 E. K.	70	48	40	30	9.2	5.5	4.5	4.7
18 L. P.	70	64	46	24	9.2	8.0	5.2	4.0
19 V. B.	70	35	42	28	9.2	3.9	4.7	4.5
20 J. B.	70	64	46	24	9.2	8.0	5.2	4.0
21 C. K.	67	62	57	10	8.6	7.6	6.8	1.8
22 T. W.	67	67	62	5	8.6	8.6	7.6	1.0
23 J. G.	64	57	62	2	8.0	6.8	7.6	0.4
24 W. L.	64	57	74	-10	8.0	6.8	10.1	-2.1
25 C. Vg.	64	62	46	18	8.0	7.6	5.2	2.8
26 C. D. L.	64	53	35	29	8.0	6.2	3.9	4.1
27 B. M. C.	64	74	64	0	8.0	10.1	8.0	0.0
28 R. Pu.	63	67	64	-1	7.8	8.6	8.0	-0.2
29 F. V. R.	61	64	46	15	7.5	8.0	5.2	2.3
30 T. M. H.	60	51	35	25	7.3	5.9	3.9	3.4
31 J. Y.	57	46	48	9	6.8	5.2	5.5	1.3
32 A. M.	57	55	48	9	6.8	6.5	5.5	1.3
33 H. W.	53	53	37	16	6.2	6.2	4.1	2.1
34 N. K.	46	0	0	46	5.2	-2.9	-2.9	2.3
Gr. md.	57	54½	52		6.8	6.4	6.0	
Cl. md.	70	62	46		9.2	7.6	5.2	

6.2. Of those at or above May level, two received 6.8 ratings, three made seventh-grade scores, seven eighth, four ninth, five tenth, four eleventh, and six twelfth-grade equivalents. In September two pupils rated "zero", while twenty-one of the thirty-four were below grade. The median at that time was 5.2 grade equivalent.

Initial instruction in the use of the dictionary was provided, and very rapid progress ensued. By January the class median had reached 7.6 grade equivalent, but several third, fourth, and fifth-grade equivalents were contained in the lower half. Instruction was continued all during the second semester with extra practice provided for those who needed it by correlating dictionary work with spelling and other content subjects, and also with the free-reading period, when new words were listed to be looked up later at a period provided for that purpose. Any meanings necessary for the understanding of the story were told so as not to break the thought of the reading. A spelling work-book provided excellent material for practice in this skill.

The two pupils who rated "zero" in September received 46 and 88 in May, giving them grade equivalents of 5.2 and above 12 respectively.

Results of Test VI B, Use of the Index, are given in Table XXXVI. Skill in using the index resulted in a very satisfactory class median in the May test, reaching 7.7 grade equivalent, with grade levels distributed from 3.9 to above 12. The September median of 5.6 grade level was below expectancy, while

TABLE XXXVI

RESULTS OF READING TEST VI, PART B, USE OF INDEX,
 COMPARED WITH JANUARY AND SEPTEMBER READ-
 ING TEST VI, PART B, USE OF INDEX

Number and pupil	Scores				Grade equivalents			
	May	Jan.	Sept.	Change	May	Jan.	Sept.	Change
1 N.H.	85	81	59	26	12 pl.	12 pl.	7.1	4.9
2 L.M.	85	56	77	8	12 pl.	16.6	10.8	1.2
3 C.K.	85	81	65	20	12 pl.	12 pl.	8.2	3.8
4 J.G.	85	73	43	42	12 pl.	9.8	4.8	7.2
5 J.Sh.	73	73	73	0	9.8	9.8	9.8	0.0
6 R.Pe.	73	62	56	17	9.8	7.6	6.6	3.2
7 R.B.	73	59	49	24	9.8	7.1	5.6	4.2
8 J.St.	73	56	53	20	9.8	6.6	6.2	3.6
9 T.K.	65	62	56	9	8.2	7.6	6.6	1.6
10 N.S.	65	49	46	19	8.2	5.6	5.2	3.0
11 G.C.	65	53	46	19	8.2	6.2	5.2	3.0
12 J.F.	63	77	49	14	7.8	10.8	5.6	2.2
13 J.Ko.	63	59	62	1	7.8	7.1	7.6	0.2
14 B.G.	63	56	56	7	7.8	6.6	6.6	1.2
15 T.C.	63	62	49	14	7.8	7.6	5.6	2.2
16 L.P.	63	56	56	7	7.8	6.6	6.6	1.2
17 J.Ke.	63	59	53	10	7.8	7.1	6.2	1.6
18 B.MC.	62	65	56	6	7.6	8.2	6.6	1.0
19 J.Y.	61	56	49	12	7.5	6.6	5.6	1.9
20 E.K.	61	56	33	28	7.5	6.6	3.7	3.8
21 P.VR.	59	73	49	10	7.1	9.8	5.6	1.5
22 C.VG.	59	62	43	16	7.1	7.6	4.8	2.3
23 C.DL.	59	43	36	23	7.1	4.8	4.0	3.1
24 J.M.	59	53	43	16	7.1	6.2	4.8	2.3
25 T.W.	56	49	40	16	6.6	5.6	4.5	2.1
26 V.B.	56	40	36	20	6.6	4.5	4.0	2.6
27 R.Pu.	53	59	46	7	6.2	7.1	5.2	1.0
28 D.G.	53	69	56	- 3	6.2	9.0	6.6	-0.4
29 N.K.	53	53	40	13	6.2	6.2	4.5	1.7
30 J.B.	53	59	49	4	6.2	7.1	5.6	0.6
31 A.M.	49	30	36	13	5.6	3.4	4.0	1.6
32 W.L.	49	46	43	6	5.6	5.2	4.8	0.8
33 H.W.	43	36	36	7	4.8	4.0	4.0	0.8
34 T.MH.	35	46	33	2	3.9	5.2	3.7	0.2
Gr. md.	57	54 $\frac{1}{2}$	52		6.8	6.4	6.0	
Cl. md.	62 $\frac{1}{2}$	57 $\frac{1}{2}$	49		7.7	6.8 $\frac{1}{2}$	5.6	

in January it had risen to $6.8\frac{1}{2}$ grade equivalent.

The May grade distributions were as follows: one third-grade level; one fourth; two fifth; six sixth (all below 6.8 level); thirteen seventh; three eighth; four ninth; and four twelfth-grade equivalent.

The total changes in this skill ranged from -4 months to 7 years 2 months. Ten children did not reach grade level, although half of these made total gains well in excess of expectancy (from one year to two years six months). The other five children made from -4 months to 8 months. Because of the time-consuming nature of the subject matter, time did not permit as much practice in this skill as in the use of the dictionary, but every opportunity was utilized in the reading classes and in other subjects. Special attention was given to preparation of exercises for those who were poor in this work.

The ten who were still below grade expectancy should be provided with additional instruction and practice, as this ability is so necessary in upper grades, high school, and college. Like the use of the dictionary, it is not developed without instruction and guidance.

Table XXXVII, as well as the graph at the end of the chapter, gives the summary of class medians earned in the May reading tests. All medians were above the 6.8 level except Test I, Part A, Rate, and Test V, Sentence Meaning. The former is considerably below the level of September, the May median of $48\frac{1}{2}$ being equivalent to 5.6 grade level. In Test V, the class

TABLE XXXVII

SUMMARY OF DISTRIBUTION OF SCORES IN MAY READING TEST

Reading skills	Distribution of cases over the following grade levels												Class median score	Gr.lev. of median	Years of spread
	-3	3	4	5	6	7	8	9	10	11	12	12+			
IA Rate		6	10	6	8	4							48½	5.6	4.5
IB Comprehension		6	1	6	4	9	3	2	1			2	57½	6.8	8.9
II Directed reading			3	2	2	8	4	5	5			5	66	8.4	7.1
III Word-meaning		4	4	3	4	9	3	4	2			1	59	7.1	8.6
IV Paragraph comprehension			2	6	6	7	5	1	1		3	3	63	7.8	7.6
V Sentence meaning			8	10	5	5	1	3	1	1			50	5.7	7.6
VIA Alphabetizing				1	3	3	7	4	5	4		7	70	9.2	6.8
VIB Use of index		1	1	2	6	13	3	4				4	62½	7.7	8.1
Median total reading			2	7	4	8	5	2	3			3	62	7.6	7.4
Totals		17	31	43	42	66	31	25	18	5	3	25			

median was also below sixth grade, and one point above the median earned in Rate, the median being 5.7 grade level.

Gains were made during both semesters, resulting in a median gain of $4\frac{1}{2}$ score points, or 7 months, in Rate, and 11 score points, or 1.3 years, in Sentence Meaning. As growth is slow but upward, further remedial work in these fields should result in bringing the class up to ability in these two reading skills.

In Test IB, Comprehension, the class median in May was $57\frac{1}{2}$ which is one-half point above the grade median of 6.8 level. A gain of $13\frac{1}{2}$ score points, or an equivalent of 1 year 9 months was made from September to May. The class median in September was only 44, or 4.9 grade equivalent, while in January it was 54, or just one-half point below the grade level.

Test III, Word Meaning, yielded results next in the ascending order. The May median score was 59, as compared with 43 in September, and 51 in January, with corresponding grade equivalents of 7.1, 4.8, and 5.9, indicating a gain of 16 score points, and 2 years 3 months increase in grade level.

The test which rated just above Word Meaning was Test VI B, Use of the Index. The May median of the class was $62\frac{1}{2}$, which is equivalent to 7.7 grade level. The September median was 49, or 5.6 grade equivalent, and the January median was $57\frac{1}{2}$, or 6.8 $\frac{1}{2}$ grade level. The total gain was $13\frac{1}{2}$ score points, or the equivalent of 2 years 1 month.

Test IV, Paragraph Comprehension, resulted in a class

median of 63, or 7.8 grade level. An average of class medians in IV A and IV B for September and January yielded median scores of $49\frac{1}{2}$, or 5.7 grade level, and 54, or $63\frac{1}{4}$ grade level respectively. These figures indicate a total gain of $13\frac{1}{2}$ score points and 2 years 1 month grade equivalent.

Test II, Directed Reading, was raised 20 points in class median score from September to May. The September score was 46, or 5 years 2 months level. The January score was 62, or 7 years 2 months, and the May score was 66, or 8 years 4 months grade equivalent.

The highest class median was made in the May test in Alphabetizing, which was Test VI, Part A, in which the class median was 70, or 9 years 2 months grade level. In September the median for this skill was only 46, or 5 years 2 months level, and in January it was 62 score, the 7 years 6 months level. This total of 24 score points represents a gain of four years in grade equivalent.

The medians for total reading ability changed 10 score points from September to January, and an almost equal change of $9\frac{1}{4}$ score points from January to May. The class median changed from $4.8\frac{1}{2}$ grade level in September to $6.2\frac{1}{2}$ in grade level for January, and went up to 7.6 grade equivalent in May. This resulted in 1 year 4 months the first semester, and 1 year $3\frac{1}{2}$ months the second, a total change of 2 years $7\frac{1}{2}$ months within the eight months of remedial work, or $3\frac{1}{2}$ times normal progress.

The correlation between the amount of change in Intelligence Quotients and in Reading Grade Equivalents was negative, as can be concluded from the tabulation of changes from January to May which is given in Table XXXVIII. The coefficient of correlation is $-.215$.

The points of gain are tabulated from the highest May I Q to the lowest I Q rating. There is neither close correlation between gains made by the brightest pupils, as significant gains are scattered throughout the four quartiles, nor between gains in I Q points and gains in reading.

In only a few instances was significant change in I Q accompanied by less than normal reading growth. These cases were: the student who improved 13 points in I Q and only three months in reading; a six-point I Q change with three months' reading improvement; and a five-point I Q gain with no reading improvement.

In the first case, the time allowance in the mental test was sufficient for the test items to be completed by the student, whereas in the reading, loss of rate prevented finishing the sub-tests. The gains made were in Comprehension, Alphabetizing, and Sentence Meaning, which skills were utilized in the mental group test. His reading losses were met in Comprehension of Paragraphs, which did not enter into the mental testing situation, and the liberal time-limit lessened the loss which rate might have caused. Similar explanations can readily be seen by a comparison of tables for the other cases noted above.

TABLE XXXVIII

COMPARISON BETWEEN I Q CHANGES AND READING
CHANGES FROM JANUARY TO MAY

Changes in I Q	Changes in reading grade
5	2.7 plus
13	1.6
0	3.5
6	0.5
1	2.7
0	1.1
4	0.6
3	1.6
11	1.5
0	2.5
13	0.7
0	0.8
9	0.9
13	0.3
0	0.8
5	3.0
10	2.0
15	0.7
7	2.2
6	0.3
6	1.4
10	0.8
3	0.2
1	0.9
5	1.0
2	0.6
7	0.9
2	0.6
4	0.6
2	1.7
5	0.0
0	2.2
12	2.2
5	0.7

A similar comparison can be drawn between the total gains made in Intelligence Quotients and in reading grade equivalents over the eight-month period of experimental work. This tabulation is given in Table XXXIX.

Each of the four quartiles in the May I Q range contains instances of two and three years' gain in reading grade equivalents, while the two upper quartiles have instances above four years' reading gain. The coefficient of correlation between the amount of reading gain and the amount of change in I Q score was negative, $-.156$.

The student with no I Q gain, and the two who made only four points gain, as well as the one with six points in I Q change, all made significant reading gains. These cases have all been mentioned before. As stated before, the I Q's of September and January were in all probability in close correlation with their true mental ability. Further testing would be necessary to prove this point.

The median class gain of 16 I Q points, and the median reading improvement of 2 years $7\frac{1}{2}$ months in reading grade equivalent, while unevenly paired off, are significant, gratifying, and suggestive of further possibilities with these children. The results of the May tests are a basis for a continuation of remedial work.

The graph mentioned before depicts a very brief and obvious summary of the accomplishments made in the field of re-

TABLE XXXIX

COMPARISON BETWEEN I Q CHANGES AND READING
CHANGES FROM SEPTEMBER TO MAY

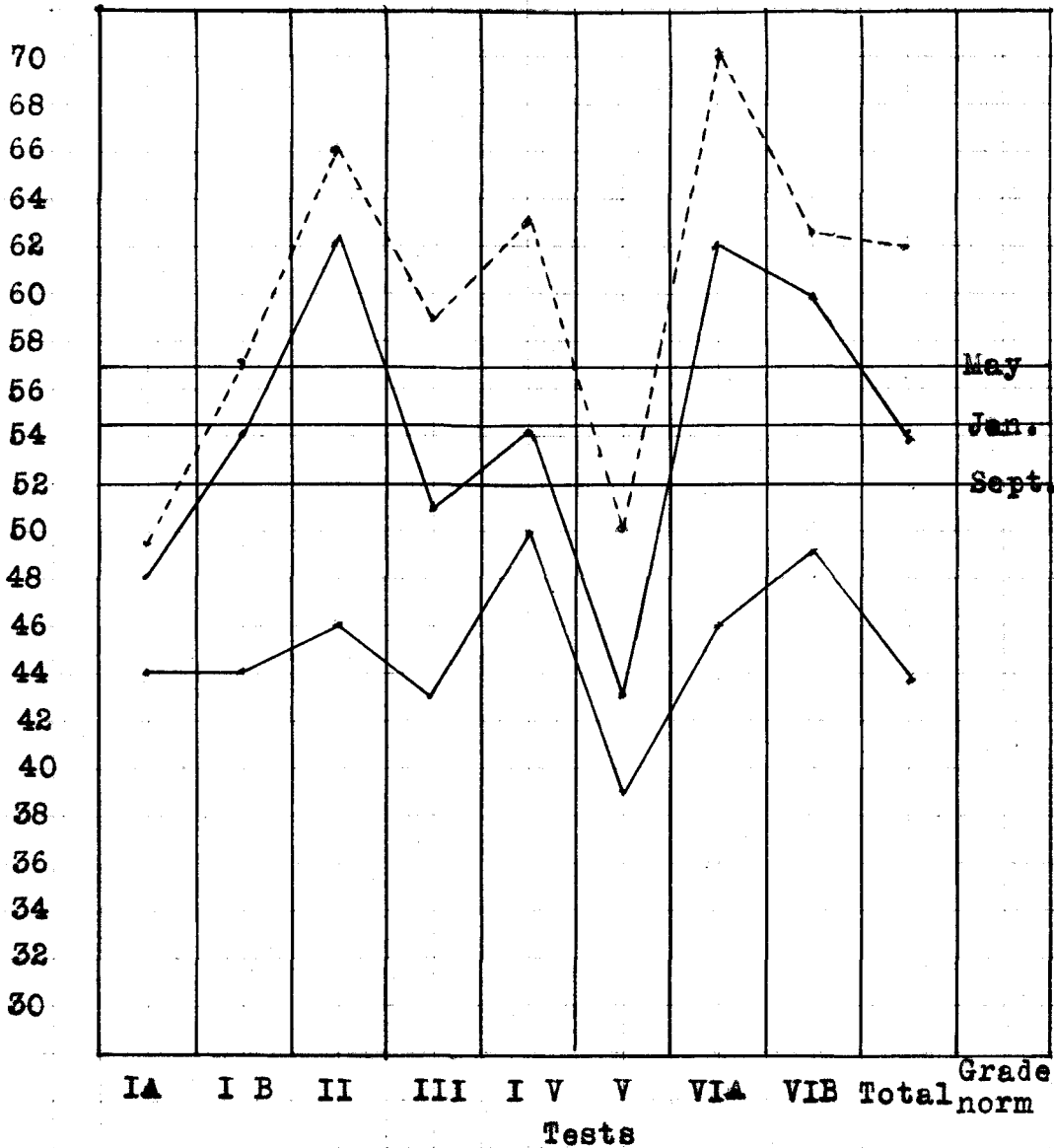
Changes in I Q	Changes in reading grade
18	2.6
23	3.4
17	4.7
15	3.0
15	4.5
25	2.2
17	2.8
4	2.6
20	2.7
0	4.2
13	3.3
13	2.2
15	0.9
19	1.4
16	2.5
11	2.7
14	2.4
16	2.3
20	1.9
26	2.1
16	3.6
19	2.0
18	2.0
17	1.0
10	1.7
17	1.9
17	1.1
10	2.3
4	1.6
11	3.2
11	1.0
19	0.8
6	1.4
15	1.6

medial reading. This is given on page 173.

The individual testing that was done during the second semester included the individual Stanford-Binet Test which was administered to the individual referred to on page 137. Her I Q on this test was 86, which is the same as that recorded for her on a first-grade individual test, but is in excess of results shown during this experiment. If her I Q is 86, then, in accordance with this indicated ability, further remedial work in reading should result in higher I Q ratings on group tests than were obtained in the course of this experimental study. These results, however, came too late in the year to be of benefit in the present study, but can profitably be the basis of further remedial work with the student concerned.

Table XL summarizes the project. The results of the three mental tests, together with the amount of change for the entire period are given. The same information is tabulated for the reading tests results. The students of the experimental group are arranged in this table in the order of May I Q ratings, beginning with the highest May I Q.

Scores



Sept. ———
 Jan. ———
 May - - - -

FIGURE I

MEDIAN SCORES IN READING FOR SEPTEMBER,
 JANUARY, AND MAY

TABLE XI

COMPARISONS BETWEEN THE MENTAL TEST AND READING
TEST CHANGES FROM SEPTEMBER TO MAY

Number and pupil	Scores				Grade equivalents			
	Sept.	Jan.	May	Change	Sept.	Jan.	May	Change
1 R. Pe.	116	129	134	18	7.5	9.3	10.1	2.6
2 J. F.	109	119	132	23	6.2	8.0	9.6	3.4
3 L. M.	112	129	129	17	7.3	8.5	12 pl.	4.7
4 C. K.	113	122	128	15	7.6	10.1	10.6	3.0
5 N. H.	113	127	128	15	7.5	9.3	12 pl.	4.7
6 C. V. G.	100	125	125	25	4.9	6.0	7.1	2.2
7 J. G.	107	120	124	17	6.8	8.0	8.6	3.8
8 W. L.	120	121	124	4	5.6	6.6	8.2	2.6
9 E. K.	102	111	122	20	4.8	6.0	7.5	2.7
10 J. Sh.	121	121	121	0	7.8	9.5	12 pl.	4.4
11 R. B.	108	108	121	13	4.9	7.5	8.2	3.3
12 J. Ke.	103	120	120	13	5.4	6.8	7.6	2.2
13 B. M. C.	104	110	119	15	6.9	6.9	7.8	0.9
14 J. Y.	100	106	119	19	6.4	7.5	7.8	1.4
15 T. K.	101	117	117	16	5.9	6.6	8.4	2.4
16 J. Ko.	104	110	115	11	6.5	6.2	9.2	2.7
17 B. G.	101	105	115	14	6.2	6.6	8.6	2.4
18 R. Fu.	96	97	112	16	4.8	6.4	7.1	2.3
19 T. W.	92	106	112	20	4.7	6.3	6.6	1.9
20 H. W.	84	104	110	26	4.4	5.1	6.5	2.1
21 T. C.	94	103	110	16	4.2	5.6	7.8	3.6
22 J. B.	91	100	110	19	3.5	4.7	5.5	2.0
23 P. V. R.	90	105	108	18	5.6	7.4	7.6	2.0
24 D. G.	90	106	107	17	4.7	4.8	5.7	1.0
25 L. P.	95	100	105	10	4.5	5.2	6.2	1.7
26 G. C.	87	102	104	17	3.4	4.7	5.3	1.9
27 N. K.	85	95	102	17	4.5	4.7	5.6	1.1
28 N. S.	91	99	101	10	4.5	6.2	6.8	2.3
29 C. D. L.	96	96	100	4	3.9	4.9	5.5	1.6
30 J. St.	88	97	99	11	4.4	5.9	7.6	3.2
31 T. M. H.	82	88	93	11	3.6	4.6	4.6	1.3
32 J. M.	71	90	90	19	4.3	4.9	5.1	0.8
33 V. B.	73	67	79	6	4.5	3.7	5.9	1.4
34 A. M.	60	70	75	15	3.3	4.2	4.9	1.6
Cl. md.				16				2.7½

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

The purpose of this study was to obtain the I Q ratings for thirty-four sixth-grade pupils by means of a group intelligence test requiring the reading of every item before response could be made; to obtain the reading ages and reading grade equivalents of these same pupils by means of a standardized analytic reading test; to institute an immediate remedial reading program based upon the results obtained; to repeat the testing program with a second form of the tests in January, revising the remedial program according to results obtained; to repeat the testing program with a third form of the tests in May; to discover from the changes in I Q test scores as compared with gains in reading grade and reading age the extent to which improvement in reading can affect the child's ability to rate well on a group test of mental ability wherein reading is an important median of performance.

The tests used in the study were: The Otis Quick-Scoring Test of Mental Ability, Form A (in September), and Form B (in May); The Otis Self-Administering Test of Mental Ability, Form A (in January); The Iowa Silent Reading Test, Revised, Form A (in September); Form B (in January); and Form C (in May).

The Otis test, administered to a group of thirty-four pu-

pils of grade six in September, indicated a spread of ability from 60 I Q to 121 I Q, with a class median of 96. The September results of total reading ability ranged from 3.3 grade level to 7.8 grade level, with reading ages from 8 years 3 months to 12 years 6 months. The class median was 4.8 grade level, and 10 years reading age, as compared with the grade expectancy for September of 6.0 grade level, and 11 years 7 months reading age.

The children were grouped into four sections according to the reading grade determined by the September reading test results. By a careful analysis of the sub-tests, remedial work was provided to meet the particular weaknesses of each group, and for individual weaknesses as well. Books were provided at the grade level indicated by the test. A library reading period was also provided during school time when children read books of their own choice at their own grade level of ability, and of their proper age interest.

The second Otis test was administered in January to those children who were present for the September testing. The I Q range was 67 to 129, as compared with 60 to 121 in September. The median gain in I Q points was 9. This test was followed by Form B of the Iowa test, which yielded a class distribution of reading grades from 3.7 to 10.1, with a median of 6.2½ grade level, as compared with the September ratings, indicating a successful gain of more than a year in class median, and a change in reading age from 10 years to 11 years 7 months.

The class was regrouped according to the grade levels a-

chieved in January, and emphasis in the remedial program was shifted from skills which were brought up to grade to those which still indicated need of emphasis.

Form B of the Otis test was administered in May to the same group of children who participated in the experiment, indicating a Beta I Q range from 75 to 134. The distribution of gains yielded a median of 5 I Q points improvement in the I Q test ratings. The Iowa test, Form C, resulted in reading ages from 9 years 7 months to above 16 years, with reading grade equivalents from 4.6 to 12 plus, which was a gain of more than a year during the second semester of the project.

The distribution of I Q gains made by the thirty-four children who participated in the classroom experiment are summarized below: one gained twenty-six points; one twenty-five; one twenty-three; two twenty; three nineteen; two eighteen; five seventeen; three sixteen; four fifteen; one fourteen; two thirteen; three eleven; two ten; one six; two four; and one made no gain.

The median gain in the above distribution was 16 points, which is significant.

A study of the extent to which I Q's could be raised by an improvement in the reading ability of children through an intensive remedial reading program brought about the following discoveries in relation to the group of students who participated:

(1) Significant changes in I Q test results were made in an eight-month period of time, the class median change being a gain of 16 points, with 30 pupils, or 88.2% of the group gaining 10 points or more, while only four pupils, or 12.8% gained less than 10 points. Five pupils, or 14.7% of the class gained 20 points or more. The high correlation between these tests substantiates their validity, (.906, .949, and .931.)

(2) The median change during the first semester was 9 points, while the second semester median gain was only 5 points. This indicated that the children were nearer their true ability in the January rating than they were in September.¹

(3) These gains were not typical of those who rated high in I Q in the initial test, but were evenly scattered throughout the four quartile distributions of mental ability.

(4) Those children whose initial I Q's were in close correlation with mental capacity made little or no gain in I Q even in those instances where reading was improved many times more than normal expectancy. This point can be further substantiated by a comparison between the first and second semester gains; those whose January I Q rating had approached more close-

¹ The apparent discrepancy between the sum of semester medians, both in I Q and in Reading Results, with the medians for the two semesters, is due to the variable error of distribution caused by regrouping for distribution on the tables, and to the minus ratings in the separate semester results.

ly to their innate ability, made less significant changes thereafter.

A summary of the changes in reading test results can be seen in the total gains made in reading grade equivalents during the eight months of intensive remedial reading, carried on with a group of thirty-four sixth-grade pupils which is as follows: two pupils gained 4 years 7 months; one 4 years 4 months; one 3 years 6 months; one 3 years 4 months; one 3 years 3 months; one 3 years 2 months; one 3 years; two 2 years 3 months; two 2 years 2 months; one 2 years 1 month; two 2 years; two 1 year 9 months; one 1 year 8 months; one 1 year and seven months; two 1 year 6 months; two 1 year 4 months; one 1 year 3 months; one 1 year 1 month; one 1 year; one 9 months; and one 8 months.

The median amount of individual gain of 2 years 2 months as figured from the above results, indicates an improvement nearly three times that of normal growth in the skills utilized in study-type reading. This accomplishment, raising the grade level of the class from $4.8\frac{1}{2}$ to 7.6, or a gain of 2 years $7\frac{1}{2}$ months, was most worth-while in itself apart from any resultant effect upon mental test scores for the following reasons:

(1) All school subjects of which reading is a tool were benefited and improved through an improvement in reading skills.

(2) A love for reading came with a lessening of the effort needed to read through increased skill in reading, through properly selected books, and through provision of a free-read-

ing period wherein reading as a leisure-time enjoyment was cultivated.

(3) Desire to improve up to ability came with the knowledge that steady improvement could be and was being made.

In comparing intelligence test score changes and improvement in reading, it has been discovered that reading improvement actually affected the results of the intelligence test ratings of the thirty-four children who participated in this eight-month experiment as follows:

(1) All but one child improved in reading at a rate above normal expectancy.

(2) All pupils made gains in ratings on mental tests (with one exception) most of which gains were significant.

(3) In the majority of cases, growth in reading and I Q change was steady and upward. This can be seen by a comparison of semester results.

(4) As pupils approached their true mental rating, less gain in I Q scores accompanied even very significant reading improvement, as indicated by several of the second-semester results.

(5) There is no relationship between the initial (September) I Q and the amount of improvement in reading or in I Q points, nor between the upper and lower levels of the class, divided according to reading ability, as the negative coefficients of correlation substantiate, (-.059, -.215, and -.156).

The conclusion reached at the end of an eight-month remedial reading program, instigated to discover to what extent improvement in reading would affect the intelligence test results of children obtained on a group mental test in which every item must be read before response could be made, is that improvement in reading of the study-type skills through an intensive remedial reading program was accompanied by significant gains in intelligence quotients up to the point where true measurement of mental ability was reached, and that effort thereafter resulted in reading gains only which should continue to be made until mental age and reading age become equivalent.

While the majority of the students in the experimental group have made very significant improvement, it is obvious from the May grade level of reading, as well as from the deviations from mental-age grade-equivalents, that further remedial reading is necessary: (1) for all the pupils in the lowest group, and three in the group of next ranking ability who are still below the level of their grade; and (2) for those students in the other groups who are up to the level of grade 6.8, or above, but are still below their mental-age grade-efficiency.

The following suggestions are recommended for remedial work with this group of thirty-four children in Grade Seven:

- (1) Divide the class into two or more groups according to the grade levels gained in the May testing program;
- (2) Give intensive training for the purpose of meeting

the students' specific needs as indicated by the sub-test results of the May reading test;

(3) Instigate an enriched and highly motivated reading program for those students who have made progress, and are up to their mental-age grade-expectancy, and significantly above the level of seventh grade, and also for those who are above grade level, but not up to their mental-age ability;

(4) Retest for the purpose of noting progress, regrouping, and revising emphasis of the remedial measures being used;

(5) Continue the remedial program until the mental ages and the reading ages correspond;

(6) A reading test and a mental test at the end of seventh grade for the purpose of discovering the extent to which students who were successful in improving their reading ability have scored higher on a mental test requiring reading because of improvement in this important medium, would further substantiate the conclusions reached in this study.

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APPENDIX I
MENTAL TESTS AND READING TESTS USED
IN THE CLASSROOM PROJECT

By ARTHUR S. OTIS, PH.D.
Formerly Development Specialist with Advisory Board, General Staff, United States War Department

BETA TEST: FORM A

For Grades 4-9

Score.....

Read this page. Do what it tells you to do.

Do not open this booklet, or turn it over, until you are told to do so.
Fill these blanks, giving your name, age, birthday, etc. Write plainly.

Name.....Age last birthday years
First name, initial, and last name

Birthday.....Teacher.....Date.....19.....
Month Day

Grade.....School.....City.....

This is a test to see how well you can think. It contains questions of different kinds. Here is a sample question already answered correctly. Notice how the question is answered:

Sample: Which one of the five things below is soft?
1 glass 2 stone 3 cotton 4 iron 5 ice.....
1 2 3 4 5

The right answer, of course, is *cotton*; so the word *cotton* is underlined. And the word *cotton* is No. 3; so a heavy cross has been put in the 3d circle. This is the way you are to answer the questions.

Try this sample question yourself. Do not write the answer; just draw a line under it and then put a heavy cross in the right circle.

Sample: A robin is a kind of —
1 plant 2 bird 3 worm 4 fish 5 flower.....
1 2 3 4 5

The answer is *bird*; so you should have drawn a line under the word *bird* and put a heavy cross in the 2d circle. Try this one:

Sample: Which one of the five numbers below is larger than 55?
1 53 2 48 3 29 4 57 5 16.....
1 2 3 4 5

The answer, of course, is 57; so you should have drawn a line under 57 and put a heavy cross in the 4th circle.

The test contains 80 questions. You are not expected to be able to answer all of them, but do the best you can. You will be allowed half an hour after the examiner tells you to begin. Try to get as many right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. No questions about the test will be answered by the examiner after the test begins. Lay your pencil down.

Do not turn this booklet until you are told to begin.

Patent No. 1,586,628

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OTIS SELF-ADMINISTERING TESTS OF MENTAL ABILITY

By ARTHUR S. OTIS, Ph.D.

Formerly Development Specialist with Advisory Board, General Staff, United States War Department

INTERMEDIATE EXAMINATION: FORM A

For Grades 4-9

20

Score.....

Read this page. Do what it tells you to do.

Do not open this paper, or turn it over, until you are told to do so. Fill these blanks, giving your name, age, birthday, etc. Write plainly.

Name..... Age last birthday..... years
First name, initial, and last name

Birthday..... Teacher..... Date..... 19.....
Month Day

Grade..... School..... City.....

This is a test to see how well you can think. It contains questions of different kinds. Here is a sample question already answered correctly. Notice how the question is answered:

Sample: Which one of the five words below tells what an apple is?

1 flower, 2 tree, 3 vegetable, 4 fruit, 5 animal..... (4)

The right answer, of course, is "fruit"; so the word "fruit" is underlined. And the word "fruit" is No. 4; so a figure 4 is placed in the parentheses at the end of the dotted line. This is the way you are to answer the questions.

Try this sample question yourself. Do not write the answer; just draw a line under it and then put its number in the parentheses:

Sample: Which one of the five things below is round?

1 a book, 2 a brick, 3 a ball, 4 a house, 5 a box..... ()

The answer, of course, is "a ball"; so you should have drawn a line under the words "a ball" and put a figure 3 in the parentheses. Try this one:

Sample: A foot is to a man and a paw is to a cat the same as a hoof is to a — what?

1 dog, 2 horse, 3 shoe, 4 blacksmith, 5 saddle..... ()

The answer, of course, is "horse"; so you should have drawn a line under the word "horse" and put a figure 2 in the parentheses. Try this one:

Sample: At four cents each, how many cents will 6 pencils cost?..... ()

The answer, of course, is 24, and there is nothing to underline; so just put the 24 in the parentheses.

If the answer to any question is a number or a letter, put the number or letter in the parentheses without underlining anything. Make all letters like printed capitals.

The test contains 75 questions. You are not expected to be able to answer all of them, but do the best you can. You will be allowed half an hour after the examiner tells you to begin. Try to get as many right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. No questions about the test will be answered by the examiner after the test begins. Lay your pencil down.

Do not turn this page until you are told to begin.

OTIS QUICK-SCORING MENTAL ABILITY TESTS

By ARTHUR S. OTIS, PH.D.

Formerly Development Specialist with Advisory Board, General Staff, United States War Department

Beta
B

BETA TEST: FORM B

For Grades 4-9

Score.....

Read this page. Do what it tells you to do.

Do not open this booklet, or turn it over, until you are told to do so.

Fill these blanks, giving your name, age, birthday, etc. Write plainly.

Name..... Age last birthday years
First name, initial, and last name

Birthday..... Teacher..... Date..... 19.....
Month Day

Grade..... School..... City.....

This is a test to see how well you can think. It contains questions of different kinds. Here is a sample question already answered correctly. Notice how the question is answered:

Sample: Which one of the five things below is soft?

1 glass 2 stone 3 cotton 4 iron 5 ice.....

The right answer, of course, is *cotton*; so the word *cotton* is underlined. And the word *cotton* is No. 3; so a heavy cross has been put in the 3d circle. This is the way you are to answer the questions.

Try this sample question yourself. Do not write the answer; just draw a line under it and then put a heavy cross in the right circle.

Sample: A robin is a kind of —

1 plant 2 bird 3 worm 4 fish 5 flower.....

The answer is *bird*; so you should have drawn a line under the word *bird* and put a heavy cross in the 2d circle. Try this one:

Sample: Which one of the five numbers below is larger than 55?

1 53 2 48 3 29 4 57 5 16.....

The answer, of course, is 57; so you should have drawn a line under 57 and put a heavy cross in the 4th circle.

The test contains 80 questions. You are not expected to be able to answer all of them, but do the best you can. You will be allowed half an hour after the examiner tells you to begin. Try to get as many right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. No questions about the test will be answered by the examiner after the test begins. Lay your pencil down.

Do not turn this booklet until you are told to begin.

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APPROVAL SHEET

The thesis submitted by Sister Mary Emma Cleary has been read and approved by three members of the Department of Education.

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content, form, and mechanical accuracy.

The thesis is therefore accepted in partial fulfillment of the requirements for the Degree of Master of Arts.

1/30/44
Date

Rev. J. B. Gleason
Signature of Adviser