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<https://doi.org/10.18297/etd/1936>

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UNIVERSITY OF LOUISVILLE

THE EFFECTS OF A SPECIAL TECHNIQUE UPON RATE AND
COMPREHENSION IN TEACHING SILENT READING

A DISSERTATION

SUBMITTED TO THE FACULTY
OF THE GRADUATE SCHOOL OF THE UNIVERSITY OF LOUISVILLE
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE
OF MASTER OF ARTS

DEPARTMENT OF EDUCATION

BY

S. HARLAN VOGT

1932

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CHAPTER I

CHAPTER I

INTRODUCTION

This experiment was undertaken with the object in view of determining whether or not a technique, embracing certain factors, in teaching Silent Reading, would result in an increase of speed and comprehension. The experiment was conducted in the fourth, fifth, and sixth grades of the Port Fulton School of Jeffersonville, Indiana, during a period of seventy-five school days.

The factors involved in this technique are:

- I. Recognition of the value of the habit of rapid Silent Reading;
- II. Practice in extensive Silent Reading;
- III. Formation of habits of proper uniform rhythmical eye movement;
- IV. Decrease in vocalization;
- V. Time-pressure control.

According to Gates, Reading is both the most important and the most troublesome subject in the elementary school curriculum. It is most important since it is a tool, mastery of which is essential to the learning of nearly every other school subject; most troublesome since pupils fail in reading far more frequently than in any other elementary skill.

The importance of reading is indicated in many ways. That teachers and school officers recognize its significance is indicated by the relatively large time allotment and the wealth of

teaching devices originated for this subject in the elementary school. That those engaged in research realize the importance of reading is apparent in the relatively large number of investigations in this subject that have been made during the last three decades. Both school experience and scientific research have added new evidence of the prime importance of good reading in school work. That spelling is partly dependent upon effective reading, that good methods of study in geography, history, and other subjects are largely due to types of reading techniques, that difficulties in working arithmetic problems frequently result from faulty reading habits; these facts are examples of an increasing number of findings that emphasize the value of establishing good reading habits.¹

Again, Germane and Germane say the importance of teaching pupils to read effectively can scarcely be overestimated, since reading is the key to all subject-matter. We know that the pupil's progress in school depends largely upon the speed and accuracy with which he can get the thought from the printed page. Judging from the time allotment accorded reading in the grades, it is evident that the importance of this subject has been recognized. In fact, an examination of courses of study shows that in the primary grades approximately 70 per cent of the time has been devoted to the teaching of reading. 90 per cent of a child's reading both in school and out is silent reading. Is it fair to have the child acquire attitudes toward a subject and to form habits and develop skill for which he will

¹Gates, Arthur I., The Improvement Of Reading P. 3-4

have little use either in school or out of it? The habits formed in oral reading may be a positive hindrance to the acquirements of speed and comprehension in silent reading.¹

Stone holds that traditional objectives and practices in teaching reading have failed to take into account the importance, economy, and efficiency of silent reading, as distinguished from oral reading. The stereotyped oral-reading procedure stresses form and mechanics, whereas the new objective for developing skillful silent reading emphasizes thought-getting under conditions of correct attitudes and motivating purposes. The need for special attention to silent reading is indicated in the fact that, in the army intelligence tests, approximately one fourth of the young men of the country could not comprehend simple passages of the most ordinary printed material. Numerous surveys with reading tests have revealed the inability of a considerable portion of pupils in the middle and upper grades to do the reading required in their studies. An important general objective in reading is the development of all pupils in skillful silent reading, to the extent of their mental ability. Training in silent reading should aim to improve comprehension in its three fundamental phases: power or depth of comprehension, quickness or speed of comprehension, and accuracy.²

"The teaching of silent reading, if it is to be effective, must be based upon clearly defined aims and carefully worked out methods of procedure. It might be inferred that the only objectives of silent reading are a rapid rate and efficiency in

¹Germane, Charles E. & Germane, Edith G., Silent Reading Chap.I, P.11

²Stone, Clarence R., Silent and Oral Reading, Chap. I, P.4

reproducing specific points. Silent reading implies much more. It implies above all the ability to react to the materials of the printed page in a critical manner, the ability to use them in the solution of daily problems and for purposes of general intellectual growth. Silent reading and study are, therefore, essentially synonymous. Therefore, training in silent reading implies training in study and training in the use of books. This means of course that training in silent reading should be closely correlated with the work in other subjects. It stresses the necessity of making the reading exercise specific and purposeful. The continued reading of selections for no other purpose than to restate in general what has been read is at best a questionable practice. For the most part the pupil should read with specific problems in mind, problems which have been defined under the direction of the teacher before the reading begins. The pupil should be judged largely by the speed and the accuracy which he displays in connection with reading of this kind.¹

¹Smith, William A., The Reading Process, Chap. IV, P. 194

CHAPTER II

CHAPTER II

STATEMENT OF PROBLEM AND QUESTIONS

This experiment, as was stated, was undertaken with the object in view, of determining, if possible, whether or not a technique, embracing certain factors in teaching Silent Reading, would result in an increase in speed and comprehension.

What is the significance of this study? Present day social conditions require the need for effective, rapid Silent Reading; reading material is abundant; reading is almost universal, only a few, comparatively speaking, are unable to read; communication is very rapid; the written language is one of the chief means of communication. In fact, success and happiness in life may depend largely upon the kind and scope of one's reading.

In the Port Fulton School, of Jeffersonville, Indiana, where this experiment was conducted, a great number of the pupils of the fourth, fifth, and sixth grades seemingly were unable to read as rapidly and as comprehensively as could be desired. The sixth grade especially aroused my interest as they have been under observation since their entrance into the school. They seemed unable to discriminate between the major and minor facts in their studies; they could not read as rapidly as was sometimes necessary in a crowded curriculum as is ours at the present time. The question then presented itself;- Can these boys and girls be trained to better their present rate in speed, and ability to comprehend; and if so, how?

Some consideration must be given regarding the type of

homes from which these children come; did they come from homes where the father was a professional man, business man or laborer? What advantages for reading were given to the boys and girls in these families; did they have access to newspapers and periodicals, was there private library in the home; were they patrons of the Public Library? In short, the economic status of the family should be considered.

Below is a resume in which the children are classified as coming from three types of homes; laboring; business; and professional classes:-

Laboring class-----	45 or 75%
Business -----	14 or 23%
Professional -----	1 or 2%

The amount and variety of reading material available is shown in the following tabulation:

Newspapers -----	20 children
Magazines -----	12
Private Library-----	4
Patrons of public library-----	15

This study was made with these groups inasmuch as such experts, as Charles H. Judd and William S. Gray, and progressive schools generally, have accepted the position that the middle grades form the critical period in developing fundamental attitudes, habits and skills in Silent Reading.

With these statements in mind there follows a number of pertinent questions which this investigation will endeavor to answer:

What increase, if any, in the speed of reading is noted?

Is the comprehension thereby decreased, unaffected, or increased?

Do the individual differences in rate tend to decrease or to become more prominent as a result of training in silent reading?

What grades show the greatest susceptibility, if any, to improvement in rate of silent reading?

How do the present norms for rate of silent reading for fourth, fifth, and sixth grades compare with the norms obtained in this study after training has been given in rapid silent reading?

What are tentative standards for rate for grades in which pupils have been trained in rapid silent reading?

CHAPTER III

CHAPTER III

EXPLANATION OF FACTORS INVOLVED IN TECHNIQUE

As previously stated the factors involved in the technique used in this experiment are:

- (1) Recognition of the value of the habit of rapid Silent Reading;
- (2) Practice in extensive Silent Reading;
- (3) Formation of habits of proper uniform rhythmical eye movement;
- (4) Decrease in vocalization; and
- (5) Time pressure-control.

Each of these factors will be discussed separately, and in Chapter IV a summary of some recent studies will be given, similar to the one under consideration.

FACTOR I

In recognition of this factor Germane and Germane¹ hold that "the pupil's attitude toward reading is very important. If he thinks of the lesson as containing material with which he should become familiar, he will accomplish much more. Psychology has shown the influence of the will when doing a thing. If the pupil desires to become a proficient reader, the methods employed during the class period will be much more effective."

O'Brien² maintains that probably the chief reason why comparatively few readers have acquired habit of rapid silent reading

¹Germane and Germane, Silent Reading, Chap. XIII, P. 260

²O'Brien, John Anthony, Silent Reading, Chap. III, P. 70-71

is due to the fact that they have failed to recognize the possibility of greatly increasing their rate. The discovery of the possibility of appreciably accelerating the rate is the result of investigations of comparatively recent date. The knowledge thus gained from these investigations is only beginning to filter through into educational practice and to reach the popular mind. It is necessary that one recognize the possibility of establishing immeasurably more effective and economical habits of rapid silent reading, along with an appreciation of their value, if one is to acquire them. Once these facts have been clearly perceived, the effort necessary to substitute "higher order" habits of reading for slow dawdling ones will be readily forthcoming. It is of the utmost importance that both the teacher and the pupils recognize the value and possibility of establishing such habits. Unless the pupils perceive the value of such habits, and are made to feel the need of acquiring them, their reading is apt to be mechanical and lacking that earnestness which is so necessary to effective habit formation, and, in fact, to all successful work. On the other hand, if the value of such habits is perceived and the need felt, the successful outcome is already half assured. From such an attitude there springs concentration of mind, enthusiasm, and sustained interest, all of which are so essential in the acquirement of habits of rapid silent reading.

One must have the determination to read rapidly. The general literature on the subject of reading records several instances of persons suddenly awakening to the realization that their rate was unnecessarily slow. Accordingly they resolved

rather simply and naturally to bring it up to a higher level. Huey¹ owed the doubling of the rate largely to his simple determination to "speed up." Indifference to improvement in their habits of reading on the part of pupils may be justly expected to produce indifferent results. According to O'Brien² much of the ordinary reading is of the lackadaisical, dead-level, plodding type broken by many gaps of attention and much unconscious day dreaming. He holds that a sudden determination to "speed up" effects a change in the whole mental attitude; it shoots the attention rapidly over the subject matter, and replaces listlessness with spirit and dynamic energy.

Again Germane and Germane³ hold that the pupil's attitude toward reading is very important. "If the child thinks of the lesson as containing material with which he should become familiar, he will accomplish much more. Psychology has shown the influence of the will when doing a thing." If we can get the pupil interested to the point that he wants to become a proficient reader, the methods employed during the class period will be much more effective and conducive of results.

FACTOR II

In order to develop the proper background of meaning there should be extensive reading of all types of material that give the child valuable experience. The traditional point of view in relation to the reading course for the middle grades has been to have a few well selected units studied intensively, with

¹Huey, Edmund B., The Psychology and Pedagogy of Reading, Chap. IX, P. 179

²O'Brien, John Anthony, Silent Reading, Chap. 3, P. 72

³Germane & Germane, Silent Reading, Chap. 3, P. 260

oral rendition following minute analysis. The point of view now coming to be more generally accepted is to have large amounts of reading done in these grades, to provide the pupil with a vicarious type of experience, to develop efficient reading habits, and to develop the habit of reading for recreation.

According to Anderson and Davidson¹ extensive reading increases rate. Much reading of simple, interesting material should be provided. The opportunity to read widely increases word mastery and improves reading rate.

In the intermediate grades the reading is extensive, and the emphasis is on thought getting. Since the aim of this reading is both informational and recreational, it should contribute toward the development of a permanent interest in a variety of reading material. The pupil should master the mechanics of reading reasonably well in the primary grades; beginning with the fourth grade his chief concern should be to improve his power to "husk thought" from the printed page. Silent reading must be stressed more than heretofore. Not only must silent reading seek the thought, but it must strive to get the thought in progressively shorter time.²

Germane insists³ that if we are to develop the child's silent reading ability to the utmost, we must give him much practice in reading various kinds of material. We must get rid of the idea that one book contains all that a child should read in a year. We must give him access to an abundance of

¹Anderson, Charles J. & Davidson, Isobel, Reading Objectives, Chap. 6, P. 95

²Schmidt, C.C., Teaching And Learning The Common branches, Chap. 6, P. 179

³Germane & Germane, Silent Reading, Chap. 10, P. 186

material which is within the range of his interests and comprehension. Investigations have proven that children need different kinds of reading material if they are to obtain the best results from their work in reading, because the ability to assimilate what one reads depends to a large extent on the nature of the subject matter. There are as many different kinds of silent-reading abilities as there are different kinds of reading materials. No type of material is adequate for teaching silent reading. The greater the supply of kinds of subject matter, the better it is for both teacher and pupil. There are at least four reliable sources of reading material which are available to every teacher: The various school readers, text-books, library books, pamphlets or bulletins.

Stone holds¹ that studies of various types of silent reading indicate the need of training pupils in effective habits of attack in reading different types of content, in reading for different purposes, and in doing analytical study. He further points out that the fourth, fifth, and sixth grades are probably not periods of elaborate analytical study, but that there should be much reading of a variety of material. To the fourth, fifth, and sixth grades, then, may be assigned the task of cultivating fluent silent reading of various types in preparation for later elaborate form of analytical study.

From the above statements it is plain that if one wishes to acquire skill in silent reading, it is necessary that he have abundant practice in the two principal types of silent reading;

¹Stone, Clarence R., Silent and Oral Reading, Chap. 2, P 30

namely, cursory, unreflective, nonstudious reading and reflective, studious reading.

FACTOR III

In consideration of the third factor Smith¹ says that contrary to popular opinion, the passage of the eyes across the page is not continuous. He says that it consists rather of a series of movements and stops, the former being commonly designated as interfixation movements and the latter as fixation pauses. He further reminds us that upon reaching the end of a given line the eye returns, by means of the return sweep, to the beginning of the next. The intensive study of these movements and pauses, especially the pauses, has thrown much light upon the nature of the reading process. Again in speaking of the character of interfixation movements and return sweep he says, "It has been conclusively established through a long chain of investigations that the eye can receive no distinct visual impression during the time that it passes from one fixation point to another. All but an insignificant fraction of the time in reading is spent in pauses. It is during these pauses, periods of apparent rest on the part of the eye, that distinct visual impressions are received from the printed page. The pauses constitute, therefore, the period of perception par excellence, though it must be borne in mind always that perception and assimilation as such are continuous processes which proceed essentially uninterrupted by movements and pauses." From the above quotation it is obvious that the number of pauses which an individual requires in reading a line is one of the most

¹Smith, William A., The Reading Process, Chap. 6, P. 105-114

important factors in determining his rate of reading. In general we might say the larger the number of pauses the slower the rate and vice versa. Again Smith¹ says that aside from the possible exception, of their number, the duration of the pauses is the most important factor in determining the rate of reading. The shorter the pauses, the more rapid the rate of reading and vice versa. From the above statements it appears that the perception time in the case of a given unit of reading material, such as a line or a paragraph, is the product of the average number and the average duration of the pauses required in reading it.

Stone² in discussing the importance of eye-movements reminds us that the study of eye-movements has occupied an important place in psychological studies of the reading process from the earliest investigations to the present time. He says that in reading the eye makes a series of quick movements with very brief intervening pauses, the actual reading taking place only during the eye-pause or act of fixation. He further tells us that the number of eye pauses per line varies according to the maturity and efficiency of the reader, the good reader in the upper grades makes as many as fifteen. The better readers not only make fewer pauses, but the eye-movements are of a more rhythmical character. The development of the proper eye-movement habits is one of the most important problems in reading.

¹Ibid, PP. 117-18

²Stone, Clarence R., Silent And Oral Reading. Chap. 2, P. 6

In commenting on the work of the eye in reading Anderson and Davidson¹ maintain that a child cannot get thought from his reading unless he has command over the mechanics of reading. They hold that one mechanical adjustment that is essential in both silent and oral reading is the movement of the eyes along the lines of print. In reading the eye does not move along the lines of print in a steady, even manner, but rather by a series of quick, jerky movements. They say that reading takes place during the fixation pauses which occur between the jerks or sweeps and that the number of fixation pauses is determined by the nature of the material, the purpose for which it is read, and the individual's familiarity with the vocabulary presented.

From the above it is plain that all methods or devices should tax the eye span to the limit; that is, each child should be trained to see as many words as possible at each fixation pause. All methods or devices should reduce the number of fixations per line, and lessen the time spent on each pause. Further, all methods or devices should increase the tendency to read in rhythmical sweeps by increasing the span of recognition. Since one's rate of reading becomes a fixed motor habit, as difficult to change possibly as any other habit, it is logical to assume that right habits should be established in the early stages of learning to read.

Again Schmidt² says that we have long assumed that the eye moves steadily along the line, from left to right, word by word, as we read. Recently this process has been subjected to experimental study, and it has been found that what really takes place

¹Anderson, Charles J. & Davidson, Isobel, Reading Objectives, Chap. 6, P. 87

²Schmidt, C.C., Teaching And Learning The Common Branches, Chap. 6, P. 18.

is a succession of rapid eye movements separated by pauses, and that the recognition of words takes place during those pauses. If a finger is laid lightly on the lid of one eye while the other eye is permitted to read, the jerks and stops may be detected. This peculiar eye movement in reading may also be seen by placing a mirror on the left page of a book and looking over the subject's shoulder while he is reading the right page. The character of these movements and pauses is an important factor in the reading process. An efficient reader moves his eyes rapidly and regularly with only three or four short pauses per line. A poor reader makes several times as many pauses; and his pauses are longer. The eye movements are frequently regressive as well as progressive. The child who is just beginning to read pauses at every word or phonogram, and makes many regressive or backward movements. With experience in reading, the pauses become shorter and fewer, and the eye sweeps or movements become longer. When a person's reading habits are formed his eye movements reveal a regular rhythm of movements and pauses, but the rhythm varies with different kinds of subject matter, with different sizes of type, and with different length of lines. Schmidt¹ further says that one may judge a pupil's reading ability by the character of the eye sweeps, pauses, and regressive movements.

In the discussion of formation of habits of proper uniform eye movements Stone² says that the photographic studies of eye movements of children and adults in reading indicate that visual perception may take place in units of phrases, words,

¹Schmidt, C.C., Teaching And Learning The Common Branches, Chap.6, P.182
²Stone, Clarence R., Silent And Oral Reading, Chap. 2, P.27

parts of words, or letter by letter. Usually immature readers, such as first grade pupils, and slow, laborious readers of any age, make several eye-fixations in recognizing a word. It is rare for children to recognize more than a word in one eye pause before the third and fourth grade. There is rapid growth in visual perception for both oral and silent reading during the first three grades. In the middle and upper grades the rate of recognition continues to increase, but investigations show the problems in the middle grades is to continue the growth attained in the lower grades in increasing the span of recognition in silent reading.

FACTOR IV

In considering factor four which has to do with decreased vocalization or inner speech it is necessary that we remember that in silent reading, the vocal organs tend to produce the words which the mind perceives and synthesizes into a complete sentence. We appear to hear in imagination what we read silently. In young readers this impulse to vocalization is manifested by movement of lips. Practiced readers have learned to suppress lip movement despite the ever present activity of the vocal mechanism.

According to Schmidt¹ the importance of inner speech in silent reading depends upon the subject matter and upon our aim in reading it. In poetry, for example, rhythm and melody are important elements and much of the beauty is lost if we read too fast for this inner articulation to take place. On the other

¹Schmidt, C.C., Teaching And Learning The Common Branches, Chap.6, P.183

hand Schmidt¹ holds that in much of our ordinary reading, it is desirable to gather only the main ideas, and to apprehend these as rapidly as possible. Further, in this later instance he says that inner speech contributes little; its presence retards the reading and detracts from the thought.

"The expert silent reader does not hear the sonorous sounds of his own voice or experience any muscular tension of the vocal cords as he reads, especially as he reads the literature of information. When one is reading the "literature of power," of inspiration, the kind that should be chosen for much of the oral reading, no doubt he will and should experience a mental pronunciation of the words. But the vast bulk of all our silent reading is of the former kind, and because of this we should strive to bring the printed word and the thought into direct association. The more intimate this association becomes, the less the necessity for the reader to think the reading in terms of oral speech before the thought is obtained. In proportion as he does this he falls short of the ideal of silent reading for ordinary purposes. In all silent reading, the vocal-motor tendency should be reduced to the minimum, because it tends to retard or becloud the thinking. The sentence read should awaken the ideational centers rather than the vocal-motor or the auditory. The words should be made as transparent as is possible; the language series should become subconscious, mechanical; that is, offer the least possible resistance. The great purpose of silent reading is realized whenever the attention is focused

¹Ibid, P. 184

on the stream of thought rather than on words and phrases."¹

In speaking of inner speech in reading Klapper² says that because there is an inseparable association between a word and its sound there is always a problem of inner speech. Just as soon as a visual image of a word is recognized in consciousness an auditory image of it arises, and these two prompt an instantaneous verbal motor expression. He further adds that purely visual reading is not normal. We have here, therefore, an explanation of the prevalent practice, in early reading, of lip movement. This method of reading is not acquired by the children; it is the result of the natural tendency to give expression to any idea in the mind. No sooner does the mind become conscious of the meaning of the symbol which it sees than the organs of speech give expression to it. Reading without lip reaction is an acquired art, a habit to be cultivated.

Huey³ states that reading without lip-movement is "an acquired habit," the natural thing being to use the lips, as almost all of us do in practice when we come to a difficult place requiring close attention. According to his own observations he maintained that the disappearance of the lip-movement is no indication of the absence of inner speech in reading. In the reading of most people some form of inner speech is present. The problem is not necessarily to eradicate inner speech entirely, for that may not always be possible or advisable, but to decrease

¹Briggs, Thomas H. & Coffman, Lotus D., Reading In Public Schools,

²Klapper, Paul, Teaching Children To Read, Chap. 7, P. 63
Chap. 3, P. 17.

³Huey, Edmund B., The Psychology And Pedagogy Of Reading, Chap.6
P. 123

and abbreviate it until it becomes shadowy, slight and vestigial.

Why concern ourselves with the problems of inner speech in reading and mental vs. visual reading? These two questions are important, because they determine a most vital factor in reading as a process of thought-getting, that is, rate in reading. From actual observations we find that there are great discrepancies in the rate of reading among individuals. In other words, it is usual to find among people of the same class, experience, and education individuals who read three or four times faster than others. Generally speaking, the rate in reading is determined by the rhythmic sweeps of the eye over a line; but the rate of rhythmic sweeps is, in its turn, modified by inner speech and mental grasp.

FACTOR V

In discussing the factor of time pressure-control we simply mean that the rate of a pupil's reading is being measured by a clock or watch. O'Brien¹ holds that the consciousness that he is being timed, not only tends to inhibit dawdling and daydreaming, but it increases the concentration and spurs him on to greater speed. He says that the consciousness of a reliable objective check on any performance serves as a wholesome prophylactic against careless, slovenly, half-hearted work, and provokes the maximum of ability. When the pupil realizes that there is no check upon his performance, no means of determining his rate, there is the tendency for daydreaming and unconscious

¹O'Brien, John Anthony, Silent Reading, Chap. 3, P. 73-4

wanderings of the attention to occur. Not that these disturbing elements are willfully invited, but the mental attitude is such as to offer no strong barrier to their entrance. As mentioned above the consciousness that a clock or watch is accurately measuring the pupil's rate of reading induces a mental "set," which focuses the attention directly upon the task at hand, and which is incompatible both with lackadaisical poring and leisurely dawdling. In other words the pressure of a time check serves to "key up" the mind to a superior level of attention, which enables it to devote its whole conscious energy to the gathering of the thought from the printed page and saves it from the necessity of making a fight against irrelevant ideas which tend to draw the attention away from the context. In type of training where speed is one of the qualities aimed at, it would seem that this factor cannot well be omitted.

According to Klapper¹ silent reading, under pressure of limited time, if made a regular part of every reading lesson, brings advantages that are far-reaching and permanent. It not only develops the art of concentration but it trains the eye to be an efficient tool in thought-getting, by subordinating words and symbols to sentences. It also guarantees better oral reading.

As a summary (1) it is recognized that in order to acquire more effective and economical habits of rapid silent reading with an appreciation of their value one must have determination

¹ Klapper, Paul, Teaching Children To Read, Chap. 9, P. 138

to acquire them; (2) much practice in reading various kinds of silent reading material tends to develop the silent reading ability; (3) the development of proper habits of eye movement is one of the most important problems in reading. One may judge the character of a pupil's reading ability by the number of pauses, eye sweeps, and regressive movements; (4) in all silent reading the vocal-motor tendency should be reduced to a minimum as it tends to retard or becloud thinking. The great purpose of silent reading is realized whenever the attention is focused on the stream of thought rather than on words and phrases; (5) silent reading, under pressure of limited time, not only develops the art of concentration but it trains the eye to be an efficient tool in thought-getting, by subordinating words and symbols to sentences.

CHAPTER IV

CHAPTER IV

A REVIEW OF SOME RECENT INVESTIGATIONS

Some similiar investigations dealing with the factors listed in Chapter III have been made and a summary of several of them follow:

The story of how one school system carried out a program of devices for increasing speed and comprehension with marked improvement in reading follows:-

The Thorndike-McCall Reading Scale, Form 2, was used in Grades IV to VIII to discover how the pupils compared in their reading ability with pupils in other school systems. The results showed a decided need of improving speed and comprehension.

There was a general agreement to try to increase speed and comprehension in silent reading by more attention to the thought and word introduction of the reading lesson, by reading with a definite motivation and a time limit, by overcoming vocalization, by using varied devices for testing understanding and emotional responses, by applying devices for lengthening eye-span, and by having a summary which should cause the child to look back over the reading lesson as a whole before leaving it.

In order to measure approximately the gains which they hoped to make, the teachers gave pupils of Grades IV to VIII the Chapman-Cook Speed of Reading Test before inaugurating the program of devices and again at the end of two months' trial of the program. The first test was given on March 28 and showed 32 classes with average scores above the standard for their grades,

three classes with scores equivalent to the standard, and fifty below the standard.

On June 2, the close of the two months' test period the Chapman-Cook Speed of Reading Test yielded the following results: Out of eighty-five classes, eighty-three showed scores above the standard for their grades as against thirty-two on March 28, and only two below the standard against fifty below on March 28. All grades showed an increase in the June 2 over the March 28 score. The amount of increase varied from one point to thirteen points. The gain of 13 points in a fifth grade class represented an increase of 100 per cent.¹

Rhoads² provided systematic training in comprehension for a group of sixth grade pupils of superior reading ability to determine whether upper grade pupils could profit from such training. Remmers and Stalnaker³ provided training for poor readers at the college level. The results of these and other studies are very gratifying. They indicate that systematic training in important reading habits can often be provided at all levels to advantage. They also show that the achievement of groups of poor readers can be radically improved when appropriate methods of instruction are applied.

Hunt⁴ studied two groups of which the intelligence scores

¹Springsteed, Clara B., Improving Speed and Comprehension In Reading, Journal of Educational Method 5:48-52; Oct. 1925

²Rhoads, Luke C., Systematic Remedial Training for Pupils of Superior Reading Ability, Elementary School Journal-Vol. XXIX (June 1929) PP. 771-73

³Remmers, H. H., and Stalnaker, J.M., An Experiment in Remedial Exercises at the College Level School & Society. Vol. XXVIII-Dec. 1928-PP. 797-800

⁴Hunt, C. W., Extensive Reading: A Factor in Developing Reading Ability-School & Society-Vol XI (1920) PP. 260-61

were virtually the same and found that pupils who read extensively improved more in both rate and comprehension of reading than other pupils. In 1921 Zirbes¹ divided a second grade class into two sections of approximately equal size.

"The pupils of the one section were matched or paired with those of the other section in chronological age, Binet mental age, and reading ability as represented by a composite score on several informal reading tests, the Gray Oral Reading Test and the Courtis Silent Reading Test." During a period of 6 weeks one group received carefully planned formal and intensive instruction" in reading. "Extensive, silent, and informal reading experience was provided for the other section. The pupils of the latter section were given the opportunity to choose the material which they read. The teacher also supervised their reading each day, giving to each child such help or encouragement as was needed. The purpose of the experiment was to determine the relative merits of the two types of reading activities, "When the time and other factors were as nearly constant as possible and when each was at its best." Records were kept of the daily progress of the pupils. At the end of two months both groups were retested. An analysis of the descriptive records and a comparison of the test scores revealed the following facts:

The average growth in reading ability was almost identical in both groups, but the upper part of the group which had extensive individual silent reading experiences showed more im-

¹Zirbes, Laura, Silent Reading in the Primary Grades Elementary School Journal- Vol 26- 1926-PP. 578-79

provement or growth than the upper part of the group which had formal instruction. The lower ranges of ability in the informal extensive group evidenced less growth than that registered by pupils in the lower end of the formal-instruction group. There was indeed a sharp division which seemed to indicate that extensive silent reading of new material is neither very interesting nor profitable to pupils who read less than sixty words per minute orally and who make two or more serious errors per minute or meet with as many difficulties in which they require help.

Conversely, the pupils who read more than sixty words per minute orally with infrequent errors and comparative independence seemed to be retarded by instruction and gained more from extensive reading experiences. While intensive reading experiences, i, e, review or re-reading were especially valuable in the case of children of slow rate and low ability, they were neither as valuable nor as interesting to children who had passed a certain minimal ability. When children with inadequate ability were merely provided with opportunities to do silent reading without appropriate instruction and supervision, they frequently acquired bad reading habits and attitudes.

An elaborate study reported by Payne¹ in 1930 indicated that it is difficult to measure with accuracy the "perceptual span." The data secured led to the tentative conclusion that difficulty in learning to read does not relate so much to the amount recognized at one fixation as it does to "automatizing

¹Payne, Cassie Spencer, The Derivation of Tentative Norms for Short Exposures in Reading. Harvard Monographs in Education, No. 10, Harvard University Press, 1930

the right responses. The amount of reading matter which can be responded to accurately appears to depend upon training and to a limited extent upon maturity."

In the school year of 1923-24 Burton¹ directed a study for the purpose of improving ability in silent reading in grades III to VIII.

Early in the school year pupils were given either the Otis Group Intelligence Test or the Illinois General Intelligence Test, and both the Standardized Silent Reading Test and the Thorndyke-McCall Reading Scale. For a period of eight weeks pupils were directed in their reading activities, a wide variety of reading material being provided.

The results of the study showed that there was marked improvement in practically all the grades.

In the study made by Tinker², in which he studied the relation between eye-movement duration and reading time, he found that "only 5.9 per cent of the reading time was consumed by eye-movements," on the average. This allowed about 94 per cent for pauses. He also found that the ratio between eye-movement duration and reading time bore a constant relationship to the reading attitude, the more careful and analytical the reading between more complex, the reading pauses consumed a relatively greater per cent of the total reading time.

During the year 1923-24 the State Normal School at Indiana, Pennsylvania conducted an experiment in silent reading. Pupils

¹Burton, Cassie B., Unpublished Master Thesis-Things to Do in Teaching of Reading-George Peabody College for Teachers 1925

²Tinker, Miles A., Eye Movement Duration, Pause Duration, and Reading Time Psychological Review 35: 385-97 September 1928

from village and rural schools were arranged in special classes. A group intelligence test was given to each class to get a rough measure of the general ability of the group. The plan was to try for ten weeks to test silent reading, largely as suggested in the text (Germane & Germane) supplemented to some extent by suggestions from the teacher, to see how much improvement could be made in comprehension. The children were to read under time pressure control. Then they were to be tested on what they had read. After this there was to be a short drill on phrases and sentences to help the pupils to lengthen their eye span. They were also to be encouraged to do much reading both at school and at home.

At the end of the ten weeks period it was found that the fourth, fifth, and sixth grades had gained as much as is usually accomplished in three years. Every class showed gains in comprehension during the experiment. The gain made would average at least 25 per cent.¹

Tinker² summarized 110 studies relating to visual apprehension and perception in reading to determine their nature. He found that there is "a natural tendency to combine the different elements of a visual impression into higher units whenever grouping is possible," also that "word form is a very important factor in word perception and that characteristic word form arises from an alternation of 'dominant' letters of letter complexes with 'indifferent' letters." He further holds that

¹Lowry, Ellsworth, A Silent-Reading Experiment in Rural and Village Schools Elementary School Journal, 26: 42-9. 1925

²Tinker, Miles A., Visual Apprehension and Perception in Reading Psychological Bulletin 26: 223-40; April 1929.

no individual can be classified strictly as an objective type or as a subjective type, nor does any single person read by the same method in all reading situations. He may read largely by word wholes with certain material, while with more difficult or more unfamiliar material his reading may be largely analytical.

O'Brien¹ conducted an experiment with 1200 children in grades 3 to 8 in 20 schools for a period of 39 days. The experiment dealt with methods to increase rate. No measure was taken of the mental ability of the subjects, although the experimental and control groups were approximately equal in reading ability. Furthermore no measure was taken of the quality of work being done in other school subjects while the children were speeding up their reading habits. The final tests showed large gains in rate for the experimental grades when compared with both the control and norms of the Courtis Silent Reading test. In comprehension the gains were very slight in the experimental groups (.09%) while the controls showed an average loss (-.07%).

What is the significance of these investigations or what relationship do they bear to this study?

First - in the studies cited above the persons conducting the experiments have used, in their techniques for the study of improvements on rate and comprehension, one or more of the five factors which have been chosen as a basis for the technique of this study.

¹O'Brien, John A. Silent Reading 1920

Second - the final analysis of the results obtained by the use of these factors shows, that a noticeable increase can be made, both in speed and comprehension.

CHAPTER V

CHAPTER V

MATERIALS & METHOD

As has been stated this experiment covered a period of seventy-five days, plus four days used for testing, viz.

January 22, February 29, April 5, and May 11. The work began January 22 and ended May 11.

The time was divided into three periods of twenty-five days each, first January 25 to February 26, second March 1 to April 4, third April 6 to May 10 inclusive.

The grades were apportioned between two teachers as follows, fourth and beginning section of fifth (twenty-nine pupils) to one, and advanced section of fifth and the sixth (thirty-one pupils) to the other. Both teachers, prior to the beginning of the experiment, adopted identical methods of attack, as length of class period (thirty minutes); daily time of class period, nine to ten A.M. (thirty minutes devoted to each of the sections A, B, C, and D.); use of same types of tests, reading material, method of attack, etc.

In these grades the ages of the children were of standard level as a group; that is: fourth grade median age was ten years, fifth grade eleven years, and sixth grade twelve years. There were some outstanding exceptions--children who were retarded mentally and consequently whose ages were above the norm; some were accelerated. In the charts on the following page will be shown the age-distribution, both chronological and mental of the pupils in grades IV, V, and VI.

CHART 1.

CHART SHOWING AGE-DISTRIBUTION OF THE PUPILS IN GRADES IV, V AND VI IN THE PORT FULTON SCHOOL OF JEFFERSONVILLE, INDIANA.

Grades	AGE IN YEARS								Totals
	16	15	14	13	12	11	10	9	
IV						6	12	1	19
V	1		1	1	2	9	4		18
VI			1	3	16	3			23
	1		2	4	18	18	16	1	60

CHART 2

CHART SHOWING MENTAL AGE-DISTRIBUTION OF PUPILS IN GRADES IV, V, AND VI IN THE PORT FULTON SCHOOL OF JEFFERSONVILLE, INDIANA.

YEARS AND MONTHS										
	6-0	7-0	8-0	9-0	10-0	11-0	12-0	13-0	14-0	
Grades	6-11	7-11	8-11	9-11	10-11	11-11	12-11	13-11	14-11	Totals
IV	2	1	7	5	2	2				19
V	2	2	1	4	4	4		1		18
VI				3	4	9	3	2	2	23

MEDIANS-

Grade IV - 8 years - 8 years, 11 months

Grade V - 10 years

Grade VI - 11 years-- 11 years, 11 months.

The materials used, in this experiment, in daily work and testing, included (a) text books

Grade IV.

Wide Awake Reader- Murray

Grade V

Bolenius Fifth Grade Reader- Bolenius

Grade VI

Thought Study Readers- Spencer, Gans, and Fritschler

(b) Supplementary Materials-

(1) Booklets:¹

Story of Peter Cooper

What Happened at the Zoo

Story of Bryant

A Dog of Flanders

David Crockett

Children of the South Lands

Lady of the Lake

Patrick Henry

Stories of the Backwoods

Selections from Wordsworth

Horatius and other Poems

Story of Father Hennepin

Paul Hamilton Hayne

Great European Cities

¹These booklets can be purchased in any quantity at nominal cost from the F. A. Owen Publishing Co., Dansville, N. Y.

American Naval Heroes

Louisa M. Alcott

A Tale of the White Hills

(c) Tests¹

(1) National Intelligence Test

(2) Detroit Reading Test. (Test III, Forms A,B,C, and D.)

On January 22 all the children in grades IV, V, and VI were given the National Intelligence Test and the Detroit Reading Test-Form A.²

During the first period of twenty-five days, January 25 to February 26, silent reading was taught in this school very much in the same manner as is used in a large number of schools which have not made a special study of modern methods of teaching the subject. This criticism is not made adversely, but merely as a statement of a known fact. The method used was generally of the following nature:

At the beginning of the class period pupils were told to prepare for silent reading. Text books, which each child kept at his desk, were opened at a certain page, the teacher speaking in some such words as these: "Today we are to study a selection by Ernest Thompson Seton. It might be well to learn more about the author and other articles or selections he has written. One book which would interest you is 'Wild Animals I Have Known'. The title of our selection is 'The Banded Death'.

¹These tests can be secured from the C. A. Gregory Company, 345 Calhoun Street, Cincinnati, Ohio.

²The results of these tests are listed as tables in appendix.

What is it? Why was it so called? Who are the actors? What do you consider the most exciting part? Be sure to use the dictionary or the glossary at the end of the selection, for words you don't understand. Let us begin to read."

The selection usually was short enough to be read in approximately fifteen minutes; with the preliminary remarks this covered about two-thirds of the class period of thirty minutes. However, if the selection was too long to be read in this time a stopping place was designated, the remaining time, if any, was used for discussion.

On February 29, at the end of the first twenty-five day period the Detroit Reading Test, Form B was given. (Results listed as tables in appendix.)

March 1, marks the beginning of the second twenty-five day period which ended April 4, during which period the new technique was used.

At the beginning of the first lesson the children were given a short talk in which the teacher told the pupils that a new plan of study was to be tried for the next few weeks. At this time mention was made of the advantages to be gained of increased ability in rapid reading, especially in preparation of assignments in such subjects as history, geography, etc., and that later, in high school and college where assignments are increasingly long, such ability is invaluable; that much reading tends to increase reading ability; that proper habits of eye movement must be formed; that lip reading must be reduced, and if possible, abolished, and finally that reading under a time limit tends to make for more effective reading.

Every effort was made to enlist the whole hearted cooperation of the pupils. Charts, which had been prepared previously, were then distributed and pupils were instructed as to their use. These charts were to be used to show the pupil his daily rate in silent reading. The daily procedure was as follows:

Reading material was distributed at the beginning of the period, and careful directions were given as to the beginning point. Difficult words were explained in order that the child might not be delayed, annoyed or handicapped after he had begun to read.

Motivation was provided by questions, the type of material determining the kind and number of questions asked: questions tending to arouse curiosity about some part of the story, or some character in the story. Sometimes questions were written on the blackboard and children were told to read for the answers.

In substance these words were used: "Read this as fast as you can when the word 'Go' is given. See how much you can read in two (or three) minutes but remember, you are to tell what you have read, so don't skip anything. When the word 'Stop' is given, mark the last word read."

After ascertaining that all the children understood what was required and that all were in readiness, the word "Go" was given and all began to read. At the expiration of two minutes¹ the signal was given to stop and all pupils checked the last

¹The short period safeguarded against fatigue, as well as against a relapse into the customary leisurely reading rate.

word read. They were then asked to reproduce what they had read, the method of testing varying--depending upon the type of material read; the methods used were: (1) Answering questions placed on blackboard at the beginning of the class period; (2) finding answers to questions that require the organization of the thought of several sentences, paragraphs, or even pages; (3) finding titles to paragraphs; (4) outlining; (5) oral reproduction of the story; (6) dramatization.¹

In a similar manner reading and reproduction were continued till the end of the thirty minutes assigned. (Exception, One period, per week, of ten minutes was devoted to flash cards and an occasional five minute period was used for a reproduction of the material read in the booklets.)

As a part of the teacher's preparation for the exercise, the average number of words per line and the number of lines per page, in the material read was computed. From the pupil's report as to the pages and lines read the number of words were estimated, as well as the number read per minute. Each pupil determined his own score and entered it immediately upon his chart, which served as a record of his daily progress in silent reading.

As an incentive for practice in extensive silent reading, booklets were distributed at various times, at the beginning of the class period. Pupils were not tested for rate, as each was told that he could read as many as he wished, but that he would be asked to reproduce what he had read. The number of

¹Neal, E. A. and Foster, I. Program of Silent Reading Elementary School Journal 27: PP. 275-80- Dec. 1926.

booklets read, per pupil, varied as will be shown by table in the appendix. Other sources of reading were mentioned; newspapers, periodicals, and library books were recommended and pupils were urged to make use of this material.

Because of the lack of technical equipment the teacher was handicapped in the attempt to measure eye-movement. However pupils were informed of the necessity of increasing the span, and the elimination of regressive movements. As an aid, flash cards were used. These cards containing words and phrases, of increasing length, progressively, were used once each week for a period of ten minutes.

Efforts to overcome vocalization in silent reading were carried out by means of the following devices:

(1) Explanation of the disadvantages of vocalization in silent reading;

(2) Emphasis upon silent reading until word symbols become subordinate to the thought as a whole;

(3) Having the child exert a definite effort to read more rapidly, and

(4) Having children place a finger over the lips until a decrease in vocalization becomes habitual.

The period of two (or three) minutes in silent reading acted as a safeguard against fatigue, as well as against a relapse into customary leisurely reading rate.

On April 5, at the end of the second twenty-five day period, the Detroit Reading Test, Form C, was given. (The results are listed in tables in appendix.)

April 6, was the beginning of third period of twenty-five

days which ended May 10. During this period the technique used was similar to that used in the first twenty-five day period. On May 11, the Detroit Reading Test, Form D, was given. (The results are listed in tables in appendix.)

It would be well to call attention to the fact that these methods of teaching are not used today, 1931-1932, in progressive schools or school systems. I do not mean to imply that our schools are not progressive. Indeed, they have made rapid strides in the past decade. But we are governed to a great degree by the recommendations of our State Board of Education and are required to follow them as closely as possible.

In the Port Fulton School, the teacher load, coupled with an over crowded curriculum and lack of provision for special pupils (i.e. retarded or accelerated) probably has had a tendency to minimize the efficiency of the new technique. Possibly, due to the same reasons, the newer method (i.e., project) could not be used advantageously.

In the newer method today, children are taught by projects; children are taught to read because of the desire to read, rather than for the desire to satisfy the requirements for a formal reading lesson.

As a final statement,---of the five factors used in the new technique, only one, the formation of habits of proper rhythmical eye movement, has given any decided dissatisfaction. The difficulty of measuring the results of this factor, lay, as was previously mentioned, in the lack of proper equipment. The response to the new technique, both by teachers and pupils was most gratifying---the lively interest created being manifest

in the spirit in which it was received and in the results shown in tables listed in Chapter VI.

CHAPTER VI

CHAPTER VI

SUMMARY AND CONCLUSIONS

A brief review or summary of the findings of this study, with conclusions regarding them may be stated in answering the following questions previously mentioned in Chapter II;

Is the comprehension thereby decreased, unaffected, or increased?

Do the individual differences in rate tend to decrease or to become more prominent as a result of training in silent reading?

What grades show the greatest susceptibility, if any, to improvement in rate of silent reading?

What increase, if any, in the speed of reading is noted?

How do the present norms for rate of silent reading for fourth, fifth, and sixth grades compare with the norms obtained in this study after training has been given in rapid silent reading?

What are tentative standards for rate for grades in which pupils have been trained in rapid silent reading?

As stated before the experiment consisted in conducting the classes, composed of fourth, fifth, and sixth grade pupils, through three different periods under study, the first period in which the old method of teaching silent reading was used, started with test A, and terminated with test B; the second period began with test B and ended with test C. This was the period during which the Experimental method of teaching was used, and this will be referred to hereafter as the Experimental period. During the last period the old

teaching procedures were followed. This period was considered as starting at the time test C was given and terminating with test D. It will be noted that the first period, test A to test B and the last period, test C to test D are the control periods, and are the periods which will be compared with the Experimental period. Table 1 shows the means of raw scores for comprehension of reading which were obtained by various tests during different periods. It will be noted also that for the sixth grade very peculiar results were obtained for the first and third periods; i.e., apparently the children not only did not gain in comprehension during these periods but actually seem to have lost, as is indicated by the comprehension score of $15.34 \pm .7$ on test A, and mean raw scores $13.26 \pm .74$ on test B. On test C the mean score was $18.1 \pm .74$ and on test D the mean score was $16.83 \pm .72$.

TABLE I.

COMPARISON OF MEANS OF RAW SCORES, MADE ON VARIOUS TESTS OF COMPREHENSION OF SILENT READING IN THE FOURTH, FIFTH, AND SIXTH GRADES OF THE PORT FULTON SCHOOL, JEFFERSONVILLE, INDIANA.

GRADES	MEAN SCORES FOR COMPREHENSION			
	TEST A	TEST B	TEST C	TEST D
VI	$15.34 \pm .70$	$13.26 \pm .74$	$18.1 \pm .74$	$16.83 \pm .72$
V	$8.77 \pm .8$	$9.78 \pm .67$	$11.78 \pm .91$	$11.45 \pm .77$
IV	$4.97 \pm .45$	$6.07 \pm .56$	$7.97 \pm .59$	$8.1 \pm .65$

These apparent losses are shown in Table II where the difference of means for tests A and B is $\pm 2.08 \pm 1.02$, and the difference between the means for tests C and D is -1.3 ± 1.04 . The large P. E. in both of the cases indicates that they are not reliable. This lack of reliability is further indicated in the table giving the critical ratios as 2 and 1.2 respectively. These ratios should be at least 3 to bear any reliability.

TABLE II.

DIFFERENCES OF MEANS OF RAW SCORES AND CRITICAL RATIOS OF COMPREHENSION FOR VARIOUS TESTS IN SILENT READING IN THE FOURTH, FIFTH, AND SIXTH GRADES OF THE PORT FULTON SCHOOL, JEFFERSONVILLE, INDIANA.

GRADE	DIFFERENCE OF MEANS			CRITICAL RATIO		
	TEST A&B	TEST B&C	TEST C&D	TEST A&B	TEST B&C	TEST C&D
VI	-2.08 ± 1.02	4.9 ± 1.05	-1.3 ± 1.0	2	4.6	1.2
V	1.01 ± 1.07	$2. \pm 1.13$	$.33 \pm 1.19$	.93	.17	.27
IV	$1.10 \pm .72$	$1.90 \pm .81$	$.13 \pm .87$	1.53	2.33	.148

If instead of taking means of raw scores we consider the means of the gains in comprehension of individual pupils we find a similiar situation for grade six, as indicated by table V.

TABLE III.

MEANS OF THE GAINS IN RATE AND COMPREHENSION OF SILENT READING DURING DIFFERENT TEACHING PERIODS IN THE SIXTH GRADE OF THE PORT FULTON SCHOOL, JEFFERSONVILLE, INDIANA.

TEACHING SITUATION	MEAN GAINS	
	RATE	COMPREHENSION
1. 1ST 25 DAY PERIOD	-1.13±.52	-2.17±.31
2. 2ND 25 DAY PERIOD	32.17±.36	4.33±.34
3. 3RD 25 DAY PERIOD	-.98±.66	-.523±.345
4. AVERAGE 1 AND 3	-1.41±.419	-1.35±.196

On the other hand, Table I indicates a real difference between the means at the beginning and at the end of the Experimental period, these means being $13.26 \pm .74$ and $18.1 \pm .74$. Table II gives this difference 4.9 ± 1.05 , and when compared with the P. E. of the difference of the means gives a critical ratio of 4.6, which indicates a real difference, in this case a real increase. These results indicate without doubt, as far as the sixth grade is concerned, that the Experimental method of teaching produced much better results in reading comprehension than were obtained during the two control periods. This conclusion is strengthened by the results given in Table IV where the critical ratios for the difference of gains in comprehension are compared--comparing the first control period with the Experimental period, the second control period with the Experimental period. All critical ratios are so large that there is no question about the existence of a real difference.

TABLE IV.

DIFFERENCE IN MEANS OF GAINS AND CRITICAL RATIOS FOR VARIOUS TESTS OF COMPREHENSION AND RATE IN SILENT READING IN THE SIXTH GRADE OF THE PORT FULTON SCHOOL, JEFFERSONVILLE, INDIANA.

GRADE VI.

DIFFERENCE IN MEANS OF GAINS			CRITICAL RATIOS	
TEACHING SITUATION	COMPREHENSION	RATE	COMPREHENSION	RATE
1. 1ST 25 DAY PERIOD AND 2ND 25 DAY PERIOD	6.5±.46	33.3±.63	14.1	52.8
2. 2ND 25 DAY PERIOD AND 3RD 25 DAY PERIOD	4.85±.47	33.15±.75	9.2	44.2
3. 1ST AND 3RD 25 DAY PERIODS, AND 2ND 25 DAY PERIOD	5.68±.39	33.17±1.47	14.75	20.38

For the fifth grade we find somewhat similar conditions. However, the means of the raw scores and the critical ratios of the comprehension of the various study periods reveal the fact that the results are so erratic as to be of little value in determining anything definite regarding the relative merits of the several teaching situations. In fact, none of the critical ratios are as much as unity. It, therefore, seems that neither the Experimental method nor the methods used for the control periods have proved valuable so far as comprehension is concerned. In fact, the smallest critical ratio is obtained for the Experimental period. If this is an indication then the fifth grade is proven to be the least susceptible to improvement

in comprehension under the experimental method.

The method of means of gains was not used for grades four and five because the results of the sixth grade indicate that nothing new is revealed by the use of this technique. It is interesting to note, however, that there were apparent gains in comprehension during all three periods studied, although the P. E. of differences are so large compared with the difference of the means that the existence of real positive differences are questionable.

Results similar to those obtained for the fifth grade were found in the fourth grade. Here again Table II indicates apparent gains with comparatively high P. E. of differences in all study periods except that the critical ratio of the Experimental period is 2.33 which would lead one to believe that for this period at least there was a real gain in the comprehension of reading.

In Tables V and VI will be found data concerning the rate of silent reading. For the sixth grade there seems to have been improvement in this respect during each of the periods studied. This is especially true during each of the Experimental periods where the increase amounted to 28, and the P. E. of difference to 3.6 which is large enough to be sure that a real difference does exist. It is surprising to note that during the two control periods there were practically no gains in the rate of reading. In fact, if we use the method of comparing means of gains these results are negative for the

first and second control periods as well as for the average of these two periods, while for the Experimental period the mean gain in rate was $32.17 \pm .36$. Moreover, the critical ratios, given in Table IV where the two control periods are compared to the Experimental period and the average of the results of the controlled periods are compared to the Experimental period, are so large that there is no question of a real advantage in favor of the Experimental period.

TABLE V

COMPARISON OF MEANS OF RAW SCORES MADE ON VARIOUS TESTS OF RATE IN SILENT READING IN THE FOURTH, FIFTH, AND SIXTH GRADES OF THE PORT FULTON SCHOOL, JEFFERSONVILLE, INDIANA.

MEAN SCORES FOR RATE				
GRADE	TEST A	TEST B	TEST C	TEST D
VI	112.9 ± 3.13	$113. \pm 4.07$	141 ± 6.61	143 ± 6.87
V	94.4 ± 4.65	90 ± 3.74	100.56 ± 4.28	101.66 ± 4.64
IV	71.3 ± 4.95	$75. \pm 5.02$	88.3 ± 4.60	88.2 ± 4.14

The fifth grade again seems to be less susceptible to improvement in rate of silent reading than the sixth grade. Table V shows that during the two control periods there was practically no gain in the rate of reading. In fact, during the first period there seems to have been a loss, as the critical ratio is so small in both cases that it is difficult to determine exactly what did take place. There seems to have been a gain during the Experimental period as indicated by a difference means of raw scores amounting to 10.56 with a critical ratio of 1.86. This

critical ratio is not large enough to be absolutely sure that there was a gain, however it is possible that there was a gain.

Although the results for the fourth grade indicate gains in the rate of silent reading for all the periods studied, only during the Experimental period was the gain enough to be considered a real gain. In fact, there might be some doubt of real improvement having been made during this period. There is no question, however, about the fact that the Experimental method has proved more effective than the method used in the control periods. This is interesting because in the second control period the pupils started with a fuller background than that which they had at the beginning of the Experimental period.

TABLE VI.

DIFFERENCES OF MEANS OF RAW SCORES AND CRITICAL RATIOS OF RATE FOR VARIOUS TESTS OF SILENT READING IN THE FOURTH, FIFTH, AND SIXTH GRADES OF THE PORT FULTON SCHOOL, JEFFERSONVILLE, INDIANA.

GRADE	DIFFERENCE OF MEANS			CRITICAL RATIOS		
	TEST A&B	TEST B&C	TEST C&D	TEST A&B	TEST B&C	TEST C&D
VI	.11±5.13	28±7.76	2±3.6	.019	3.8	.21
V	4.4±5.96	10.56±5.57	110±6.3	.73	1.86	.174
IV	3.68±7.05	13.3±6.81	.1±6.18	.52	1.96	.016

As it was for comprehension it seems that the Experimental method has proved more effective for rate of silent reading in the work

with the sixth grade pupils than either fourth or fifth grade pupils, although there does not seem to be quite such a large difference for the results obtained in the various grades in rate of silent reading as there was in comprehension in silent reading. While there is not much difference in the critical ratios for the fourth and fifth grades there is a slight advantage in favor of the fourth grade as far as the rate of silent reading is concerned. It therefore seems that the sixth grade, in this experiment, has proved the most susceptible to the method used, the fourth grade next, and the fifth grade least, for both rate and comprehension of silent reading.

In Table VII are given correlations between the Intelligence Quotients and the gains made by the various pupils of the sixth grade, first during the control period, and second during the Experimental period. It will be observed, both for rate and comprehension that the correlation of the test scores with the Intelligence Quotients is practically zero during the first period. Moreover, during the Experimental period the correlation of the scores for comprehension seem to bear no definite relation to the Intelligence Quotients. The scores on rate do seem to be very closely in line with the Intelligence Quotients, as indicated by a correlation of $.93 \pm .018$.

TABLE VII

CORRELATION BETWEEN GAINS, MADE IN RATE AND COMPREHENSION TESTS IN SILENT READING, AND THE INTELLIGENCE QUOTIENTS OF SIXTH GRADE PUPILS TESTED IN PORT FULTON SCHOOL, JEFFERSONVILLE, INDIANA.

TESTS	CORRELATION WITH INTELLIGENCE QUOTIENTS	
	RATE	COMPREHENSION
A AND B	$.18 \pm .135$	$-.122 \pm .002$
B AND C	$.93 \pm .018$	$.214 \pm .134$

This would indicate that at least as far as the rate of silent reading is concerned the Experimental method is well adapted to meet the demands of the individual differences of children. These results do not show that the same is true for comprehension. The P. E. of means of raw scores for comprehension as given in Table I under test C shows that if there is any difference at all, the Experimental method probably reduces, more than the method used in either of the control groups, the differences between the attainments of the individual pupils.

The data in Table V show that the same situation prevails for rate, though not quite so marked.

A comparison of the norms found by Gray, Starch, and Courtis and the norms found as a result of this experiment are shown in the table below.

	Fourth Grade	Fifth Grade	Sixth Grade
Starch	144	168	192
Gray	180	204	216
Courtis ¹	145	168	191
Experimental	88	100	141

Though the scores, attained by the pupils, in this study are considerably lower than the norms given by Courtis, Gray, and Starch it will be observed that Gray's norms are considerably higher than those given by Starch or Courtis. It therefore seems quite likely that if these pupils are given training like that used during the Experimental period they will be able to approach, rather closely the norms presented by these writers.

This investigation seems to reveal the fact that although

pupils may read more rapidly there is no definite indication that they comprehend equally well what they read.

The results of this experiment might lead one especially interested in the subject to conduct a similar experiment, but taking comprehension as his subject of investigation. What factors, other than those used in this new technique could be evolved, which might produce results similar to those for rate in this investigation; further, what results might be obtained by using this same technique with pupils of high intelligence quotients. Would there be the same upward trend in rate as evidenced by the results of this experiment with a corresponding lack of acceleration in comprehension?

¹Copied from the Class Record Sheet for the Courtis Silent-Reading Test.

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APPENDIX

RAW SCORES AND GAINS OBTAINED BY THE DETROIT
READING TEST AND INTELLIGENCE QUOTIENTS
OBTAINED BY THE NATIONAL INTELLIGENCE TEST
OF THE FOURTH, FIFTH AND SIXTH GRADE PUPILS OF
THE PORT FULTON SCHOOL OF JEFFERSONVILLE, IND.

6TH GRADE.

PUPILS	RAW SCORES								GAINS BETWEEN						
	TEST A		TEST B		TEST C		TEST D		TEST A-B		TEST B-C		TEST C-D		I. Q.
	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	
F.S.	71	6	82	6	85	7	86	8	11	0	3	1	1	1	76
R.M.	145	23	160	21	190	21	192	22	15	-2	30	0	2	1	112
R.P.	118	17	125	18	210	24	205	22	7	1	85	6	-5	-2	118
D.K.	118	18	120	14	110	19	112	17	2	-4	-10	5	2	-2	89
C.S.	118	19	110	14	140	19	140	20	-8	-5	30	5	0	1	105
R.G.	83	10	90	8	95	10	92	12	7	-2	5	2	-3	0	93
D.H.	95	12	82	9	110	14	100	12	-13	-3	28	5	-10	-2	88
J.S.	106	16	98	11	140	17	145	18	-8	-5	42	6	5	1	122
V.R.	128	14	90	12	145	18	142	18	-38	-2	55	6	-3	0	94
N.L.	145	24	158	19	190	23	195	23	13	-5	32	4	5	0	101
R.H.	83	13	90	12	95	12	86	10	7	-1	5	0	-9	-2	71
D.K.	95	13	125	11	125	15	128	15	30	-2	0	4	3	0	96
R.H.	145	21	90	12	152	21	150	20	-55	-9	62	9	-2	-1	97
W.V.	106	18	98	14	125	19	115	17	-8	-4	27	5	-10	-2	103
M.C.	83	10	68	8	85	10	82	9	-15	-2	17	2	-3	-1	75
J.E.	145	23	166	24	240	24	242	24	21	1	74	0	2	0	118
C.C.	145	22	150	20	240	23	245	23	5	-2	90	3	5	0	110
A.H.	145	19	155	15	185	20	188	19	10	-4	30	5	3	-1	94
R.C.	95	10	82	8	95	12	94	10	-13	-2	13	4	-1	-2	85
J.O.	83	8	82	8	95	9	90	8	-1	0	13	1	-5	-1	77
R.J.	105	14	108	14	135	17	136	18	3	0	27	3	1	1	100
K.S.	115	12	118	13	158	19	150	17	3	1	38	6	-8	-2	92
H.S.	120	13	120	14	142	20	138	21	0	1	22	6	-4	1	90

5TH GRADE

		RAW SCORES								GAINS BETWEEN									
		TEST A		TEST B		TEST C		TEST D		TEST A-B		TEST B-C		TEST C-D					
PUPILS		RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	I.Q.			
R.G.		145	22	138	20	170	23	175	20	-7	-2	32	3	5	3	128			
L.S.		106	15	98	11	102	16	100	9	-8	-4	4	5	-2	-7	98			
H.M.		83	5	110	10	112	10	108	11	27	5	2	0	-4	1	80			
E.A.		71	8	82	9	95	11	98	11	11	1	13	2	3	0	100			
T.V.		83	4	67	5	65	4	68	5	-16	1	-2	-1	3	1	71			
O.M.		59	6	68	5	55	7	53	7	9	-1	-13	2	-2	0	100			
D.H.		71	6	80	10	85	10	85	11	9	4	5	0	0	1	93			
L.M.		145	21	138	19	140	23	142	23	-7	-2	2	4	2	0	120			
J.C.		95	15	81	11	105	16	106	17	-14	-4	26	5	1	1	112			
G.D.		95	13	94	10	112	13	110	12	-1	-3	18	3	-2	-1	92			
C.S.		118	9	92	10	140	15	141	14	-26	1	48	5	1	-1	76			
L.C.		71	10	68	9	92	14	95	14	-3	-1	24	5	3	0	94			
A.A.		83	7	81	10	103	12	105	12	-2	3	22	2	2	0	95			
E.C.		128	6	92	5	68	6	66	5	-36	-1	-24	1	-2	-1	51			
K.S.		47	1	56	6	68	5	71	6	9	5	12	-1	3	1	76			
C.B.		59	4	44	6	92	8	92	9	-15	2	48	2	0	1	91			
C.S.		128	4	81	6	100	8	104	7	-47	2	19	2	4	-1	84			
L.S.		100	1	130	6	92	4	96	4	30	5	-38	-2	4	0	41			

4TH GRADE

PUPILS	RAW SCORES								GAINS BETWEEN								I.Q.
	TEST A		TEST B		TEST C		TEST D		TEST A-B		TEST B-C		TEST C-D				
	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.	RATE	COMP.			
C.C.	24	0	33	0	57	5	52	5	9	0	24	5	-5	0	64		
R.S.	71	6	68	9	104	12	105	13	-3	3	36	3	1	1	95		
H.S.	95	4	98	7	92	10	92	11	3	3	-6	3	0	1	108		
J.H.	47	4	33	5	56	5	58	4	-14	1	23	0	2	-1	86		
H.S.	83	4	90	4	92	10	98	10	-7	0	2	6	6	0	82		
D.Z.	47	7	48	5	68	9	76	9	1	-2	20	4	8	0	104		
R.H.	145	7	146	9	150	12	142	12	1	2	4	3	-8	0	81		
B.S.	83	11	82	10	92	12	94	12	-1	-1	10	2	2	0	113		
M.C.	95	9	96	12	104	15	104	16	-1	3	8	3	0	1	109		
J.O.	24	2	44	1	56	3	50	4	20	-1	12	2	6	1	71		
J.G.	83	1	78	2	78	3	70	3	-5	1	0	1	-8	0	79		
L.M.	47	2	35	2	34	3	38	3	-12	0	-1	1	4	0	89		
D.K.	59	1	68	6	68	4	70	4	-9	5	0	-2	2	0	82		
M.S.	118	6	125	8	130	7	118	6	7	2	5	-1	-12	-1	96		
L.G.	59	6	81	12	92	12	96	12	22	6	11	0	4	0	98		
H.B.	95	2	115	3	80	4	86	5	20	1	35	1	6	1	74		
R.L.	21	2	21	1	92	3	90	4	0	-1	71	2	-2	1	95		
L.K.	65	4	68	4	92	5	95	5	3	0	24	1	3	0	98		
E.S.	95	7	96	6	121	8	120	7	1	-1	25	2	1	-1	90		