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The relationship of certain word analysis abilities to the reading achievement of second grade children.

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Thesis

THE RELATIONSHIP OF CERTAIN WORD ANALYSIS ABILITIES
TO THE READING ACHIEVEMENT OF SECOND GRADE CHILDREN

Submitted by

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Doctor of Education

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INTRODUCTION

Discontent with the current method or methods of teaching reading has appeared like a refrain in professional literature, and in the prefaces of newly published readers since colonial days. Teachers of reading have always been in earnest about the purpose of producing good readers; but they have been swayed in their choice of methods by the more outspoken educators, and the authors of readers, the criticism of the public, and their own lack of conviction regarding the most effective method. And now after three hundred years of trial and error, no one is sure yet of the comparative worth of various word analysis abilities, or of the comparative value of the methods of teaching reading tried so far.

In the beginning of American teaching, emphasis was placed on the outcomes in conduct, and the method used was that which was popular in England at the time. Through his reading lessons the child was intended to learn his religious duties and patriotism. The New England Primer introduced the child to reading through the alphabet and reinforced that learning of the alphabet by means of couplets which the child memorized and which embodied Biblical, historical and patriotic ideas. For instance:¹

¹The New England Primer, Enlarged, To Which Are Added the Assembly of Divines' and Mr. Cotton's Catechism, Boston; T. J. Fleet, at the Bible and Heart in Cornhill, 176- (Charles E. Norton in a note accompanying the copy owned by the Boston Public Library, "The date of this primer must, I think, be set earlier than 1770.").

J Job feels the Rod
 Yet blesses God

K Proud Korah's troop
 Was swallowed up.

Presentation of reading matter by the analytical method is characteristic of all the early readers. The impression of educators of the time appeared to be that a child should go from the simple to the complex even in the learning of a single word. Therefore, one finds the introductory pages of the readers with the alphabet in upper and lower case, in Roman and italic type, and in light and bold face. The alphabet being learned, the next step, judging from the readers, was the teaching of combinations of consonants and vowels in meaningless syllables, before introducing the child to monosyllabic words. However, not many pages were devoted to drill work because the child moved rapidly from the syllabarium to the memorizing of the verses. That the task was odious and onerous appears to be the cause of bringing out new editions and rival readers. Emphasized in the new editions was the idea of making the process more easy. Among the editions of The New England Primer is one Boston reader which has above its title, "An Improved Edition"; and for its title, the following: The New England Primer, Improved for the More Easy Attaining the True Reading English, Adorned with Cuts to Which is Added the Episcopal and the Assembly of the Divines and Mr. Cotton's Catechisms.¹ For a frontispiece it has a picture of John

¹The New England Primer, Improved, for the Easy Attaining the True Reading of English, to Which is Added the Assembly of the Divines and Mr. Cotton's Catechisms, Boston, Edward Draper, 1777.

Hancock. Other editions carried pictures of Samuel Adams, George Washington and one had a picture of Christ blessing little children. Opposite the title page is a hymn of praise to God. On the page following the title are morning and evening prayers. Then followed the alphabet in Roman and italic letters, with consonants and vowels printed in lines separately, and labeled as such. The next page is devoted to the capital letters (called "Great Letters"). Below the two lines of letters are rows of combinations of consonants and vowels which fill that page and extend almost to the end of the next page. The two pages and a half that follow are filled with rows of one syllable words and continue until the rows contain five syllable words. One finds some change in political sentiment in the progression of New England Primers but no change of method or approach. The great distance between the interests of childhood and the material contained in much of The New England Primer can be seen in the quotation of one of the couplets:¹

Xerxes the Great did die
And so must you and I.

Therefore, despite the "Divines'" professed purpose of facilitating the teaching of reading and the promise held out by them in Philadelphia edition of 1797, theirs was apparently

¹The New England Primer, Improved, Containing a Variety of Easy Lessons for Attaining the True Reading of English, Philadelphia, Dobson at the Stone House, 1797.

net the answer. For, the effort at improvement had only begun its long trek, which continues into the middle of the twentieth century. And the end, which so often has appeared close at hand, continues to be out of sight.

To meet the need of a young democratic nation, some of whose population spoke foreign languages, Noah Webster wrote his series of readers. Having been educated as a lawyer, and having the background training current in his day, he too believed that the analytical method was the best in the teaching of reading. Very painstakingly, he worked out a system of symbols by which the various sounds of the language could be represented. The popularity of Mr. Webster's book can be seen by his saying in a note appended to his 1803 preface published in his 1806 edition that the sales at this time had reached two millions. Apparently, though, he had some rivals; and there were people who made use of his work in the writing of their own readers. It is interesting to note in his preface that he felt obliged to defend those who would learn to read, by warning them against what the other authors of readers offered. He speaks of the works of Perry, Walker and Sheridan as too complicated, and says:¹

In nine-tenths of the words in our language, a correct pronunciation is better taught by a natural division of syllables, and a direction for placing the accent, than by a minute and endless repetition of characters.

¹Noah Webster, Esq. The American Spelling Book. Boston: David Carlisle, 1806.

Quite sure that his readers were good, Mr. Webster continues:¹

Gratitude to the public as well as a desire to furnish schools with a more complete and well digested system of elements, has induced me to embrace the opportunity when the first patent expires, to revise the work and give it all the improvement, which the experience of many teachers and my own observations and reflections have suggested. In the execution of this design, care has been taken to preserve the scheme of pronunciation and the substance of the former work.

The first chapter of the second edition contains an analysis of sounds in the English language. Similar to the primers of an earlier date, pages of the alphabet in Roman and italic letters and combinations of vowels and consonants formed the approach to reading. Following the drill on isolated syllables, come page after page of words ranging from one to five syllables. At the top of each row there is a number to indicate the pronunciation of the vowel to be met with in that particular row of words. The number corresponded to a key word in the pronouncing key at the front of the book. The content of Mr. Webster's readers was enriched in comparison with The New England Primer, and contained more space for drill on words, but his attempt did little to make reading less burdensome to learn.

Continuing the vain enticement of an easier book and greater efficiency in the teaching of reading, Lindley Murray, in the introduction to An English Spelling-Book with Reading

¹Ibid.

Lessons, says¹

The work is comprehended under three general divisions. One of the principle objects of the first is, to teach accurate pronunciation of the elementary sounds. If this is effectively performed in an early stage of learning, the child's ----- progress will be easy and pleasant. If it is then neglected, the omission will be, rarely if ever, completely supplied. To attain this important object, the author is persuaded that a considerable number of lessons on monosyllables is indispensable.

It is interesting to note that many of these authors came very close to seeing some of the things that were lacking in the early readers. For example, as early as 1800 Samuel Temple, in his preface to The Child's Assistant in the Art of Reading, declares:²

Notwithstanding the variety of school books calculated to facilitate the improvement of children in useful knowledge, experience has convinced me that something is still wanting.

The most common method of proceeding with children is in the first place to put them into the Spelling Book, and then into Mr. Webster's Third Part or The American Preceptor. These books, I acknowledge, are excellent, but it is the opinion of many that to go immediately from the Spelling Book to either of the above-mentioned collections, is not sufficiently gradual. As such the following collection is intended.

To one who examines the series of new attempts among the early readers, there appears to be little relief from the

¹Lindley Murray. An English Spelling-Book with Reading Lessons. New York: Collins and Company, 1823. (Dashes indicate blurring in the type.)

²Samuel Temple. The Child's Assistant in the Art of Reading. Boston: Lincoln and Edmonds, 1816.

monotony of the syllabarium, and the lines of narrow-spaced, uninviting type. Nevertheless, in 1829, Mrs. Barbauld and Mrs. Edgeworth entitled their book, American Popular Lessons.¹ In 1883 appeared the all-embracing title, The Easy Reader or Introduction to The National Preceptor, designed to Aid in Thinking, Spelling, Defining and Correct Reading by J. Olney.² This reader makes a strong move toward reading for meaning. The author's approach to reading was through spelling. That it was ambitious and took too much for granted, however, can be seen from a quotation taken from the book's preface:

In using the following work, it is intended that the learner should spell, pronounce and define the principal words of each lesson before he reads it. This will enable him to enter into the sense of what he reads, will call into exercise the various powers of his mind and daily advance him in acquiring a knowledge of the language. That orthography, pronunciation, definition and reading can be taught more successfully in connection than separately, there can be no doubt. For studied in this manner, each assists in the acquisition of the other; and the learner is able to reduce his knowledge to practice as soon as acquired. In addition to the above, the attention of the pupil should be turned frequently to the etymology of the language. It will be found pleasing and profitable exercise for young scholars to trace words to their roots, or primitives, and follow out their derivations. This compels them to think, to examine and investigate for themselves; consequently, they proceed understandingly and pursue these studies as a source of delight and amusement.

¹Mrs. Barbauld and Mrs. Edgeworth. American Popular Lessons. New York: R. Lockwood, 1829.

²J. Olney. The Easy Reader or Introduction to the National Preceptor, Designed to Aid in Thinking, Spelling, Defining and Correct Reading. New Haven: Durrie and Peck, 1833.

In Lesson 21, page 55, of Mr. Olney's The Easy Reader, there is a sample of what Mr. Olney intended should be a "source of delight and amusement":¹

DEFINITIONS

Draw-ing, making pictures, sketching, delineating

In-ter-im, the mean time, the time intervening

Re-join-ed, answered, replied, continued

Port-fol-io, a case of the size of a book, to keep loose papers in

Following the words quoted above, were some paragraphs containing the words used in context; usually the child not only learned to read the newly introduced words in context but memorized the passage. An example of a lesson to be memorized is the following:²

WAITING FOR DINNER

"He is rather behindhand to-day," said Mrs. F. "When he left this morning, he proposed returning by four o'clock. You should have had your dinner at the usual time, my dear, had I known he would be so late." Louisa went to the window and stood for some time watching for her father's appearance. Ten minutes passed away and he did not arrive.

"Let us try some amusement, then," replied her mother, "that will divert your attention during the interim."

For amusement, the mother continues the conversation and leads the child to define articles near at hand:

¹J. Olney, ibid., p. 55.

²J. Olney, ibid., p. 55.

"What are knives made of?" said Mrs. F.
 "The hands are made of ivory, mamma," replied Louisa, "and the blades are made of steel." And what is steel and what is ivory?" said her mother. "Steel is iron prepared by fire," replied Louisa, "and ivory is the tusk of the elephant."

"Very well," said Mrs. F., "and of what are the spoons and forks made?" "Of silver, mamma, a metal procured from the mines of Po-to-si in South America." "And the salts and castors--of what are they made?" "Of glass, mamma, cut glass--glass is made of sand and flint, melted together in a furnace."

"You know I went to see a glass-house in Boston once, and was so much delighted with the dexterity with which the workmen made up cups and tumblers, in a minute, almost; just by twisting and turning and blowing a little bit of the hog liquid glass. What questions have you next?"

The plan of Mr. Olney to have the child learn to spell and define a particular number of words in the lesson, did not appear thorough enough to Epes Sargent, who brought out The Standard Reader. In his preface he announces:¹

Under the modern improved plan of instruction in reading, regard is had to the learner's ability to spell the words he uses, and to understand the lesson he reads. With a view to facilitating the spelling process, many of the elementary readers in present use have, over every exercise in reading, a number of words selected from it and arranged in columns, as in a speller. The learner's inference is, that these words and those only, are to be studied; whereas no good reason can be given why all the words in the exercise should not be learned. Many of our most judicious teachers, perceiving the inconsistency of the system, have objected to it as superfluous and confusing. It has also been abandoned in the more recent elementary readers from the London and Edinburgh press.

¹Epes Sargent. The Standard Second Reader. Boston: Phillips, Sampson and Company, 1858.

A much better practice it is for the pupil to prepare himself to spell all the words in his exercise; or in a portion of it, if the whole be too hard a task. To assist him in this a number of the more difficult words in the early exercises of the present volume have been divided into their component syllables. The principles of syllabication may be found laid down on page 25.

A glance at the material presented to teacher and child for the purpose of reading instruction makes it understandable why the word "easy" should have advertising value. And so, series of readers began to come on the market containing the most alluring word possible in their titles. In 1835, appeared Easy Lessons in Reading for the Use of the Younger Classes in Common Schools by Joshua Leavitt. While most of the authors of readers realized that the methods of teaching reading needed a change that would make the process more delectable and more gradual, Joshua Leavitt expressed one of the real faults of readers published during his time and for many years after his time--that of "pushing" children beyond their capacity. However, after striking the note of the step forward, he receded again by saying that the children should be kept at the task of learning a particular vocabulary before being promoted to the next step. His day was still far from the time that the same vocabulary would occur frequently enough in new and attractive content, that children could learn it without the drill of the early readers. In Joshua Leavitt's preface to Easy Lessons in Reading for the Use of the Younger Classes in Common Schools,

he affirms:¹

It has long been an opinion with many judicious persons that children are commonly put forward too fast in their reading. They should be kept at their spellings until they can readily pronounce common words at first sight. They will then be prepared to read without that dronish tone which is so difficult to unlearn.

It is a very useful practice for the teacher to read over each sentence before the scholars, giving the proper pauses, inflections and emphasis; and then to require the scholar to repeat it until he can pronounce it with propriety.

The Child's Guide, a reader which came out in 1842, outlined in its preface the same pattern of spelling and defining in preparation for the reading lesson;²

In using the work, when a class is called on to read, let them in the first place spell and define the most difficult words in the lesson. When a word is spelled incorrectly, let it be put to another scholar; and when properly spelled, let the whole class spell it together, keeping time with each other.

In 1843, Mr. William Swan's introduction to The Primary School Reader expressed his aspirations to help the reading situation. He is clear in his critical analysis of the current bad points in the methods of reading. He thought the children should be taught first their letters, and then their words. He suggested further than they be taught the sounds of

¹Joshua Leavitt. Easy Lessons in Reading for Use of the Younger Classes in Common Schools. Keene, New Hampshire: Prentiss, 1835.

²The Child's Guide, Comprising Familiar Lessons Designed to Aid in Correct Reading, Spelling, Defining, Thinking and Acting. (Stereotype Edition). Springfield: G. and C. Merriam Company, 1842.

letters and that they be given a training which might be considered auditory discrimination:¹

This book has been made to supply the want of a system for teaching reading in Primary Grades.

A prevalent fault in teaching consists in directing the attention of the pupil to a variety of subjects at once. Articulation, inflection, emphasis, and accent are thus presented to the child, and in the midst of all these he fails to become perfect in either. The true method will be found in teaching one thing at a time, and it is upon this principle that these lessons in this book are arranged.

Notice to Teachers

They must first be taught the names of the letters. This is generally done at home before entering school. They must next be taught to pronounce the words. This can best be done by teaching them the elementary sounds of the letters....

This method for ascertaining the elementary sound of the vowel, is to pronounce a word containing it in a slow and drawling manner. Notice the sound of the vowel element as it issues from the mouth, and utter the element alone.

Other forerunners of the teaching of some auditory discrimination, R. Soule and W. Wheeler, in their First Lessons in Reading, maintain, in speaking of their reader:²

...Its aim is to teach the art of reading by enabling the pupil, in the first place to analyze spoken words into their elementary sounds, and, in the second place, to recognize the signs used for these sounds in the ordinary printed text. The letters of the alphabet, as single or

¹William D. Swan. The Primary School Reader, (First Part). Boston: Charles C. Little and James Brown, 1843.

²R. Soule, W. Wheeler. First Lessons in Reading. Boston: Lee and Shepard, 1866.

combined, are considered, in the outset, simply as signs of sound, and not with reference to their names as letters. In other words, the use or power of the letter is taught before its name which is not introduced until considerable progress has been made in learning to read.

A definite change occurred about the middle of the nineteenth century when the Word Method made its entrance into the American way of teaching reading. Instead of long lists of consonant-vowel combinations and gradually increasing numbers of syllables, the books opened with lists of words, and devoted in some instances, as many as forty-seven pages to lists of words. In spite of the fact that to the eyes of a present day teacher, there seemed to be little progress in this change to the Word Method, Josiah Bumstead, in his introduction to My Little Primer knew a big step had been taken, and sounds hopeful:¹

In teaching reading, the general practice has been to begin with the alphabet, and drill the child upon the letters, month after month, until he is supposed to have acquired them. This method, so irksome and vexatious to both teacher and scholar, is now giving place to another, which experience has proved to be more philosophical, intelligent, pleasant and rapid. It is that of beginning with familiar and easy words, instead of letters.

On that note, the readers, which had followed the lead of The New England Primer and of the readers designed by Noah Webster, lost prominence. The Word Method received all the more enthusiasm because of the criticism given by Horace Mann

¹Josiah Bumstead. My Little Primer. Boston: Perkins and Marvin, 1840.

to the alphabet method. In his Second Annual Report, as Secretary of the Board of Education, December, 1838, he declared:¹

When a motive to learn exists, the first practical question respects the order in which letters and words are to be taught; i.e., whether letters, taken separately, as in the alphabet, shall be taught before words or whether monosyllabic and familiar words shall be taught before letters. In those who have learnt, and have since taught, in the former mode, and have never heard of any other, this suggestion may excite surprise. The mode of teaching words first, however, is not mere theory; nor is it new. It has now been practiced for some time in the City of Boston--in which there are four or five thousand children--and it is found to succeed better than the old mode. In other places in this country, and in some parts of Europe, where education is successfully conducted, the practice of teaching words first and letters subsequently, is now established. Having no personal experience, I shall venture no affirmation upon this point; but will only submit a few remarks for the consideration of those, who wish, before countenancing the plan, to examine the reason on which it is founded.

During the first year of a child's life, he perceives, thinks, and acquires something of a store of ideas, without any reference to word or letters. After this, the wonderful faculty of language begins to develop itself. Children then utter words--the names of objects around them,--as whole sounds, and without any conception of the letters of which those words are composed. In speaking the word 'apple', for instance, young children think no more of the Roman letters which spell it, than, in eating the fruit, they think of the chemical ingredients--the oxygen, hydrogen and carbon--which compose it. Hence, presenting them with the alphabet, is giving them what they never saw, heard, or thought of before. It is as new as algebra, and, to the eye, not very unlike it. But printed names of known things are the

¹Mary Mann. Life and Works of Horace Mann, Vol. II, Appendix. Cambridge, 1867, p. 519.

signs of sounds which their ears have been accustomed to hear, and their organs of speech to utter, and which may excite agreeable feelings and associations, by reminding them of the objects named. When put to learning the letters of the alphabet first, the child has no acquaintance with them, either the eye, the ear, the tongue or the mind; but if put to learning familiar words first, he already knows them by the ear, the tongue, and the mind, while his eye is unacquainted with them. He is thus introduced to a stranger through the medium of an old acquaintance. It can hardly be doubted, therefore, that a child would learn to name any twenty-six familiar words much sooner than the twenty-six unknown, unheard, unthought-of letters of the alphabet.

Then making a suggestion for the teaching of phonetics,

Mann continues:¹

To obviate the inconsistency of teaching children the names of letters, which are to be untaught as soon as they are combined into words some persons instruct them in the vocal elements of the letters only;--that is, to utter for each letter, that part of a sound of a whole word, which belongs to the letters, respectively,--as to give a single breathing for the letter h, instead of the sound of aytch. This practice is very limited.

A climax in the difficulties of teaching reading appears to have been reached a hundred years ago in the 1850 publication of Reading without Tears. In that reader, the author outlines "A Pleasant Mode of Learning to Read". Following up the title which must have sounded encouraging, its author, Mrs. F. L. Mortimer, explains:²

¹Ibid., p. 522.

²Mrs. F. L. Mortimer. Reading without Tears, or a Pleasant Mode of Learning to Read. New York: Harper and Brothers, 1866.

Great pains have been taken to render this book pleasing to children. To allure them to tread the path of knowledge,--steps have been cut in the steep rock, and flowers have been planted by the wayside. Pictures are these flowers--careful arrangement and exact classification are the steps.

.....

There are occasions enough, even in life's happy springtime, to draw forth tears without making reading one.

It is noticeable, as one examines the readers of Mrs. Mortimer's day, that while a new plan of teaching reading was being given a trial, old methods were still being used by some teachers. The teachers continued to use the old approaches, in some instances, because there has consistently remained with a certain number the conviction that a knowledge of the names and sounds of letters is related to reading success; in other cases, the old methods were preserved because the readers contained exercises adapted to the former ways of teaching. The publishers, caught in the quandry of theories, and not knowing which was the more effective method, or when the wind of opinion would change again, played safe and advertised their books as suitable for any method employed. Several readers could be quoted to illustrate this point. However, G. S. Hilliard and L. J. Campbell, in introducing their book, The Primer or First Reader, in 1864, bear out the idea sufficiently to serve the purpose. Note, though, the traditional presentation of words gradually increasing in the numbers of letters

or syllables:¹

This primer will be found fitted for those who prefer the phonic method and for those who first teach the names of letters.

In the graduation of lessons, great care has been taken. Words of two letters are first presented, then common words of three letters. A few easy dissyllables are introduced in the latter part of the book.

Condemning the spelling method and advocating a method of teaching the sounds of letters, A. Knell and J. H. Jones, brought out The Phonic Reader. In explaining their purpose in their preface they make mention of the fact that readers themselves have a tendency to keep the teachers from making progress:²

It is now acknowledged by nearly all leading educators that the old spelling method of teaching reading is a hindrance rather than an assistance. Theoretically, that method has been discarded, but practically it is retained in most of our schools for the sole reason that the arrangement of primary readers is based on its principles.

The present little work aims at embodying practically what has been acquired theoretically in endeavoring to accomplish this task; the principles of the Phonic Method are adopted, according to which the names of the letters are ignored, cognizance being taken of their sounds and power only.

There continued, then, for some time an emphasis on the teaching of sounds, and readers provided detailed directions

¹G. S. Hilliard, L. J. Campbell. The Primer or First Reader. Boston: Brewer and Tileston, 1864.

²A. Knell and J. H. Jones. The Phonic Reader. Cincinnati: Wilson, Hinkle and Company, 1868.

for the Sounding Method. In their introduction, authors, William T. Harris and Andrew Rickoff, of the Appleton Series wrote:¹

Many years' experience have shown the superiority of the phonic, supplemented by the word method, and it is therefore still carefully kept in view in this book. The use of the diacritical marks is extended. They should become as familiar to the pupil as the letters with which they are associated. The marking of silent letters aids to fix in the memory both the form and the sound-- spelling and pronunciation--of words.

Showing their desire to please the promoters of the Word Method Mr. Harris and Mr. Rickoff added:

Though the phonic method has been kept in view in the arrangement of its reading matter, this book is as well adapted as other books to any different method of instruction which may be preferred by the teacher.

In their reader, The Franklin Primer, G. S. Hilliard and L. J. Campbell, made a conscious effort to break away from the beginning of reading with monosyllabic words; and also, they tried to find words for their book which would be common to children:²

The usual method of beginning with words of two letters has been avoided. Such phrases as "He is by it", "He is up", awaken no interest in the child's mind, while experience has shown that they are not learned so easily as words of three letters.

¹W. T. Harris, A. Rickoff. Appleton School Readers, The Second Reader. D. Appleton Company, 1880. Copyright, 1878.

²G. S. Hilliard, L. J. Campbell. The Franklin Primer or First Reader. Boston: Brewer and Tileston, 1875.

The appearance of each new primer on the market with its advertising preface or introduction has carried an expression of dissatisfaction with the books and practices obtaining at the time. A really new note was sounded, though, with the coming of Harper's First Reader in 1888. It contained an acknowledgment that there might be more than one method of teaching reading. There is even a hint of adapting materials to individual differences:¹

No skillful teacher will confine himself to one 'method' in teaching reading. The most successful teachers undoubtedly teach words as wholes. Children will, without special effort, very soon learn the names of the letters, and they should be taught the sounds for which they stand....

Harper's First Reader also makes some provision for training in auditory and visual discrimination and the substitution device used in teaching word analysis which is used today.

It is an excellent blackboard exercise to write different initial letters with familiar words; for example, by prefixing certain letters to the word old we form the words beld, cold, told, etc. So also we may form new words by changing the terminal letter of a given word as bat, bad, bag, etc. And again by changing some other letter; as man, men; bend, band, bind; lamp, limp, lump, etc.

Moving closer still to the present day in attitude regarding visual discrimination, E. Todd and W. B. Powell, say

¹Harper's First Reader. New York: American Book Company, 1888.

in their preface to Primer, Preliminary Work in Reading:¹
 "Accuracy in seeing should be cultivated from the beginning.
 It is all-important."

Then in spite of all the serious efforts on the part of the teachers and of the proposers of new and better ways of teaching reading, there came at the opening of the last decade of the nineteenth century a complaint printed in Rebecca Pollard's Manual which sounds like a quotation from a present day periodical:²

There is quite a general complaint among teachers, principals, and superintendents that pupils in the higher grades are not able to read with ease and expression; they have so little mastery over words that an exercise in reading becomes a laborious effort at word calling. Pupils read usually very well through the first three readers, according to our present standard of reading in these grades. But the trouble begins in the fourth reader, and by the time the class is in the fifth, the reading recitation is torture to the teacher and a hateful task to the pupil. There can be no good reading without the ability to call words readily, and it may be well to consider whether the methods of teaching primary reading which seem productive of such good results in the primary grades, are not at fault in preparing the pupil for the advanced reading.

We are inclined to think the inability of pupils in the higher grades to call words is the legitimate outgrowth of the teaching of the word method. By this method the word is presented to the child as a whole, and the teacher either tells the child the word, or by skillful questioning leads him to use the word. Later, when phonics

¹E. Todd, W. B. Powell. The Normal Course in Reading, Primer, Preliminary Work in Reading. Boston: Silver Burdett, 1891.

²Rebecca S. Pollard. Pollard's Synthetic Method, A Complete Manual of Reading and Spelling. New York: American Book Company. Copyright 1889, Western Publishing House.

have been introduced, the teacher writes the new and difficult words on the blackboard and marks them. The results of these methods on the mind of the pupil are about the same. He soon learns to think he can do nothing with a new word without the help of the teacher in some way. While he should be learning independence in making out words, he has learned dependence, and his dependence increases with the increase of difficulties.

In the early years of the twentieth century, the Ward, Beacon and Aldine Readers were widely used. The Ward Readers gave the children a sight vocabulary, and then an intensive training in phonetics. Continued phonetic training appeared in the reading matter, with enough diacritical markings to obscure the words. The other two readers, Beacon and Aldine, supplied charts which contained many pages of drill on vowel and consonant combinations.

People in the public school system of Brooklyn, New York,-- Edward and Mary Ward and Madalene Barnum,--produced the Ward Readers. In the introduction to their readers, there is a section, "Instruction to Teachers", which gives the following mapping out of the procedure to be followed:¹

The use of this book should not begin till fifty sight-words given below have been thoroughly learned.

During this 'First Stage' three lines of work are to be separately practiced every day:--

1. Sight reading from sight word cards and from the blackboard.
2. Drill on phonograms.
3. Ear training.

¹Edward Ward, Mary Ward, Madalene Barnum. The Rational Method in Reading. Boston: Silver Burdett, 1916.

This also is a preparation for phonetic reading. It should begin at the very commencement of the term and be practiced daily. With brisk work, five minutes a day should suffice for it....

II

During the 'Second Stage' of the work, three lines are to be separately practiced every day:--

1. Sight reading from cards, blackboard, and Primer.
2. Drill on Phonograms.
3. Drill on the blend.

III

During the 'Third Stage', four lines of work are to be separately practiced every day:--

1. Reading from Primer, Part II.
2. Drill on the Phonograms.
3. Drill on the blend.
4. Continued drill on Sight Words.

One of the most noteworthy features about this set of readers is the provision made in them for ear training.

The Beacon Gate to Reading, by M. E. Sullivan, Philena Cox and Sara Athey, goes into considerable detail in the manual for teachers. There is some space given to urging the teacher to devote time to child study, and makes some provision for individual differences by suggesting that the children be grouped according to ability. The Manual includes material on the training that should be given in word analysis, and explains the necessity of teaching both oral and silent reading skills. Regarding individual differences, they say:¹

¹M. E. Sullivan, Philena M. Cox, Sara C. Athey. A Manual to Accompany Sullivan and Cox's Beacon Gate to Reading. Boston: Ginn and Company, 1926. p. 4.

...No two children will respond alike to the same treatment. But every school will naturally divide itself into three general groups of individuals having similar abilities for achievement....

Sullivan and Cox discuss the four principles upon which the mechanics of their readers is built, and outline their work in phonetics:¹

1. To develop good auditory images of the forty-four rudimentary sounds of the English language which take care of the mechanics of reading (see explanation under 'Phonetic Guide').

2. To eliminate blend difficulties by blending the first consonant of a word with the vowel that follows, thus reducing the number of blending processes to a minimum.

3. To rely on natural phonetic elements instead of upon diacritical marks and family endings to determine phonetic values.

4. To teach all unphonetic words by sight, without the confusion of diacritical marks or the use of irrational family endings.

Authors of the Aldine Series were Frank Spaulding and Catherine Bryce, both of the public school system of Newton, Massachusetts. In the introduction to their method of teaching reading, they say:²

The term 'method' is used in this Manual for want of a better one. Here it has not, however, the quite usual meaning of an elaborately wrought system of formal devices. It refers mainly to the sum of principles and processes whose application has been found most effective in accomplishing a definite result, teaching children to read independently.

¹Ibid., p. 5.

²Frank Spaulding, Catherine Bryce. The Aldine Readers, Learning to Read, A Manual for Teachers. New York: Newsen and Company, 1911.

The method described is not the outgrowth of untried theories of teaching reading. It is rather the description of certain processes of accomplishing certain results, processes founded on sound psychological principles and plans set forth in this Manual. There is not a plan or device herein described from the least to the most important, whose practicability and worth have not been demonstrated.

Rhymes for the teaching of sight vocabulary is at the very core of the Aldine method. Of this device, the authors maintain:¹

The use of rhymes on pages 2, 5, 10, 15... are designed to be thoroughly memorized by the pupil. These rhymes furnish nearly all the words used in the book....

Discussing their view of training in phonetic ability, Spaulding and Bryce declare:²

The phonetic facts are extremely simple. The basis of our spoken language is a certain number of elementary sounds. One or more of these sounds make up each spoken word. Our written language consists of symbols which represent the elementary sounds. As the elementary sounds are combined into spoken words so the simple symbols are combined into written words.

They continue in their discussion of the reading method.

...What the child needs now is to form the habit of pronouncing a letter or a combination of letters in a certain way--the habit of pronouncing a letter or a combination of letters in the way that he has pronounced that letter or combination of letters before. Only thus can he acquire the ability of reading independently.

¹Ibid.

²Spaulding and Bryce, op. cit., p. 16.

Now, obviously, the most direct way for the child to form that habit is to observe how the letter or combination of letters is pronounced in one place and then to pronounce them in the same way in another place, thus constantly making use of whatever knowledge of pronunciation he has....

Then while the Ward, Beacon, and Aldine systems, with their emphasis on phonetics were flourishing, there came a stirring for a new placement of emphasis. Since all children were not made good readers through oral reading and the employment of phonetic analysis, the searchers for success in reading thought that at last the right solution to the problem was in having the children do most of their reading silently. In this period of educational history, phonics was given the blame for much of the poor reading of the former times, and those teachers who taught it systematically and formally, even though not with unreasonable stress, were considered very much outmoded.

Like other ideas, when first introduced to the public, it was hailed as the answer to the reading puzzle and was overstressed. Regarding silent reading, the introduction to the Beacon Manual has this to say:¹

It has been truly said that reading is a thought process. In brief, silent reading is the process of getting impressions and, through mental processes, weaving these impressions into useful combinations that will have much to do with our behavior as individuals and will help to control human conduct.

.....

¹Sullivan, Cox, op. cit., p. 19f.

Silent reading is useful for all purposes. It is absolutely indispensable. The process of silent reading must actually take place before oral expression is possible. Oral reading is useful for only a very few purposes. When we remember that in the actual practices of life 98 per cent of all reading is done silently, and when we remember that oral reading adds a very heavy burden to the process of reading, we shall understand the importance of devoting more time to a development of silent reading habits and less time to the development of oral-reading habits.

Readers were published during the 1920's and 1930's that were devoted entirely to the teaching of reading as a thought-getting process through silent reading. A good example of this trend is the Stone Silent Readers. In his preface to Book One, Clarence Stone says:¹

Do not use oral reading. The best result in training the pupil to get thought from the printed page will be secured by depending altogether upon some other type of response from the pupils than oral reading.

Emphasis on the silent reading aspect of the teaching of reading reached its culmination in the experiment of McDade of the Chicago Public Schools. He proposed to teach reading entirely through the use of silent reading. He provided a separate language period in which the materials of the reading period were discussed, and the reading period then could be spent entirely in silent reading.

¹Clarence Stone. Stone's Silent Reading, Book One. Boston: Houghton Mifflin, 1924.

In the Beacon Gate to Reading, there is this passage regarding the worth of oral reading in the reading program:¹

As we have already shown, oral reading always puts a check upon the rapidity of the process of reading. It reduces the capacity to read to such an extent that it greatly depreciates one's ability to read. It is much easier to teach a child to read silently than to teach him to read orally. Yet oral exercises in the teaching of reading are absolutely necessary as an aid in teaching. Oral reading is one of the teacher's best checks on the kind of silent reading that is done. Oral reading establishes correct pronunciation. Oral reading forms contact between the teacher and the pupil in the preparation of lessons....

Warning against the thoughtless over use of silent reading, Nila Smith declares:²

There is a strong objection to having primary children spend an undue amount of time sitting in their seats carrying out prescribed silent reading exercises. This type of work leaves little opportunity for the child to develop his own initiative and to express his creative impulses. When used extensively, it crowds out many more active and fruitful experiences which the little child should have.

The heyday of silent reading advocates was in the late 1920's and the 1930's. It was probably during this period that phonetics receded farthest into obscurity. It was at that time, too, that teachers who were convinced that phonics had value taught as their judgment prompted them, but did not talk much about it because they had no objective data to support

¹Sullivan, Cox, op. cit., p. 22.

²Nila B. Smith. American Reading Instruction. New York: Silver Burdett and Company, 1934. p. 273.

their contention. They were relying wholly on their own observation. In the 1920's and the 1930's the history of reading was undergoing another of its revolts against failures in the teaching of the main tool subject. The revolt took the form of a change of emphasis to see if that would cure the trouble. Behind the revolt and the change of emphasis, there was only subjective judgment, guesses as formerly, and the leadership of some outspoken educators.

In the 1940's the value of training in auditory and visual discrimination began to gain prominence and now in the 1950's is still maintaining momentum, especially in the teaching of reading readiness. There has been some research done in visual discrimination, and a considerable amount of research in auditory discrimination. However, the comparative values of these various word analysis abilities are still uncertain. Gray, in his 1948 edition of On Their Own in Reading, speaks of auditory and visual training as the foundation for good instruction in phonetics:¹

When he has developed the ability to see and hear the separate elements in word wholes, he should begin to associate appropriate sounds with certain symbols in words.

Many readers of the 1940's and of the current decade provide for all three word analysis abilities. In the 1946-47

¹William S. Gray. On Their Own in Reading. New York: Scott, Foresman and Company, 1948. p. 132.

Guidebook for More Streets and Roads, the authors, William S. and Lillian Gray outline a very complete program of word analysis. They say:¹

Children must learn to use phonetic analysis as a method of word attack....

Training in auditory perception is the first step in the program for developing power in phonetic analysis....

Visual-auditory perception is the second step in the program....

The substitution of one phonetic element for another is one of the simplest wayⁿ of applying knowledge of phonetic elements....

Several pages are devoted to a discussion of the importance of training in phonetic analysis.

In the teacher's manual of Up and Away, the second level of the first grade book of the Reading for Meaning Series, 1950 edition, the authors discuss reading deficiencies and go on to say:²

Among the commonest of these deficiencies and difficulties are (1) inability to work out the pronunciation of strange words independently, (2) failure to see crucial differences in the forms of words, (3) failure to hear differences in the sounds of letters....

Many pages of Up and Away are devoted to the presentation of phonetic elements and word analysis abilities in general.

¹William S. Gray and Lillian Gray. Guidebook for More Streets and Roads, Basic Reader, Curriculum Foundation Series. New York: Scott, Foresman and Company, 1946-47.

²Paul McKee, M. Lucille Harrison, Annie McCowen, and Elizabeth Lehr. Reading for Meaning, Teacher's Manual for Up and Away. New York: Houghton Mifflin, 1950.

Many of the current readers give space in their manuals to directions for word analysis work, but it is not because they are certain of the value of the various word analysis abilities. In all probability, these authors have a purpose similar to that of the authors who sold readers when the method was being extolled--they want to sell their books, and so they say in effect, this book is adaptable to any method you advocate.

Having run the gamut of extremes--from the alphabet and the syllabarium to reliance upon phonics; then to the word method with a softer pedal on phonics; then to the phrase and sentence as the unit of teaching; then to a silent reading program and a condemnation of phonics; and more recently to a reaching out for help in the form of auditory discrimination and visual discrimination and informal phonetics,--the practices of teaching reading in America are still receiving condemnation. The theme of the reading conference held in Chicago in 1948 was "Changing Conceptions of Basic Instruction in Reading in Elementary and High Schools". Giving reasons for the selection of the conference theme, Gray states:¹

When those who attended the 1947 conference were asked to suggest topics for discussion this year, an overwhelming majority urged that the program focus attention on current issues relating to basic instruction in reading. The arguments advanced in support of the proposal were illuminating.

¹William S. Gray. "Basic Instruction in Reading in Elementary and High Schools." Supplementary Educational Monograph, No. 65. Chicago: University of Chicago Press, October 1948.

Some reported that after several years of neglect of reading instruction in their schools, they faced crucial problems that called for drastic action.

A second group emphasized the fact that great confusion exists today among teachers and schools officers concerning the policies and procedures that should be adopted in organizing a sound reading program. This is due largely, they explained, to a wide variety of conflicting theories and practices that now prevail concerning basic instruction in reading.

CHAPTER I

REVIEW OF RESEARCH

To discover the relationship between certain word analysis abilities and reading achievement is the purpose of this study. The word analysis included in the study are: auditory discrimination, visual discrimination and phonetic ability.

As sketched above, the history of reading instruction in America has been one of vacillation, regarding method. Teachers of reading and authors of textbooks have made some advance in improving the reading situation, but it has been at the expense of much back-tracking, and wasteful trial and error. Whenever a theory failed in the past, it was dropped by many teachers without further inquiry into its possible merit. Then after a few years, when some other theory failed to produce the expected results, the former method was again brought to the fore and hailed as the answer to the search for an effective way of teaching reading. This is particularly true of the many appearances phonics have made in the teaching scene. There has always been a belief, sometimes outspoken and bold, at other times timid, that a knowledge of the sounds that go to make up the English language is closely related to the ability to read.

It is possible that many or all of the theories held in the past have some merit in the teaching of reading. The fact

that they have continued to claim the faith in varying degrees of some teachers through the years is an indication that they cannot be wholly without merit. The solution, then, to the reading problem may be the discovery of the relative value of the various methods and the consequent placing of emphasis in accordance with their objective evaluation. That certain approaches to reading, once prominent and then discarded, may have a place in sound teaching techniques is borne out by one who takes a scientific approach to the problem:¹

No one of these methods (the alphabetical oral method, the phonic method, the look-and-say method and the phrase method) has proven entirely satisfactory; neither is any one completely condemned. It is probably true that we should have many ways of teaching reading within a single classroom. For example, some children seem to learn better if they learn the sounds first. We should teach these children the sounds as the first step in learning to read. Others may learn faster by a kinaesthetic approach, and still others, by a written language approach. If a technique has been effective in teaching reading we should not discard it completely for a new approach unless the new approach has been proven to be more effective....

Today, the belief is very strong that children should have a period of preparation before attempting to read. This is called a reading readiness program. It includes, among other things, the teaching of children to hear and see likenesses and differences in words and word elements. Such teaching is

¹Helen Murphy. "Skills Instruction in Primary Reading." The National Elementary Principal 29: 4-10; December 1949.

known as training in auditory and visual discrimination. To test the value of training for auditory and visual discrimination, there have been some studies made. There have also been experiments performed to discover the most efficient means of giving this training. And to aid the teacher further in economizing her time, there have even been studies to find the order of difficulty of the letters.

In 1936, Acomb made a study of psychological factors relating to reading and spelling. Summarizing his findings, he said:¹

1. The ability to distinguish through visual and auditory means, small differences between words with accuracy and rapidity, depends somewhat on mental age.

2. Visual and auditory discrimination, perception and associability, are highly significant factors in relation to reading ability.

3. Visual and auditory factors are significantly related to spelling ability.

4. Visual and auditory factors are definitely interrelated with one another, each recalling the other automatically during the reading process.

Murphy evaluated the effect of the combination of specific exercises for auditory and visual discrimination, the effect of specific exercises for visual discrimination, and the effect of specific exercises for auditory discrimination in beginning

¹Allen Acomb. "A Study of the Psychological Factors in Reading and Spelling." Unpublished Master's thesis, Boston University School of Education, Boston, 1936.

first grade on the learning rate; the reading score; the change in the child's usual perception of words, and the change in the child's auditory discrimination between likenesses and differences in words.

The 540 children, whom Murphy included in her study, were placed in four groups. One group was taught material for developing visual discrimination and material for developing auditory discrimination for ten minutes a day for thirty successive school days. The second group was taught just the material for visual discrimination for ten minutes a day; the third group was taught only the auditory material for ten minutes a day; and the fourth group, or the control group was given no particular training. Tests were repeated at the close of the teaching period. An oral reading test was given in February and a learning-rate test was administered in June.

At the end of the experiment, Murphy concluded:¹

1. All experimental groups were superior to the control group in Reading achievement in November, February and June. At every measuring period after the auditory and visual discrimination exercises had been given, the experimental groups show statistically significant superiority in reading achievement to the control group.

2. In the Detroit Word Recognition Test in November, the three experimental groups were superior to the control group. The mean score for the combined group was 8.05 words, for the visual

¹Helen A. Murphy. "An Evaluation of the Effect of Specific Training in Auditory and Visual Discrimination on Beginning Reading." Unpublished Doctor's thesis, Boston University School of Education, Boston, 1943.

group 7.24 words, and for the auditory group 4.24 compared with 2.53 words for the control group. The critical ratios being 7.17, 6.63, and 3.66 showed these differences all to be statistically significant.

3. The individual oral reading test in February showed the experimental groups to be superior to the control group. The mean score for the combined group was 93.40 words for the control group. The critical ratios being 6.69, 4.61, and 3.08 showed all these differences to be statistically significant.

4. The Detroit Word Recognition Test in June showed the three experimental groups superior to the control group. The mean score for the combined group was 21.46, for the visual group 19.12 words, and for the auditory group 19.99 words compared with 14.53 for the control group. The critical ratios being 5.09, 3.47, and 3.90 showed these differences to be statistically significant.

5. The June reading achievement test score showed the experimental teaching material to be in the following order of increasing effectiveness visual perception training, auditory perception training, visual and auditory perception training combined. The differences between the three types were slight--visual being 19.12, auditory 19.99, combined 21.46 compared to 14.53 for the control group.

6. The reading achievement test in November showed the experimental teaching materials to be in the following order of increasing effectiveness auditory perception training, visual perception training, combined visual and auditory perception training.

The February achievement test showed the same order, but the difference between the auditory and the other two was less than in November, and the June test showed the auditory group slightly superior to the visual. Visual training may be more effective in the beginning teaching.

Crossley, in 1948, tested the effect of lantern slides in the teaching of auditory and visual discrimination of word

elements. Crossley analyzed her data to determine the reading scores of the children in May; the change in their learning-rate; the change in auditory discrimination, and the change in visual discrimination. Her findings were as follows:¹

1. The experimental group was superior to the control group in all analyses of auditory discrimination.

2. In comparing the groups as a whole there was no statistically significant difference in visual discrimination scores. Careful analysis showed the experimental group had made statistically significant gain in the second and third quarters.

3. A comparison of the groups as a whole indicates statistically significant differences in learning-rate at the end of the teaching periods. The greatest gain was made in the fourth quarter of the experimental group.

4. From the results of the testing it can be assumed that it is possible to teach letters as beginnings and endings at the same time without causing confusion.

5. Children who are subjected to auditory discrimination of vowel sounds profit by such training.

6. The differences in reading scores were not statistically significant but the critical ratios were all in favor of the experimental group and close enough to the 2.576 level to indicate some tendency to superiority for the experimental group.

7. On an individual test of 61 items, the experimental group was superior to the control group. The testing took place after five weeks without use of the slide material and indicates that material taught by means of the visual aids is retained as well as that taught by other methods.

¹Alice Crossley. "An Evaluation of the Effect of Lantern Slides on Auditory and Visual Discrimination of Word Elements." Unpublished Doctor's thesis, Boston University, Boston, 1948.

8. In general, children who had higher scores in auditory discrimination attained higher scores in reading even though they were equal on the basis of mental age.

9. The difference between boys and girls was not statistically significant in any ability measured in this study.

McFarland studied the relationship of reading readiness factors to achievement and noted that:¹

The three factors showed a positive relationship with reading achievement. The hearing rate was the highest .666, probable error .039; auditory .655, probable error .039; and visual .55, probable error .047. These are fairly high correlations indicating a definite relationship with reading achievement.

Evaluating exercises for specific training in auditory and visual discrimination for Grade 3, Rynne experimented with two classes in the same school building. Each class had twenty-four children in it. She enumerated the following conclusions:²

1. In the phonics test that was administered at the beginning of the experiment, the control and the experimental groups were very close. The difference of the means was only .46 in favor of the control group. At the conclusion of the experiment, the mean score for the experimental group was 54.42 compared with 55.04 for the control group. The difference of the mean was .62 in favor of the control group. However, the difference between the initial and final means showed

¹Mary E. McFarland. "The Relationship of Readiness Factors to Success in Beginning Reading." Unpublished Master's thesis, Boston University School of Education, Boston, 1947.

²Esther Rynne. "An Evaluation of Exercises for Specific Training in Auditory and Visual Discrimination in Grade 1." Unpublished Master's thesis, Boston University School of Education, Boston, 1950.

a gain of .16. When the critical ratio of these differences was computed, the result was .06 which was not statistically significant.

2. In the Metropolitan Reading Test which was given at the end of the experiment, the control group was superior to the experimental group. The critical ratio was .10 which is not a significant difference statistically. A reading test had not been given at the beginning of the study. As a result, there was no measure of reading growth in the two groups during the course of the experiment. The mean mental age of the control group was six months in advance of the experimental group, and was four months better than the experimental group. It probably would be safe to say that the control group's better reading mean might be due to that cause.

Concerning the order of difficulty in teaching the sounds of letters some studies, as mentioned above, have been made. Murphy¹ found the order to be: initial consonants, blends, rhymes, and final consonants.

Biggy,² analyzing the results of the Murphy test, reported the relative order of difficulty of initial consonants to be: g, r, h, s, p, j, n, t, l, m, v, w. For blends, she found: ch, sp, tr, sh to be the order. And for rhymes: ing, an, un, and, at. The six consonants--g, l, n, p, s, t, used as both initial and final sounds proved more difficult in final position.

¹Murphy, op. cit.

²M. Virginia Biggy. "The Establishment of a Relative Order of Difficulty of Word Elements in Auditory Discrimination" Unpublished Master's thesis, Boston University School of Education, Boston, 1946.

Fahy,¹ in her evaluating of ear training in Grade 1, concluded that "Apparently there is no set order of difficulty of word elements which remain constant in every situation."

Regarding the true value of another word analysis ability--phonetics--in the teaching of reading, some voices have been loud in praise; others have been just as articulate in condemning it. Stevens, writing in 1934, was not impressed with the utility of phonetics:²

Why Phonetics? Many hours per year are usually spent in phonetic teaching. Let us say that a teacher devotes ten minutes a day to such work, or fifty minutes a week. That makes perhaps thirty-five hours in a year of the teacher's time. Multiply this by the number of children in her room, say forty, and you have 1,400 hours spent by teacher and pupils together. This is surely a fair way to reckon. It is the method used in a factory when only dollars are in question. Each individual's time is reckoned separately. Why should we not reckon a child's time as at least as valuable.

Nor is this all. We must admit that a certain proportion of the children, perhaps a quarter or a third, do not need any phonetic teaching, can get along perfectly well without it, may even have their reading speed slowed down by constant word analysis when they are at the stage to profit by phrase or thought units. Another smaller group at the foot of the class will be repeaters. They are behind because of absence, immaturity or dullness, and cannot learn the phonetic drill.

¹Anne Fahy. "Evaluation of Ear Training in Grade 1." Unpublished Master's thesis, Boston University School of Education, Boston, 1949.

²Marion P. Stevens. The Activities Curriculum. New York: D. C. Heath and Company, 1934.

Now add to these the number of children who are paying no attention to the work, a number whom we have no means of knowing, since outward forms of attention do not imply inward thought, and we must conclude that several hundred of those 1,400 hours spent on phonetics are of at least negative value. Yet our supposititious picture is of but one class in one school in one city. Multiply this by at least half the number of primary classrooms the country over (surely a conservative estimate) and you have a staggering total of waste of time which runs into millions of hours.

A few paragraphs later in her book, Stevens makes one exception. She would permit the teaching of beginning consonants.

In 1936, Stevens wrote in the American Childhood Magazine:¹

First, as to whether phonetics should be taught at all, we have in the beginning the natural tendencies of children, already illustrated, to aid their memories by crude analogies. We know that these will be inadequate as more and more words are learned. Then children will either develop other experimental methods of phonetic analysis, or we must furnish them with more adequate guides. It seems clear that the second course is the only sensible one, and most authorities in the field of reading agree. Says Judd in Reading: Its Nature and Development, 'Analyses of words cannot be omitted from any complete training of pupils. The experience of schools in this matter is unequivocal. A child can read without analysis as long as his vocabulary is small and the words are short, but sooner or later he must make analyses and then he will be greatly helped if he has been trained in systematic methods.'

Later in the article, Stevens clung somewhat to her former attitude by declaring that training in phonetics should be put

¹Marion P. Stevens. "Phonetics What and How?" American Childhood 21: 19-20.

off until several weeks or even months after the child begins to read.

Currier, reviewing an article which she had published in the Elementary School Journal in December, 1916, regarding an experiment done in the public schools of Tilton, New Hampshire, recalled the following observations made at that time:¹

1. Phonetically trained classes read generally with less speed, less interest, greater fatigue, and with confusion of ideas.

2. Classes not having phonetic drills read with greater interest, increased speed and more expression. They were careless in pronunciation and employed more or less word substitution. Fatigue was much reduced, and story reproduction was very successful.

Coinciding with those who saw no great help in phonics for the teaching of reading, Gates wrote in 1927:²

...No other single teaching device has been so widely adopted by American teachers. It is the very keystone of the American method. For a practice given so much and such universal attention over so long a period of time, one would expect to find ample justification. Favorable evidence may be sought in four different sources:

1. In the data concerning the phonetic characteristics of the English language.

2. In the results of experimental investigations of the use of phonetic method with school children.

¹Lillian Currier. "Phonics or No Phonics." Elementary School Journal 23: 448-452.

²Arthur I. Gates. "Studies of Phonetic Training in Beginning Reading." Journal of Education Psychology 18: 217-226.

3. In the logical application of principles of the psychology of learning to the use of phonetics as a teaching device.

4. In the opinions of recognized students of psychology and education who are familiar with the scientific literature concerning the teaching of reading or who have observed extensively the results of various methods utilized in schools.

Gates answers: "In none of the sources is the evidence unequivocal."

Lindsay, also of the 1930 mind, wrote:¹

Does it seem possible that the overemphasis of phonics in pedagogy is coming in again, or what is the reason for the recurrence of this dalliance with this quite, quite ancient subject? One might suppose this question had been threshed out these many years, and yet, we find apparently new spelling books clinging with loving solicitude to this relic of days long laid away in lavender and pensive recollection. When we find that certain individuals whose work is the field of education is quoted and held in esteem, are giving their names to the use of phonetic grouping, it is time for the ordinary observer to stop and con the matter over for a few minutes.

Lindsay believed the words grouped because of supposed similarity of phonetic elements to be misleading and to bring about "erroneous thinking" in the child:²

...To say to a child that one set of symbols is pronounced thus, and later to deny that this is true in another and similar arrangement of symbols, is quite illogical, and is to me a 'damned spot that will not out' by any amount of oratorical laying at the instance of such author's pedagogical friends and interested associates.

¹W. B. Lindsay. "What About the Pendulum Business?" Education 51: 10-15.

²Ibid., p. 11.

Steinbach made a study of "the relationships existing between reading achievement of first-grade pupils and certain factors or groups of factors which have been considered by educators important for initial success in reading". Among her conclusions, she lists the following, and declares the first four factors to be given in the order of importance in relation to success in reading:¹

The following six variables are closely related to reading achievement:

1. Ability to discriminate between words spoken;
2. Mental age;
3. Ability to discriminate between letter forms;
4. Range of information;
5. Ability to discriminate between word forms;
6. Vocabulary knowledge.

Horn, although he was convinced that the English language is difficult to manage phonetically, was fair and restrained in his attitude toward the worth of teaching phonics as an aid to reading. In 1929, he wrote:²

...The failure to show the desirability of phonic training may be due to one or more of several possible causes. First, it must be admitted that the investigation of phonic vs. non-phonic training which have been made up to the present time have been poorly controlled. It is possible that were the factor of phonic training skillfully isolated, and the results of the experiment adequately analyzed, a superiority would be shown....

¹Sister Mary Nila Steinbach, O.S.F. An Experimental Study of Progress in First-Grade Reading. The Catholic University of America Research Monographs, 1940. p. 105.

²Ernest Horn. "The Child's Early Experience with the Letter "A"." Journal of Educational Psychology 20: 161-168.

Back in 1934, Smith, who had just completed a review of the entire field of American reading instruction declared:¹ "The subject of phonetics has in recent years been one of the most widely questioned and discussed phases of reading instruction, and it is undoubtedly the phase which has had the least experimentation."

By 1937, phonics in American teaching of reading should have been buried forever beneath the word method, the phrase method, the story method and the silent reading method. But that year Dolch made a strong plea for the reinstatement of phonics:²

The idea has become commonly accepted that a child cannot begin to learn to read until he has reached a certain degree of mental maturity. That mental maturity has been called 'reading readiness'; it is chiefly 'school readiness' plus the ability to acquire a sight vocabulary, that is to associate word sounds with word forms. When a child can make such associations under classroom conditions, he can begin learning to read. When he has accumulated a sight vocabulary of the most common words, he can actually read books if they are strictly limited to the simplest vocabulary. Thus with sight learning of common words and with vocabulary control in reading materials, teachers can secure what is typically first-grade reading.

School books do not however remain limited to the sight vocabulary of the first grade pupil. New words must come in daily and at an ever increasing rate. At the same time the amount of repetition of new words steadily decreases. As the

¹Nilá Smith. American Reading Instruction. New York: Silver Burdett and Company, 1934. p. 271.

²Edward Dolch and Maurine Bloomster. "Phonic Readiness." Elementary School Journal 38: 201-205; November 1937.

number of words becomes greater, the appearance of the words becomes more and more similar. All these conditions--greater number, less repetition of new word and greater similarity of words--demand something more than the sight method of learning. They demand what is called 'independence in word recognition', and that means some sort of phonic attack.

In 1949, Traxler makes a similar comment:¹ "There has long been considerable discussion among elementary school teachers in the United States concerning the relationship between phonetic ability and ability to read, and concerning the value of teaching phonics in a reading program."

Dolch, in pursuing his interest in phonetics, wished to test an hypothesis--that ability to learn and to use principles of phonics is connected with the increase in mental age. Therefore, he performed an experiment in two first grades of a school where phonics had been taught uniformly for at least two years and in which phonics had had some emphasis, though not an unusual amount. He measured the children's mental development and secondly their phonic attainment to see whether one was in any way related to the other.

About the first of May in 1935, the Pintner-Cunningham Primary Mental Test was given to the children in each of the two grades. In the previous September, the first grade pupils had been given the Detroit First-Grade Intelligence Test; and the year before, the children now in Grade II had been given

¹Arthur Traxler. "Research in Reading in the United States." Journal of Educational Research 42: 481-99.

the Pintner-Cunningham Primary Mental Test. The tests were brought up to date, according to Dolch, by the addition of the number of months from the time of giving the test to May 1. The mental ages of the children were secured from the average of the two tests.

To obtain the phonic achievement of the children, he used the experimental issues of Tests I and II of the Gates Reading Tests, Word-Attack Series. Test I of this series consists of words containing only the short vowels, preceded and followed by a single consonant. He did not think the children could recognize the words from sight because each test word appeared in a line of words very similar to it. He thought the similarity of the words would compel the child to use his phonetic ability if he possessed any. Test II was more difficult in that it contained short and long vowels, and the use of the silent "e". Again, the child had to have more than sight vocabulary ability to help him. In Grade I, only the easier test was administered, but in Grade II, both tests were given and the average obtained. For each group the mental age and the phonic achievement were correlated by the Pearson Product-Moment method. And as a check on the results obtained, the experiment was repeated in May, 1936. "Marked agreement" was found between the results of the two experiments. Dolch comments:¹ "When consideration is given to the difficulty of

¹Dolch, op. cit., p. 204.

accurate measurement of young children in both the fields concerned, the relation between mental maturity and the use of phonics is remarkably high."

In the first test for the first year's trial, he found a correlation of $.412 \pm .102$; for the second grade, $.47 \pm .106$. In the second year for the first grade he found a correlation of $.516 \pm .096$; and for the second grade, $.406 \pm .098$.

Another finding of Dolch was that children of high mental ability sometimes failed to acquire phonic ability, but that children of low mental ability are certain to fail.

In 1936, Tate of the Eli Whitney School in Chicago, studied the influence of phonics in silent reading in Grade 1. The population making up the experimental and control groups consisted of the two classes in the first grade. No equating on the basis of intelligence was attempted. Customarily, the children were arranged alphabetically on admission to the school, and were assigned to their classes on the basis of odd and even numbers. Most of the children were of Bohemian and German parentage, some of the children having been born abroad.

For some years previous to the study the children had been taught phonics only incidentally; but during the experiment, the control group did not even receive incidental teaching. The experimental group had thirty minutes a day, the time being distributed according to the needs of the three groups into

which the class was divided. The instruction in phonics consisted of formal instruction and drill in phonics. Ear training exercises were given and flash card drills used generously. Tate says:¹

Both in the supplementary and in the basic reading the emphasis in attacking new words was placed on the phonetic method. However, none of the other elements that enter into the proper teaching of reading were neglected. In the supplementary reading where the major emphasis was placed on thought-getting, the pupils were encouraged to recognize new words from the context....

In the control group a corresponding length of time was given to extra drill work on word recognition, phrase recognition, recognition of the sense of a selection, including exercises requiring dramatic action, completion exercises, and exercises requiring oral response. The material used was different from that found in the basic textbook.

New words were taught to the control group by the story-telling method and by the use of flash cards. To solve reading problems, children in the control group were asked questions regarding the context for the unlocking of unfamiliar words. In case they did not get the word through this help, they were told the word.

The Gates Primary Reading Test, Form I was administered at the beginning of the experiment and Form II at the end.

At the close of the experiment, Tate drew the following conclusions:²

¹Harry L. Tate. "The Influence of Phonics on Silent Reading in Grade 1." The Elementary School Journal 37: 752-763.

²Ibid., p. 762 f.

In this experiment ample evidence was obtained to justify several important conclusions regarding phonics instruction and drill as employed in this experiment. These are not considered by the investigator to have universal application, but are thought of only in the light of empirical findings. The conclusions are: (1) Phonics instruction and drill, as judged by the results of the Gates Primary Reading Test, Type 1, is far superior to the look-and-say method in developing the ability to recognize words. (2) The results of Type 2 of the Gates Test give a slight indication that the look-and-say method is superior to phonics instruction and drill in developing the ability to comprehend sentences. (3) Results obtained from Type 3 of the test show conclusively that the look-and-say method is superior to phonics instruction and drill in developing the ability to comprehend paragraphs of directions. (4) The use of as many as thirty minutes daily for special phonics instruction and drill leads to an unbalanced development of the abilities to comprehend words, to understand sentences and to grasp the meaning of paragraphs.

Other deductions that do not rest directly on the data and therefore do not have the weight of conclusions are, in the opinion of the investigator, justified. These inferences are: (1) Regular periods for phonics instruction and drill are not desirable. (2) Phonics should be used by the pupil as a tool and not as a subject matter to be mastered for its own value. (3) Overemphasis on phonics hinders rapidity and thoroughness of comprehension.

The next year the same children, taught by the same teachers who took part in the first experiment cooperated in the second experiment. This time the purpose was "to determine the effect on primary reading of the total nonuse of phonics". In the experimental group there was no attempt on the part of the teachers or children to sound letters. And so Tate and his associates say the experimental factor in the investigation was the total nonuse of phonics.

To overcome the inability of the children to work out the recognition of words, many devices were used such as: the illustrations accompanying the story; summarizing the story up to the stumbling place, the teacher's re-reading of the section immediately preceding the word giving trouble; the pupil's re-reading of the preceding passage; the asking of "pointed questions"; the substitution by the teacher of a word having the opposite or an absurd meaning or picture; and the naming of the word by some other pupil or by the teacher.

The control group continued, according to the usual method at the Eli Whitney School,--the incidental method.

In this experiment the children were placed in classes in the same manner (by odd and even numbers as in the first experiment). Summarizing his results on this experiment, Tate states:¹

It may be concluded (1) that, without employing phonics, either formal or incidental, as a medium of instruction, teachers can secure reading performances corresponding to those indicated by the norms of standardized tests but (2) that the incidental-phonetic method is superior in developing the ability to recognize words, and to comprehend the meaning of sentences and paragraphs.

At the conclusion of the first experiment which contrasted the effects of the non-phonetic and the formal-phonetic methods, the investigators determined to run the second experiment, and the incidental phonetic methods to determine whether it would be possible to rate the three methods in order of effectiveness.

¹Harry L. Tate, Theresa M. Herbert, Josephine K. Zeman. "Nonphonetic Primary Reading." Elementary School Journal 40: 529-37; 1940.

Since reliable data on more than one factor cannot be obtained in any one experiment, the comparison of the three methods must rest more on logical reasoning than on numerical data. The type of reasoning employed in arriving at the inferences is similar to that which is inherent in the statement, 'Since 3 is greater than 2, and 4 is greater than 3, then 4 is greater than 2.

Evaluating the three methods, Tate explains:¹

...To the extent, then, that the conclusion of both experiments are valid, it seems probable that these inferences are relatively sound:

(1) Of the three methods investigated--formal phonics, nonphonics and incidental phonics--formal phonics is the least efficient in developing comprehension or thought-getting. (2) The main value of formal phonics lies in the field of word-recognition. (3) The incidental-phonetic method is superior to the nonphonetic method in developing ability to recognize words. (4) The non-phonetic method is superior to the formal-phonetic method and the incidental phonetic method in developing comprehension.

Wilson, Flemming and Burke and Garrison, in New York, took part in a cooperative study of reading progress in the kindergarten and primary grades to determine "the more effective and economical learning of the mechanics of reading without violating in any way the basic emphasis on a varied and rich experience for young children or without violating the ideal of individualized learning". They describe the experiment thus. In the autumn of 1933, they gave the children three reading readiness tests. They also distributed questionnaires to the parents. When all of their data, including measures and appraisals covering scholastic, physical, psychological, and social aspects of children's development were assembled,

¹Ibid., p. 537.

they had 106 usable measures or appraisals. They did 2,000 correlations, and made a case study of each child.

Among the conclusions drawn by Wilson, Flemming, Burke, and Garrison, pertinent to the study at hand are the following:¹

No inherent qualitative differences among these students explain differences in their progress in reading. Varying abilities to see, hear and speak and varying mental ability or personality traits do not seem to be closely or critically related to progress in reading, as revealed by either the statistical analyses or by the case studies.

Differences in reading progress can be explained mainly in terms of learning. In the learning experiences of these children, one set of factors seemed to stand out as a preeminent effectiveness in contributing to reading progress namely, mastery of letter symbol both form and sound. This result was indicated by statistical analyses, case studies, test analyses, and notes and observations made during the testing of the children.

Because of the striking way in which the third conclusion appeared in the results of the first year of study, the investigation was continued during the succeeding years. Four other first-grade groups were studied in order to verify the results found with the original group. The study was also extended to four second and two four year old kindergarten groups, for the purpose of determining whether any trends might be found among older and younger children....

At the end of the second and third years of the continued study, the people taking part in the cooperative experiment found only verification of their first conclusions:²

¹Frank Wilson, Cecile Flemming, Agnes Burke, Charlotte Garrison. "Reading Progress in Primary Grades." Elementary School Journal 38: 442-449.

²Ibid., p. 444.

The results of the second and third years' work substantiated the conclusions reached the first year, namely that relations between abilities with letter forms and sounds on the one hand and reading ability in terms of word, sentence and paragraph reading on the other hand, are remarkably close for children learning to read in the Horace Mann School.

Recognizing not only the phonetic element in the English language but also its unphonetic portion, Browne thinks: "But rather than label our language as 'unphonetic', it would seem more accurate to say that it is rich in orthographical irregularities."¹

In 1939, Browne made a study of phonics in relation to reading. For her experiment, she used the sixth grades of six parochial schools located in Chicago, Detroit and the District of Columbia. She began with 500 children but had to exclude 180 because of incomplete data and for other reasons. For ten minutes each day, phonic drill preceded each reading lesson. A phonics test was administered to the groups before the experiment began. Browne used the phonetic elements resulting from Sullivan's analysis of the Gates Reading List. Each phonetic element was used three times in the test. Nonsense words were formed from the phonetic elements. The test was administered individually. It was explained to the children that the combinations of letters appearing on the cards were

¹Sister M. Dorothy Browne, O.P. Phonics as a Basis of Improvement in Reading. Washington, D. C.: The Catholic University of America, 1939. p. 5.

net real words, but "They are only letters put together so that they can be pronounced."

Phonics Test I was given by Browne to all the subjects of the experimental group at the beginning of the year. Phonics Test II was given nine months later to discover changes brought about by the daily phonic drill.

As stated above, ten minutes a day were spent in "simple but well-planned phonic drill". The phonics lessons were based on Cordts' Word Method of Teaching Phonics, and the phonetic elements of high frequency which Sullivan obtained in her study. In all, the phonetic teaching was done with 200 lessons planned so as to give more time to more difficult elements.

In equating the groups of four experimental and four control groups, the New Stanford Reading Test, Form V and the Kuhlman-Anderson Test for grade six were used. The average number of days absent was also considered in equating the groups. Browne reports that in equating the groups, not only the mean scores but also the variability of the scores was taken into consideration.

In her conclusions, Browne writes:¹

1. Progress in reading in the sixth grade may be aided by a carefully planned series of lessons in phonics.

¹Browne, op. cit., p. 42.

2. Children with low I.Q.'s are as likely to profit from phonic instruction as those with higher I.Q.'s.

3. Children with I.Q.'s below 100 make more progress in reading as a result of phonic instruction than those with higher I.Q.'s.

4. The study of phonics is helpful not only to the pupil who is deficient in reading, but is even more effective in stimulating the better reader to further growth.

5. The greatest gain in favor of phonic training for children with initial reading ability of average and above grade is evidenced in groups with I.Q.'s between 90 and 109.

Another study on the relation of phonetics to reading achievement was undertaken by Tiffin and McKinnis about the same time as that of Browne. Theirs included the sixth, seventh and eighth grades of the Longlois School in Lafayette, Indiana.

Explaining their reason for conducting the study, they say:¹

The status of phonics in the program of instruction in elementary reading has long troubled both professional educators and classroom teachers. Many educators (influenced no doubt by the excellent logical consideration that phonics makes for word reading which, in turn, makes for slow reading) have felt that instruction in phonics should be minimized if not completely eliminated. On the other hand, many classroom teachers (whose conclusions, though based on vast practical experience, are often given little consideration) feel that phonics should occupy some place, and possibly a prominent place, in the reading program.

¹Joseph Tiffin and Mary McKinnis. "Phonic Ability: Its Measurement and Relation to Reading Ability." School and Society 51: 190-192.

The present study was conceived to determine whether, and to what extent, phonic ability, as measured by a reliable instrument, is related to reading ability as measured by certain standardized reading tests.

The instrument used was an individual phonic ability test, modified for the present investigation from a group test of phonic ability described by Rogers.¹ Rogers' Test, Part II contained one hundred nonsense words utilizing most of the letter combinations found in the English language. In Rogers' Test each of the nonsense words is followed by four different diacritical spellings. The person tested is asked to choose the diacritical spelling which represents the correct pronunciation of the word.

Tiffin and McKinnis modified the test of 100 words to suit their need for the fifth, sixth, seventh and eighth grade youngsters. Each of the hundred nonsense words was typed on a separate card, 3 inches by 5 inches, with giant primer type. Directly below this the word was again repeated with diacritical marks indicating the correct pronunciation. In administering the test, the cards were shown one at a time, with the giant primer type toward the child. The instructions given to the child were:²

This is a word which you have never seen. Just say it the way you think it sounds. You do not know what it means but that does not make any difference. Just say the word the way you think it ought to sound.

The examiner records on a previously prepared blank whether the child's pronunciation is correct or incorrect, and proceeds to the

¹Maurine Rogers. "Phonic Ability as Related to Certain Aspects of Reading at the College Level." Journal of Experimental Education 6: 381-395.

²Tiffin, McKinnis, op. cit., p. 190.

next card. The entire list of 100 words may be given in this manner in from ten to fifteen minutes of testing time.

Besides the phonics test, as described above, each child was tested on the Iowa Silent Reading Test, Elementary, Form A; and on the New Stanford Reading Test, Form V.

In computing the results, the reliability of the Individual Phonic Test was computed by the odd-even method. The coefficient of reliability for the 155 pupils tested was $.94 \pm .006$.

The summary of results was as follows:¹

The relation between the phonic ability and the reading ability was investigated by correlating the results on the Individual Phonic Test with the results on the two reading tests. The correlations obtained are:

New Stanford Reading Test $.70 \pm .027$
 Iowa Silent Reading Test (Comprehension) $.66 \pm .030$
 Iowa Silent Reading Test (Rate) $.55 \pm .038$

The correlations show with reasonable certainty that phonic ability is significantly related to reading ability among the pupils studied. Although there is a slight increase in the mean score on the phonic test from the fifth to the eighth grade, as shown in Table III (the increase was 8.4), the increase is not great and the variability within each grade is so large that it seemed unnecessary to compute separate grade norms (for the grades studied) for the individual Phonic Ability Test.

For the 155 pupils studied, representing an age range from 9 years, 11 months to 15 years, 9 months, there was practically no relation between phonic ability and chronological age. The coefficient of correlation was $-.08 .005$.

¹Ibid., p. 191.

From the outline of research in phonics as presented in this study it can be seen that a few people have approached the problem objectively.

That there is need of training in auditory and visual discrimination, there appears to be no doubt. At least there is no noticeable controversy surrounding the teaching of those two word analysis abilities. Regarding the other ability, phonetics, however, there is still division among many people in the field of reading today. Whether phonics should be taught at all; how much it should be stressed, and in what manner it should be taught, are still matters for argument.

Summarizing the evils of over-emphasis on phonics, and telling also the results of failure to teach word analysis, Durrell reports the studies which were made in analyzing the difficulties of children who came to Boston University for help in reading:¹

Of one hundred children with severe reading difficulties who attended the Boston University Educational Clinic in 1930, ninety showed the result of over-intensive work in phonics. These children came from school systems that were then using reading methods in which the direct sounding of phonics was an important element. The children needed help in quick recognition of words and phrases, in ear training to enable them to synthesize sounds, and in word analysis in which syllables and word parts were emphasized. Six years later these same school systems had changed to newer

¹Donald D. Durrell. Improvement of Basic Reading Abilities. New York: World Book Company, 1940. p. 197.

reading methods in which word comparison was utilized in phonics. Then, of the pupils from those schools who were sent to Boston University Educational Clinic, 90 per cent were so weak in word analysis that they were unable to discriminate words of similar form, they guessed at words in an aimless fashion, or they were unable to make any attempt at word analysis. Those children improved rapidly in their reading when word-analysis instruction was given.

There is ample evidence, in addition to that just cited, to indicate the need for instruction in word analysis. Such evidence includes the complete inability of some children to solve new words, random guessing at new words without regard to word form or meaning, and various ineffective habits of attack on new words, such as mere sounding by letters and syllables. Some bright children may acquire the facility to notice the visual and auditory elements of words and hence need no formal instruction in word analysis. The majority of children, however, are aided by special practice to increase the accuracy and fluency of both visual and auditory perception of word elements.

In their chapter entitled: "Specific Reading Difficulties,"

McCullough, Strang, and Traxler discuss the phonic approach to independence in reading thus:

There are three kinds of trouble for which the phonic approach to word analysis is chiefly criticized: (1) Its emphasis upon units smaller than a syllable tends to slow the reading process so that the reader becomes a word tackler rather than a thinker; the meaning intended by the author through the association of words in the sentence is lost in the vast emptiness between difficult words slowly analyzed. Hence, any teaching of the phonic method has to be offset by other more rapid technique of word analysis and by much practice in reading easy materials for meaning, unhampered by encounters

¹Constance M. McCullough, Ruth M. Strang, Arthur E. Traxler. Problems in the Improvement of Reading. New York: McGraw-Hill Company, Inc., 1946. p. 251.

with difficult words. (2) Logical, adult minds find phonic analysis so attractive in its orderliness that certain school systems have tended to emphasize phonics to the exclusion of other methods. In such systems the expression 'word analysis' conveys only one meaning to the teacher of reading--phonic analysis. The result has been the presence in reading clinics throughout the country of children retarded in reading because of their ability to make only one kind of attack on a strange word. The fact is that only about one-third of the words in common English vocabulary are capable of phonetic analysis, and some of these are not entirely like their appearance in sound, but demand a partly visual analysis for familiar parts as well. (3) In its attention to small units the analysis of the sound of a word may leave the amateur word sleuth with a lot of little parts, which he finds himself incapable of reassembling into a meaningful whole. In other words, this method requires the blending of isolated sounds to form the syllables it has broken--something like cutting oneself while trying to open a first-aid kit. The word 'slake' can become a monster with 'sluh' for a head and 'ake' on its back, if dealt with from the purely phonic standpoint; whereas, if treated to a combination of phonic and visual analysis, it will become the easily sounded letter g with the familiar 'lake' attached. This latter attack, heresy to the phonic diehards, is the sensible approach for the retarded reader whom the pure phonic method has left years behind himself in reading achievement.

Discussing the same topic, Gray shows his belief in the need of a certain amount of phonics in the reading program:¹

The reader who develops real independence in attacking new words must acquire skill in applying phonetic as well as structural analysis to new word forms. In our language a printed word is actually a recording of the series of sounds that we use in the spoken word. Phonetic analysis is primarily a process of associating appropriate sounds with the printed word forms.

¹William S. Gray. On Their Own in Reading. Chicago: Scott, Foresman and Company, 1948. p. 88.

Later on in his chapter "Phonetic Analysis" he says:¹

Often a single phonetic clue, when combined with meaning and word-form clues, will tell the reader what a word must be. For example, assume that a child has never met the word bed in his reading. He first encounters it in the sentence 'The little girl jumped into her bed.' General context might possibly lead the child to infer that the word is car, wagon, clothes, or some other suitable word. But if he gets a clue to the sound of the word from the letter b, he may immediately think bed.

Sometimes, however, a partial clue to the sound of the word is not enough for accurate identification, even though the child knows the meaning of the word. For example, in the sentence 'He put crusts of bread on the feeding table,' Bob who is not familiar with the printed form of the word crusts, might use the cr as a sound clue when he first looks at the word and think crumb. To derive the sound of the word crusts, he must look at the word in detail and associate appropriate sounds with the letter symbols he sees in it.

Betts summarizes the opinions of several writers on the subject of phonics and concludes:²

To summarize the situation these statements may be made. First, some children may profit from systematic instruction in phonics. Second, phonics is only one aid to the recognition of words. Third, phonics instruction is not given until the child has developed initial reading skills, abilities, and attitudes and until there is a need. Fourth, the fact must be recognized that there are many words that cannot be identified by phonetic analysis. Fifth, instruction in phonetic analysis should contribute to effective structural analysis, especially syllabication. Sixth, phonics is emphasized along with other word-recognition aids at the primer, first-reader, and second-reader

¹Ibid., p. 89.

²Emmett A. Betts. Foundations of Reading Instruction. New York: American Book Company, 1950. p. 615.

levels of instruction. This does not mean that all children in the first and second grades are to be given a dose of phonics. Instead, only those pupils who are working at these achievement levels and who need this type of help are given guidance in this respect. Seventh, a highly complicated system of teaching phonics by means of isolated word drills cannot be justified in the elementary-school program. Phonics, then does have a place in the reading program.

Witty also takes the attitude that the teaching of phonics has a place in the reading program, but that it should have only an incidental treatment:¹

Experimentation has led to contradictory claims and to some confusion concerning the value of phonic training in helping children to recognize new words. Nor is there agreement concerning the number of specific phonic units to be taught and the time when these units are to be introduced. The practice frequently followed in modern schools is to postpone formal phonic instruction until children have acquired a basic stock of fifty to one hundred sight words. Moreover, it is recognized that some children have little need for formal instruction in phonics. But since such training appears to be helpful to certain children, the teacher should be prepared to offer appropriate aid whenever it is required. She will give all children encouragement and guidance in word recognition and word study in order to bring about steady growth in vocabulary.

In the section in which he discusses "Word Recognition" in the Encyclopedia of Educational Research, the 1950 edition, Gray announces that the controversy, begun so long ago is still current: "The chief controversy in this field (that of word

¹Paul Witty. Reading in Modern Education. Boston: D. C. Heath and Company, 1949. p. 144.

recognition in reading) relates to the value of phonics as an aid in teaching pupils to read...."¹

It is in view, then, of needed objective data regarding the effectiveness of various word analysis abilities that the writer has undertaken this study.

¹William S. Gray. "Teaching of Reading." Encyclopedia of Educational Research. New York: American Educational Research Association. The Macmillan Company, 1950.

CHAPTER II

PLAN OF THE STUDY

Because reading is such a complex process, it is easy for one to be misled in ascribing success or failure to a particular method or technique, used in the reading instruction. It is easy, also for one to become too zealous for a particular method, and, therefore give to it an importance not commensurate with the part it has had in bringing about the observed success in reading.

From the beginning of American education, there has been a persistent belief, sometimes strong, at other times, weak, that a knowledge of the phonetics of the language is an aid to reading. And comparatively recently, there has come to the fore an idea, that by giving the child specific training in hearing discriminately the sounds in spoken words, and by training him to see likenesses and differences in the printed forms of words, his reading efficiency can be improved. As indicated in Chapter I, some research has been done to determine the amount of aid given to reading achievement by auditory discrimination, visual discrimination and phonetics. But since the evidence has not been conclusive, there is still need of assembling objective data to ascertain whether success in reading is influenced by these word analysis abilities. And if success in reading is attributable to training in these

skills, it would be of benefit to teachers and administrators to know the extent to which reading proficiency is dependent upon each of them.

With the purpose, therefore, of discovering the relationship of the word analysis abilities, just enumerated, (auditory discrimination, visual discrimination, and phonetic ability,) to reading achievement, this study was undertaken.

Definition of Terms as Used in this Study

By auditory discrimination is meant the ability to hear likenesses and differences in the sounds of spoken words. By visual discrimination is meant the ability to see likenesses and differences in printed words. And by phonetic ability is meant the ability to recognize and to produce the sounds of letters and combinations of letters, when the visual symbols are presented.

Testing Program

To measure the word analysis abilities, tests, which had already been constructed and employed in previous studies, were used. A test built by Nason¹ to measure power to hear sounds in spoken words was used as the test of auditory discrimination. A test, constructed by Durrell,² was used to

¹Doris Nason. "The Influence of Vocabulary Common to Test and Textbook on Primary Reading Scores." Unpublished Doctor's thesis, Boston University School of Education, Boston, 1951.

²Donald D. Durrell. Test Used by Allan Acomb in "A Study of the Psychological Factors in Reading and Spelling." Unpublished Master's thesis, Boston University School of Education, Boston, 1936.

measure visual discrimination. And a test taken from the Durrell Analysis of Reading Difficulty¹ was used to measure knowledge of phonetics.

Because mental maturity, even as it is measured by current tests, is considered by some educators to be a potent factor, contributing to the reading success of first grade children, its influence on the reading achievement of the children, tested in this study was measured by the Otis Quick Scoring Mental Ability Test,² Alpha, Form A.

To test the reading achievement of the children, two informal tests, one a group test, and one an individual test, were constructed and given. Their scores were combined to obtain a composite reading score for each child.

Six other informal tests were constructed and administered but because some were considered too short and others proved too easy, they were discarded.

In this study, therefore, the following tests were employed: a test of mental maturity, a test of auditory discrimination, a test of visual discrimination, a test of phonetic ability, and two tests of reading achievement. The scores from the two reading tests were combined to produce a composite reading score.

¹Donald D. Durrell. Durrell Analysis of Reading Difficulty. Yonkers-on-Hudson, New York: World Book Company.

²Arthur S. Otis. Otis Quick Scoring Mental Ability Test, Alpha, Form A. Yonkers-on-Hudson, New York: World Book Company, 1936.

Descriptions of Tests and of the Statistical Results

Following in order, are descriptions of the tests administered and statistical tables with the analyses of results of the tests. The individual schools are indicated as School A, School B, School C, School D, and School E.

Mental Age

In Table I, are the data obtained from the Otis Quick Scoring Mental Ability Test, Alpha, Form A. This test is largely a measure of ability to understand oral language, and to follow directions read by the examiner. There are two sections to the test. The first section is a nonverbal test. It is a test of the child's ability to carry out the direction to look carefully at each row of pictures, and "find the three things that are alike and draw a line through the one that is not like those three". For instance, in one row, there are pictures of three animals and a picture of a tree. The child answers the item correctly if he draws a line through the picture of the tree. In the verbal section, the children are directed thus: "Put your finger beside row number 1. Mark the small animal with the short curly tail". The test items become much more difficult, however, as the test proceeds and require sharp, critical judgment in spatial relations. In item 90, for instance, where there are pictures of four fans, the direction is "Next mark the fan in which the corner of each part is about in the center of the next part". An example

which might illustrate the extent to which the test measures understanding of spoken language is contained in the direction for item 80. It reads: "Next mark the drawing that is just below the chain with the heart-shaped links."

Table I, as mentioned above, gives the statistical results of the Otis Test for the five schools tested.

TABLE I

MENTAL AGE FROM THE OTIS TEST
(Reported in Months)

Statistics	A	B	C	D	E	Total
Range	61	84	59	74	69	94
Mean	91.5	96.45	87.08	102.09	95.02	95.75
Median	93.35	92.31	85.33	99.05	95.18	95.27
Mode	97.05	92.31	81.83	91.02	95.14	94.8
S.D.	6.10	11.76	11.65	13.45	13.12	12.15

Table I shows the mean mental age of the entire group to be 95.75 months or 7 years and 11 and three-fourths of a month. Since the testing was done at the end of the second grade, the mental age of the group is just about average. The total range of the group is large, being close to 8 years. Implied in that large range is the need of adjustment of materials and methods to mental capacity of wide differences.

The school with the smallest range in mental ages is School C, which has a range of 59 months or 4 years and 11

months. The school with greatest range is School B with a range of 7 years or 84 months. The lowest mean mental age recorded in the table is that of School C, with 87.08 months; and the highest, School D, with 102.09 months.

The more dependable measure of variability, the standard deviation, shows School A to have the smallest standard deviation, 6.10; School D, with 13.45 has more than twice the variability of School A in mental age. The standard deviation of the entire group is 12.15.

Chronological Age

A comparison of the chronological ages of the children in the five schools studied can be noted in Table II.

TABLE II
CHRONOLOGICAL AGE
(Reported in Months)

Statistics	A	B	C	D	E	Total
Range	32	34	30	18	21	37
Mean	88.57	93.11	90.37	93.74	92.47	91.30
Median	88.42	91.84	89.68	90.56	90.04	90.75
Mode	88.57	89.3	88.3	85.08	85.08	85.9
S.D.	6.15	6.15	6.34	4.64	4.03	6.5

Table II indicates that the mean chronological age of the entire group was 91.30 or 7 years and 7.3 months. The range in chronological ages is not even half as great as is the range

in mental ages, being 37 months or 3 years and 1 month.

The mean chronological age of School D shows the children in that school to be slightly older than the children in School B, but considerably older, on the average, than the children in School A. That may be accounted for by the fact that School A had an entrance age of 1 month younger than that of the other four schools. The entrance age of Schools B, C, D, and E was 5 years and 6 months by September of the year they enter first grade. For School A, the entrance age was 5 years and 5 months.

According to the statistics in Table II, School D has the smallest range in chronological age, 18 months, or a year and a half. School B has the largest range, 34 months, or 2 years and 10 months. School E with 4.03, has the smallest standard deviation; and Schools A and B, the largest, with 6.15 each. A comparison of the measures of variability in chronological age with those in mental age of the five schools, included in the study, shows School B to have the greatest range in both chronological age and mental age. In chronological age, School B has a range of 34 months, and in mental age, a range of 85 months. The school with the smallest range in chronological age is School D with 18 months. Its range in mental age, however, was second largest and its standard deviation, the largest.

Auditory Discrimination

To test auditory discrimination, a test, as referred to before, which was constructed by Nason, was used. The test measures the child's ability to hear initial consonant sounds; rhyming sounds at the ends of words, final consonants; and a combination of initial and final consonants in words, spoken by the examiner. The test has 40 items. It is set up on a single sheet of paper in two columns, with three words in each item. Below is a sample from the page of directions, and also some items to illustrate the procedure used in the testing of auditory discrimination. Directions in parentheses are for the examiner. A copy of the test may be found in the Appendix.

SAMPLE OF DIRECTIONS FOR TEST OF AUDITORY DISCRIMINATION

Today we are going to play a game with some brand new words. We are going to see how well each of you can hear sounds and then find the letters that make the sounds.

(Write padlock vegetable barberry on the blackboard.)

Look at the words on the blackboard. Which one has the same sound at the beginning as ball? Put a circle around the word that begins like ball.

(Have one child go to the board and draw a circle around the correct word.)

Now look at Row I on your paper. Draw a circle around the word in row 1 that begins with the same sound as fall.

(Check the papers to see that all have understood the directions.)

In row 2 put a circle around the word that begins like summer. Row 3, mark the word that begins like gate. Row 4, mark the word that begins like ladder.

SAMPLE OF TEST ITEMS

1. tranquil familiar vagabond 21. crowd grasp job

16. silky remembering napkin 40. rot nicest notion

In item 1, as indicated in the directions, the child must hear the sound "f" in the word fall and then find, in the typed copy, a word whose initial sound matches the initial sound contained in fall. The directions change in item 16. There, the child is directed to listen to the rhyme in the word, and find a word that rhymes with sing. From the sample above, it can be seen that the child must choose a word which bears no resemblance to sing except in the three last letters. In item 21, the test becomes more difficult. In this section of the test, the child is required to note just the ending letter, and match what he hears at the end of the word, pronounced by the examiner. The examiner says: "Draw a circle around the word that ends like crab." The child must distinguish first the sound made by the examiner and then choose from among the following three words, crowd, grasp, and job. The last items of the test are still more difficult. There, the examiner asks that the children listen for both initial and ending consonants. In item 26, she says, "Mark the word that begins

and ends like park. The child chooses from among peacock, derrick and pardon. In the last item which is in the sample above, the direction is "Mark the word that begins and ends like not." The choice must be made from among rot, nicest and notion.

The reliability of the test, which was obtained by the split-half method, or every other item technique, is $.90 \pm .014$. In Table III, are listed the statistical results of the five schools in the Nason test of auditory discrimination. A copy of this test may be found in the Appendix.

TABLE III
AUDITORY DISCRIMINATION

Statistics	A	B	C	D	E	Total
Range	29	27	28	24	16	29
Mean	28.24	29.26	28.6	34.14	29.64	30.38
Median	28.54	29.5	28.18	37.24	30.81	31.42
Mode	29.14	29.28	27.34	(40-41)	33.15	32.50
S.D.	7.44	6.56	7.41	6.22	6.54	7.45

The highest score possible on the auditory discrimination test is 40. The mean auditory score for the total group is 30.38. The range is 29, and the standard deviation for the whole group of 500 children is 7.45.

School D, with 34, has the highest mean score. The school

nearest to it, School E, has a mean score of 29.64, which is 4.5 lower than the mean of School D. It is possible that the reason these two schools are superior in this particular skill is that of the five they are the only two which have a formal program for the teaching of auditory discrimination, apart from their teaching of phonics. Both schools use Building Word Power,¹ which trains specifically for the skill measured by this test.

The ranges of ability among the schools is very wide. The greatest range within a school is that of School C which has 28 and the smallest, that of School E. The school with the smallest standard deviation, however, is School D. There is only .02 difference between the standard deviations of School E and School B.

Visual Discrimination

The test of visual discrimination was constructed by Durrell.² It is a measure of the child's ability to see likenesses and differences in words, and word elements, when they are presented on flash cards.

The examiner, during the testing program of the present study, stood in each classroom at an angle, which would guarantee that each child had sufficient view of the flashcards.

¹Donald D. Durrell, Helen B. Sullivan, Helen A. Murphy. Building Word Power. Yonkers-on-Hudson, New York: World Book Company, 1945.

²Durrell, op. cit.

She held each card up, at first for three seconds each; then gradually, she increased the time of exposure until, toward the end of the test, she permitted as many as seven seconds exposure for each card.

The flashcards were made of white tag board, 11 inches long and 3 inches wide. The letters were manuscibed in black ink, 2 inches tall. The letters and words on the papers used by the children were typed in standard size type. The test consists of thirty items. It is set up in two columns on a single sheet of paper. The first two items call for the identification of a single letter, or of a single syllable chosen from among five others. The third item demands discrimination among words. The test continues to become more difficult until it is very precise in its differentiative power. A copy of the test may be found in the Appendix.

Following are some sample items from the test of visual discrimination.

TEST OF ABILITY TO SEE DIFFERENCES IN PRINTED WORDS
PRESENTED BY FLASH CARDS

1. y b d g f	16. clear clean close climb lean
3. no on imp in nip	17. pan park trap party quart dark part
15. drip prep drops rap drop	30. regular regulate regulation registration negotiation radiation recognition

In item 1, the examiner holds up the card containing the letter f. In item 2, she exposes a card with the word in to be identified. In item 15, the child must distinguish the word drop from among the others. In item 16, he must identify the word clean from among words which resemble it closely. In item 17, the word part is the one to be remembered from the single exposure. In item 30, the discrimination is very difficult. The word regulation must be chosen from so many that are similar in configuration.

The reliability of this test of visual discrimination as obtained by the split half or every other item technique is $.764 \pm .028$. The reason the reliability is not greater is probably because it is a short test, containing only 30 items.

There follows in Table IV, a statistical account of the visual discrimination test just described, and which was administered to the children in this study.

TABLE IV
VISUAL DISCRIMINATION

Statistics	A	B	C	D	E	Total
Range	23	23	21	21	20	25
Mean	18.56	19.48	21.36	22.12	21.44	19.98
Median	18.6	19.98	22.23	22.42	21.64	20.56
Mode	18.68	20.98	23.99	23.02	22.04	21.72
S.D.	4.54	5.26	5.46	2.72	4.46	4.72

The highest score possible on the test of visual discrimination was 30. The most conspicuous fact in Table IV is the close resemblance of the schools in range of ability in visual discrimination. The difference between the highest range and the lowest being only 3. The difference between the highest standard deviation and lowest standard deviation is 2.74; the difference, therefore, in ability in visual discrimination from school to school is not large.

In this test, School D has the highest mean score, 22.12; and School E, the second highest, with 21.44; the difference being only .68. School A has the lowest score. There is a difference between School D and School A in visual discrimination of 3.56.

The three schools appear in the test of visual discrimination in the order of their superiority in mental age. This order also parallels the order shown in their respective mean chronological ages.

Reading Achievement--Individual Oral Test

To obtain a measure of the children's ability to read in the materials used in their daily instruction in reading, the writer constructed a test, whose vocabulary is based on the reading text being used by all of the schools included in the study, the Scott, Foresman Cathedral Readers.¹ The test

¹Cathedral Readers. Chicago: Scott, Foresman and Company, 1942.

consists of a story about a trip to a circus. The story contains five paragraphs in which there are 136 unrepeated words. Each time, therefore, that a new word is introduced, it becomes an item in the test. In the testing for this study, each child read the story orally for the examiner. The omitted or miscalled words were encircled by the examiner. The reliability of the test, as obtained by the split-half method, is $.978 \pm .002$.

Table V reports the various statistical standings of the schools in the Individual Test of Oral Reading. A copy of the test may be found in the Appendix.

TABLE V
INDIVIDUAL ORAL TEST OF READING

Statistics	A	B	C	D	E	Total
Range	136	133	135	121	103	136
Mean	97.22	101.56	110.87	122.77	126.23	109.03
Median	101.27	118.5	119.48	132.08	131.7	122.99
Mode	109.37	(133-139)	(133-139)	(133-139)	(131-137)	(133-139)
S.D.	34.09	49.98	25.96	21.28	22.26	33.53

With the possibility of 136 as the highest score, the mean reading score for the total group is good, 109.03. The range for the 500 children was as great as possible, since it included the complete score attainable on the test. The standard

deviation, too, is large, indicating that there are considerable individual differences shown in the testing.

The mean scores in Table V show School E to have 126.23; School D, 122.77; School C, 110; School B, 101.56; and School A, the lowest, with 97.22. The difference between the lowest and the highest means is great: 29.01. Table V indicates also that the scores of all of the schools, except those of School A, are too high to permit the mode to be computed statistically. Therefore, the crude mode is reported, and enclosed in parentheses.

Reading--Classification Test of Vocabulary

Another measure used in the study to test reading ability in materials not necessarily found in the basal text, was also constructed by the writer. The vocabulary is based on Dolch's list of a "First Thousand Words for Children's Reading." It is called a Group Classification Test of Vocabulary. It consists of 26 items but has a possible score of 107 points. In this test, the words vary per item from five to six. The words are blocked off in one column down through the page. The test is administered by the examiner's reading a direction such as the following: "Draw a circle around the names of things we wear." Following, is a sample of the directions and of the items of the Group Classification Test of Vocabulary. A copy of the test may be found in the Appendix.

DIRECTIONS FOR GROUP CLASSIFICATION TEST OF VOCABULARY

We want to know how well you can read. (Write the following words on the blackboard: potatoes, dog, rabbit, street, school, kitten.)

Who can find the words that are names of pets? (Have each child draw a circle around the words.) Did we draw circles around all of the words? No. Sometimes, we find two. Sometimes we may find five. Be sure to read each word carefully. Listen to my directions and draw circles around just what I tell you. Ready-----

Row 1 Find row 1 on your papers. Put your marker under the line. Draw a circle around the words that are the names of things that children like for pets.

Row 2 Draw circles around the names of things that fly.

Row 3 Draw circles around the names of things that people eat.

Row 4 Draw circles around the things you would see at a circus.

The test items from which the children choose the correct words are given as samples below:

GROUP CLASSIFICATION TEST OF VOCABULARY

1.	potatoes	dog	rabbit	street	school	kitten
2.	turtle	crow	airplane	box	bird	robin
3.	bread	meat	chocolate	sky	apples	cake

To test the validity of this measure, the Group Classification Test of Vocabulary, it was correlated with the Individual Test of Oral Reading. The correlation is $.796 \pm .024$. The

reliability of the Group Classification Test of Vocabulary is $.935 \pm .008$. The reading score used in the analysis of data is a combination of the score on this test and that earned on the Individual Test of Oral Reading.

Table VI discloses the statistical outcomes for each school in the Group Classification Test of Vocabulary.

TABLE VI
GROUP CLASSIFICATION TEST OF VOCABULARY

Statistics	A	B	C	D	E	Total
Range	74	78	68	72	69	78
Mean	71.39	72.4	74.25	86.95	82.19	77.39
Median	68.94	75.9	78.25	91.75	83	79.87
Mode	57.6	82.9	76.25	101.35	84.62	84.89
S.D.	18.3	17.4	17.75	15.35	16.8	19.65

The total possible score on the test is 107. This test shows a good scatter perhaps for the reason that it is not a test of vocabulary on which the children had been drilled, as was the case in the Individual Test of Oral Reading. The mean score for the entire group is 77.39. The range is 78, which is large, but not as large as that recorded for the Individual Test of Oral Reading.

School D has the highest mean score in the group, 86.95. School A has the lowest mean score, which is 71.39. School E

is second in mean with 82.19. The difference between the highest and the lowest mean scores is 15.56. School D and School E hold first and second places respectively in having the highest mean, median and mode. School C has the smallest range, while School D has the smallest standard deviation.

Since this test was one in which the child had to know the concept for which each word stood, it was a test of word meanings.

Phonetics--Individual, Oral Test of Phonetic Ability

An oral test of phonetics was administered to each child. The test consists of the letters of the alphabet, and of some of the letters in combination, known as blends. The phonetic test was taken from the Durrell Analysis of Reading Difficulty.¹ The writer, wishing to check on the children's knowledge of the influence of silent "e" on the vowel preceding it, added five items to the test. The reliability of the test obtained by the split-half method is $.96 \pm .005$. A copy of this test may be found in the Appendix.

Below, is a copy of the entire phonetic test administered to the children individually.

¹Donald D. Durrell. Durrell Analysis of Reading Difficulty. Yonkers-on-Hudson, New York: World Book Company, 1937.

INDIVIDUAL ORAL TEST OF PHONETIC ABILITY

c l a s i b r t j u m h p

e f o g x n v q d w y k z

th st wh sh br ch dr tr cl fr gr pl sm

tw fl sk sw

ine ote ume ase eme

Each letter or blend is scored as a separate item. Therefore, the highest possible score is 48. Each child was presented with a copy of the test, and as he produced the word or failed to produce it, the examiner checked those omitted or not sounded correctly. This test was the one used in the study as the measure of the children's knowledge of phonetics.

Table VII reveals the success of each school statistically in this test.

TABLE VII

INDIVIDUAL TEST OF PHONETICS

Statistics	A	B	C	D	E	Total
Range	48	48	48	48	48	48
Mean	37.99	28.81	33.49	43.87	39.95	34.80
Median	36.16	33.58	34.48	45	40.84	38.61
Mode	32.5	43.12	36.46	47.26	42.62	46.23
S.D.	12.34	15.24	15.15	7.57	6.91	15

Judging from the range, all of the schools have children who could not give any of the sounds included in the test. The mean for the group is 34.80, and the standard deviation is 15, which is a large standard deviation for a test of 48 items.

The contrasts shown by the various schools in the total distribution can be illustrated by reviewing the number which each school contributed to the lowest interval. In the distribution of scores, a total of 52 children of the total 500 fall in the lowest interval: 0-1. School D, with one child scoring 0, contributed 1 score to the bottom interval; School E had 2 in that interval; School C, 8 scores, School B, 20 scores; and School A, 21.

School E has the smallest standard deviation in the individual phonetics test with 6.91. School D has a standard deviation of 7.57. The other three schools have 15 or more as their standard deviation.

The mean score of 43.87, obtained by School D is the highest. School E has the second highest mean in the individual test of phonetic ability; and School B has the lowest mean. The difference between the means of the highest and the lowest Schools, Schools D and School B respectively, on this test, is 15.06. This is a large difference between means, considering that the test consists of only 48 items.

This concludes the statistical description of the results of the tests which were used in this study.

TESTS DISCARDED BECAUSE TOO SHORT OR TOO EASY

Besides the tests described above and used in the analysis of data relating to the study, other tests were constructed and administered. Among the tests discarded were two reading tests, two tests of phonetic ability and one test of letter names. Three of the tests were group tests; the fourth was an individual test.

Reading--Group Test of Sight Vocabulary

One of the tests, built to measure reading was a group test, whose vocabulary is based on the words included in the basal reading series being used in the schools. The test consists of 136 items. It is a multiple choice test. Each item contains four words, from which sometimes two, and sometimes three words are chosen. The test is administered by the examiner's pronouncing the words. The children encircle the words which they think match the ones pronounced by the examiner. Below is a sample of the directions for administering the Group Test of Sight Vocabulary. A copy of the test may be found in the Appendix.

DIRECTIONS FOR THE GROUP TEST OF SIGHT VOCABULARY

We are going to play a game with words. I am going to say some words and I want you to find them on your papers.

We will do one together. (Write on the blackboard: fox wolf pig dog.) These words are in the first row on your papers. Listen carefully to the words I say--wolf dog. Find them on the blackboard. (Have someone encircle the words.)

Everybody draw a circle around pig dog on your paper. Listen carefully to each word I say. Sometimes you will encircle two words in a line; and sometimes you will encircle three words. Ready-----

GROUP TEST OF SIGHT VOCABULARY

Row 2 grows knew full late	Row 47 quick quite know his
Row 3 climb large parade front	Row 49 began store book pocket

In Row 2, the words to be encircled are knew full. In Row 3, the words to be encircled are climb front; in Row 47, three words out of the four are to be encircled: quick know his; and in Row 49, began store pocket.

Because the words are taken from the text on which the children had been drilled for sight reading, and because of the added help afforded by the pronouncing of the words by the examiner, and perhaps because the choice of two or three words from four made it possible to guess at some, the test proved to be too easy. The distribution of scores appears severely, negatively skewed. Most of the scores cluster at the top, despite the apparent wide range of 90 shown by the entire group.

TABLE VIII
GROUP TEST OF SIGHT VOCABULARY

Statistics	A	B	C	D	E	Total
Range	90	88	72	53	27	90
Mean	124.59	123.59	124.15	131.95	130.14	127.11
Median	128.86	131.09	132.85	133.4	131.68	132.22
Mode	(133-139)	(132-138)	(135-139)	(135-139)	134.76	(133-139)
S.D.	14.07	17.29	13.2	8	5.58	11.76

The degree of negative skewness can be seen from the very high mean of the total group, which is 127.11. The standard deviation of the 500 is 90 and the mode is so high it could not be statistically computed. The crude mode is the number of cases occurring in the highest interval, 133-139. The standard deviation and the range of School E are the smallest among the schools. The standard deviation and range are 5.58 and 27 respectively. This test was not used in the analysis of data.

Reading--Test of Paragraph Comprehension

The Test of Paragraph Comprehension consists of four paragraphs whose vocabulary is based on the text being used in the schools, The Cathedral Basic Reader. Following each paragraph are incomplete statements to be finished by the encircling of one of the multiple choice words. There are only eleven items in the test and it was therefore considered too

short to be a reliable test of the children's ability to comprehend paragraphs. Below is a sample of one of the paragraphs.

SAMPLE OF READING TEST OF PARAGRAPH COMPREHENSION

Once there were two little boys. They went fishing with their father. He took them up the river. There they fished all day. When it was time to go home the boys and their father counted the fish. John had caught one middle size fish. Bobby had caught a small fish and the father had caught a big fish.

1. The fish that father caught was
big yellow little brown small
2. The boys went fishing with their father in a
brook pond river stream

There follows in Table IX the statistical results of the test.

TABLE IX

GROUP TEST OF PARAGRAPH COMPREHENSION

Statistics	A	B	C	D	E	Total
Range	11	11	11	11	9	11
Mean	5.36	7.78	7.42	7.21	7.17	7.26
Median	5.03	8.63	7.61	10.75	7	6.27
Mode	4.37	10.33	7.99	8.59	6.66	4.29
S.D.	2.81	3.25	2.56	2.95	2.58	3.51

The test of paragraph comprehension was brief, having only 11 items. Therefore, no reliability was computed for it. As indicated in Table IX, the range is consistently 11 for all schools, but School E. That means that the four schools having that range had children whose score did not rise above the interval, 0-1.

School B made the highest mean, 7.78. Because School B had not displayed superiority in other tests, the writer investigated to discover whether there could be some traceable factor to account for this particular occurrence. On interviewing the three teachers of the classrooms included in the testing in School B, the writer found that one teacher used a workbook, whose format and drill work resembled the material and format of the paragraph comprehension test. It is possible that there was sufficient transfer of training in that particular classroom to account for the sudden spurt of skill shown in this test by School B.

A Test of Letter Names

A test of letter names was administered as a check on the children's ability to identify the names of letters when they saw their printed forms. The test is a multiple-choice test, set up in two columns on a single sheet of paper. The examiner, in giving the test, says the name of the letter and the children encircle the letter names. There are five letters in each item, from which the children choose the one they think has been

pronounced by the examiner. A copy of the test is in the Appendix.

Some samples of test items appear below. No statistical table appears for this test because so few children failed to make a perfect score that the test had no value for comparative or analytical purposes.

TEST OF ABILITY TO IDENTIFY LETTER NAMES

1. s m r f g 14. w o n f o

2. a h r g l 15. l g z i n

Phonetics--Test of Ability to Identify Sounds of Letters and Blends

Two phonetics tests were discarded. One was a group test in which the children encircled the sound which they thought the examiner said. There are 45 items in the test. Because the phonetic ability tested in the individual was considered sufficient for the purpose of the study, this group Test of Ability to Identify the Sounds of Letters and Blends was not used in the analysis of data. This test also was a multiple-choice test. The items were arranged in three columns. Each item contained four letters or combinations of letters. From the four letters, the children had to choose the letter or combination of letters which made the sound which was pronounced by the examiner. Below, is a sample of some of the items:

TEST OF ABILITY TO IDENTIFY SOUNDS OF LETTERS AND BLENDS

1. a l o r	16. y h o t	31. sw st wh gr
15. d e r b	30. pl br wh st	45. ue ou ph ie

Table X discloses the statistical ratings for each school in the Group Test of Ability to Identify Sounds of Letters and Blends.

TABLE X

GROUP TEST OF ABILITY TO IDENTIFY SOUNDS OF LETTERS AND BLENDS

Statistics	A	B	C	D	E	Total
Range	43	29	24	20	38	43
Mean	37.40	37.78	37.43	41.1	38.41	38.45
Median	38.45	38.9	38.38	41.99	39.93	39.93
Mode	41.75	41.14	40.28	(42-43)	42.91	42.89
S.D.	6.75	5.56	5.26	3.66	6.51	7.6

Since the test contains only 45 items, the range of 43 is very large. The mean for the entire group is 38.45, which is high.

School D attains the highest mean in this test, 41.99 which is very high, considering the number of items in the test. School E again is second to School D. The mean scores of the other three schools are very close. The least variable school is School D. There is a considerable difference between the

standard deviations of School D and the School closest to it, which is School C. The scores clustered to the top of this test to such an extent that it was not used in the study, the Individual Test of Phonetics being considered sufficient. The Individual Test has been described above.

Phonetics--Individual Test of Application of Phonetic Knowledge

Another measure of phonetic skill employed in testing the children, but not used in analysis of data was a test of the direct application of phonetic sounds of letters and blends. The test consists of 27 isolated words, not necessarily found in the children's reading vocabulary. The words, however, are probably in their hearing vocabulary. The words making up the test were arranged in five rows. Each child took the test individually by reading the words aloud for the examiner. The examiner encircled the words omitted or miscalled during the test. Because the test was so short, it was not used in the analysis of data relating to the study.

Below, however, is a comparison of the placement of the schools in application of phonetic knowledge, according to the statistical results of the test. A copy of the test may be found in the Appendix.

TABLE XI
INDIVIDUAL TEST OF APPLICATION OF PHONETIC KNOWLEDGE

Statistics	A	B	C	D	E	Total
Range	27	27	27	27	27	27
Mean	8.30	8.26	6.6	19.4	11.34	10.55
Median	1.24	2.7	2.16	22.84	8	7.19
Mode	(0-1)	(0-1)	(0-1)	(26-27)	(0-1)	(0-1)
S.D.	12.34	7.14	8.62	4.68	10.08	10.20

This test of application of the phonetic elements on which some of the children did very well, shows a low mean score for the whole population tested. The standard deviation 10.20 is very large for a test of only 27 items. The range for the group and for each individual group was as large as possible, showing that in every school there was at least one child who could not apply any phonetic knowledge to the unblocking of words. School D has a good mean score, a high median. The clustering of scores at the bottom of the distribution is so great that no statistical mode could be computed. Therefore, only the crude mode is recorded. For all of the schools, but School D, the crude mode has to be expressed instead of the statistical mode, because so many of their scores appeared in the lowest interval, 0-1.

Summary of Tests

In summary then, eleven tests were administered in the testing program connected with this study. They were: the Otis Quick Scoring Mental Ability Test, Alpha; a test of auditory and of visual discrimination; three tests of reading whose vocabulary was based on the basal reading text being used in the schools--two of the three reading tests were group tests; and one an individual oral reading tests; besides the last named three, one reading test, based on the vocabulary of Dolch's list, "First Thousand Words for Children's Reading" was given; a single test of letter names was given as a check on the children's knowledge of the alphabet; three tests of phonics--a group test, an individual test of sounding ability and a test of application of phonetic knowledge--were given.

Of the eleven tests, some were retained for analysis, while others, as indicated above, were discarded. The tests retained were: The Nason test of auditory discrimination; the Durrell test of visual discrimination; two reading tests, whose scores were combined as a composite score--the Individual Test of Oral Reading and the Group Classification Test of Vocabulary; and the Individual Test of Phonetic Ability. Only tests found suitable to second grade and containing suitable range were retained. To measure mental maturity, the Otis Quick Scoring Mental Ability Test was used.

Population

To be assured of an unbiased population for this study, the writer chose children from a variety of homes. Two schools, listed as School A and School B, contributing 139 and 136 children respectively, had enrolled in their second grades pupils from homes favored financially and socially, and children from homes ranging from the less favored to the very poor. School C, with 60 pupils, contributed a bilingual element to the tested population. School D, with 112 children in the study, had the most highly favored home backgrounds. In that school's second grades were children from the homes of professional people and those better situated financially. School E, contributing 53 children to the study, was located in the shipyard district, where the fathers, for the most part, worked in the shipyard, and the mothers contributed to the support of the families.

The faculties of the five schools represented five different religious communities of Sisters.

The basal reading text of the five schools in the study was the Cathedral Basic edition¹ of the Scott, Foresman readers. The schools, as part of their reading program, made provision for individual differences by having on hand supplementary readers to meet the range of abilities in their classrooms. Children needing individual attention were given extra help during class periods and after school.

¹Cathedral Readers. Chicago: Scott, Foresman and Co., 1942.

All five of the schools had a formal program for the teaching of phonics, and in their phonics instruction included training in auditory and visual discrimination. The schools made use of a variety of books in the teaching of phonics.

School A used the following materials in phonics instruction: See and Say Series¹ and Eye and Ear Fun.² School B used Happy Times with Sounds.³ School C employed Reading with Phonics.⁴ School D used Sounds We Use,⁵ Building Word Power,⁶ Embeco Phonics Drill Cards,⁷ and Phonics We Use.⁸ School E used Building Word Power,⁹ Phonics,¹⁰ and Phonics We Use.¹¹

¹Sarah L. Arnold, Elizabeth C. Bonny, E. F. Southworth. See and Say Series. Syracuse, New York: Iroquois Publishing Company, 1946.

²Clarence R. Stone. Eye and Ear Fun. St. Louis: Webster Publishing Company, 1943.

³Lola M. Thompson. Happy Times with Sounds. Boston: Allyn and Bacon, 1950.

⁴Julie Hay and Charles E. Wingo. Reading with Phonics. Philadelphia: J. B. Lippincott and Company, 1948.

⁵Maxine Dunfee. Sounds We Use. Fowler, Indiana: Benton Review, 1946.

⁶Donald D. Durrell, Helen B. Sullivan, Helen Murphy. Building Word Power. Yonkers-on-Hudson, New York, 1945.

⁷Embeco Phonic Drill Cards. Springfield, Mass.: Milton Bradley Company.

⁸Mary Meighen, Marjorie Pratt, Mable Halvorsen. Phonics We Use. Scranton, Pa.: Lyons and Carnahan, 1946.

⁹Durrell, Sullivan, Murphy, ibid.

¹⁰Lida Williams. Phonics. Chicago: Hall and McCreary, 1941.

¹¹Meighen, ibid.

CHAPTER III

ANALYSIS OF DATA

The purpose of this study was to discover the relationship between certain word analysis abilities and reading achievement in second grades. The word analysis abilities included were: auditory discrimination; visual discrimination; and phonetic ability. To determine the influence of mental maturity, mental age was added as a fourth variable. Data were analyzed to answer the following questions:

1. Is mental age related to reading achievement?
2. Is auditory discrimination related to reading achievement?
3. Is visual discrimination related to reading achievement?
4. Is phonetic ability related to reading achievement?

In the analysis of data, three variables were held constant by the matching of pairs of children, while the fourth variable was compared with reading achievement. In the variable compared with reading achievement, the scores were held at least one standard deviation apart. In the variables held constant, pairs of individuals were not allowed to be more than a half a standard deviation apart. The standard deviations for the four variables are as follows: mental age, 12.15; auditory discrimination, 7.45; visual discrimination, 4.72; individual test of phonetics, 15.

Analyses were also made of the relationship of each test with the others; and the weight of each variable, in its influence upon reading achievement, was ascertained through the technique of partial correlation.

Preceding the tables and analyses which show the relationship between each of the four variables and reading achievement, as found in this study, there appears a table and discussion revealing the equality of the variables held constant.

Table XII shows the closeness with which the children were matched in auditory discrimination, visual discrimination, and phonetic ability, when their scores in mental age were being compared with their scores in reading achievement. In each table, which shows the equality of the pairing, the variable to be compared with reading achievement appears first.

TABLE XII

RESULTS OF PAIRING 107 PAIRS OF CHILDREN
TO DETERMINE EFFECT OF MENTAL AGE ON READING ACHIEVEMENT

Variable	Mean of High Group	Mean of Low Group	Difference Between Means	S.E. _D	C.R.
Mental Age	105.40	86.77	18.63	1.19	15.65
Aud. Disc.	31.46	31.23	.23	.89	.257
Vis. Disc.	21	21.009	.009	.523	.017
Phonetics	31.36	31.42	.06	2.04	.29

According to Table XII, the children achieving the higher mental age in the paired groups have a mean mental age of

105.40; the lower group, a mean mental age of 86.77. The difference between the means is 18.63 and the critical ratio, 15.65. This critical ratio is extremely high. It indicates that there is a real difference in mental age between the groups of children paired.

In the factors held constant, the critical ratios indicate that the matching was done very closely. In auditory discrimination, the children in the high mental age group have a mean score of 31.46; those in the low group, 31.23. The difference is .23 and the critical ratio, .257. The mean visual discrimination scores for the high and low groups are 21 and 21.009 respectively. The difference being .009, the resulting critical ratio is .017. In phonetics, the mean score for the higher mental age group is 31.36; for the low group, 31.42. The difference is .06, and the critical ratio is .29.

There follows in Table XIII the statistical comparison of the mental age and reading achievement of the children when the other three variables were held constant.

TABLE XIII

COMPARISON OF MENTAL AGE WITH READING ACHIEVEMENT
FOR 107 PAIRS OF CHILDRENAuditory Discrimination, Visual Discrimination,
Phonetic Ability Held Constant

Mental Age	Reading Mean	S.D.	S.E.M	Diff. of Means	S.E. Diff.	C.R.
High Group	191.8	48.1	4.65	3.2	6.31	.507
Low Group	188.6	44.1	4.26			

In Table XIII, auditory discrimination, visual discrimination, and phonetic ability are held constant, by the matching technique, while mental age is made the differentiating factor. There are 107 pairs. The mean of the high group is 191.8; and for the low group, 188.6. The standard deviations are large for both groups: 48.1 for the high, and 44.1 for the low. This indicates a high variability among children in both groups. The difference between the two means in reading achievement is small, 3.2. This difference is in sharp contrast to the difference in mental ages between the same two groups--that difference being 18.63. The critical ratio is positive but extremely low: .507. This low critical ratio is an indication that, for the tested population, there is little relationship between the mental ages of these children and their reading achievement.

When the scores were distributed on the basis of high and

low ability in auditory discrimination, the three variables held constant were mental age, visual discrimination, and phonetic ability. Since the standard deviation of the auditory discrimination of the 500 children is 7.45, the children's scores in the pairing for high and low in auditory discrimination had to be held 7.45 points apart. In the matched variables, the children's scores were kept within half a standard deviation of each other. Below in Table XIV can be seen the wideness of difference in the differentiating factor, auditory discrimination, and the closeness in equality of the matched variables.

TABLE XIV

RESULTS OF PAIRING 106 PAIRS OF CHILDREN TO DETERMINE EFFECT OF AUDITORY DISCRIMINATION ON READING ACHIEVEMENT

Variable	Mean of High Group	Mean of Low Group	Difference Between Means	S.E.D	C.R.
Aud. Disc.	34.31	23.55	10.76	.69	15.58
Mental Age	93.32	93.10	.22	1.06	.207
Vis. Disc.	20.14	20.34	.20	.86	.23
Phonetics	34.09	32.81	1.28	1.98	.64

The group ranking high in auditory discrimination has a mean score of 34.31; while that scoring low has a mean score of 23.55. The differences in mean scores is 10.76; and the critical ratio, 15.58. The critical ratio indicates that there

is a real difference in the auditory discrimination of the two groups. In the matched scores of the variables held constant--mental age, visual discrimination, and phonetic ability, the equality is very close. The group, high in auditory discrimination, has a mean mental age of 93.32; while the one, low in auditory discrimination, has a mean mental age of 93.10. The difference between the mental ages of the two groups is .22. The critical ratio is .207, which is not significant. Therefore, in mental age the two groups are very equally matched. In the other two variables, visual discrimination and phonetics, those ranking high and low in auditory discrimination are also equally matched. In visual discrimination, the high group has a mean score of 20.14; and the low group, 20.34. The critical ratio is .23, which is not a significant ratio, and indicates that there is no real difference between the two matched groups in visual discrimination. The high group has a mean score of 34.09 in phonetics; while the low group has 32.81, the difference being 1.28. The critical ratio is .64, which indicates that any differences in the two groups could be the result of chance.

In Table XV, below, the statistical results of the comparison of the children in auditory discrimination and reading achievement, may be seen.

TABLE XV

COMPARISON OF AUDITORY DISCRIMINATION WITH
READING ACHIEVEMENT FOR 106 PAIRS OF CHILDRENMental Age, Visual Discrimination, Phonetic Ability
Held Constant

Auditory Disc.	Reading Mean	S.D.	S.E. _M	Diff. of Means	S.E. Diff.	C.R.
High Group	191.85	43.55	4.22	18.10	6.60	2.74
Low Group	173.75	52.45	5.09			

In Table XV, the scores were matched for mental age, visual discrimination, and phonetic ability. The distribution of scores was made on the basis of auditory discrimination. The mean of the high auditory group is 191.85 in reading; the mean score for the low auditory group in reading is 173.75. The standard deviation for the high group is 43.55, which is a large standard deviation, indicating that the group has a high degree of variability. The standard deviation for the low group is larger, 52.45. The difference between the means of the two groups is 18.10. The standard error of the difference is 6.60 and the critical ratio, 2.74. While the critical ratio is not very high, it is significant at the .01 level of confidence. This critical ratio indicates, as far as this study is concerned, that in about 96 cases out of 100 there is a real difference in the reading achievement of children superior in auditory discrimination.

When the scores were distributed on the basis of visual discrimination, and the other three variables, mental age, auditory discrimination, and phonetic ability were matched, the difference between the high and low scorers in visual discrimination was large. In Table XVI may be seen the extent to which the other three variables were held constant. As in the matching for mental age and for auditory discrimination, the scores of the children, being paired in visual discrimination, were held one standard deviation apart, or 4.72; while the same children's scores had to be within a half a standard deviation in the variables held constant.

TABLE XVI

RESULTS OF PAIRING 134 PAIRS OF CHILDREN TO DETERMINE EFFECT OF VISUAL DISCRIMINATION ON READING ACHIEVEMENT

Variable	Mean of High Group	Mean of Low Group	Difference Between Means	S.E. _D	G.R.
Vis. Disc.	24.27	16.84	7.43	.40	18.57
Mental Age	95.46	95.76	.30	1.17	.25
Aud. Disc.	30.96	30.68	.26	.84	.309
Phonetics	33.796	34.449	.653	1.77	.369

In Table XVI, the high group in visual discrimination is shown to have a mean score of 24.27; and the low group, a mean score of 17.84. The difference of the means is 7.43. The critical ratio is highly significant, 18.57. The mean score

in mental age for the high group in visual discrimination is 95.46; and for the low group, 95.76. The difference of the means is .30; and the critical ratio, .25, which is very low. The mean score of the high group in auditory discrimination is 30.96; and for the low group, 30.68. The difference of the means is .26 and the resulting critical ratio, .309. In phonetics, the mean score of the high group is 33.796; and of the low group, 34.449. The difference of the means is .653. The critical ratio is .369. The critical ratios of the three variables, held constant, are all too low to be significant.

In Table XVII, below, may be noted the statistical relationship of visual discrimination to reading achievement when mental age, auditory discrimination, and phonetic ability are held constant.

TABLE XVII

COMPARISON OF VISUAL DISCRIMINATION WITH READING ACHIEVEMENT
FOR 134 PAIRS OF CHILDREN

Mental Age, Auditory Discrimination,
Phonetic Ability Held Constant

Visual Disc.	Reading Mean	S.D.	S.E. M	Diff. of Means	S.E. Diff.	C.R.
High Group	205.6	37.2	3.21	32.1	5.48	5.85
Low Group	173.5	51.7	4.46			

The mean reading score for the children high in visual discrimination is 205.6; for those low in visual discrimination, 173.5. The standard deviation of the low group is greater, 51.7, while that of the high group is 37.2. Both groups show a wide variability. The difference between the means of the two groups is 32.1; and the critical ratio, 5.85. The critical ratio is highly significant. It indicates that, in the light of this study, there is a real difference between the reading achievement of children who have high visual discrimination and those who have low visual discrimination.

When the scores were distributed according to high scores and low scores in phonetic ability for comparison with reading achievement, mental age, auditory discrimination, and visual discrimination scores were held constant. That is, the scores of the children paired in phonetic ability had to be at least one standard deviation or 15 points apart, while the scores of the same children, on the variables held constant, could not be more than a half a standard deviation apart. Table XVIII shows the contrast between the two groups in phonetic ability and their equality in the other variables.

TABLE XVIII

RESULTS OF PAIRING 79 PAIRS OF CHILDREN TO DETERMINE
EFFECT OF PHONETIC ABILITY ON READING ACHIEVEMENT

Variable	Mean of High Group	Mean of Low Group	Difference Between Means	S.E. _D	C.R.
Phonics	38.24	10.88	27.36	1.54	17.76
Mental Age	94.11	94.36	.25	1.22	.20
Aud. Dis.	27.9	27.46	.56	1.10	.50
Vis. Dis.	18.67	18.6	.07	.67	.10

In Table XVIII, the group high in phonetic ability has a mean score of 38.24, while the low group has a mean score of 10.88. The difference of the means is 27.36, and the critical ratio is 17.76. This critical ratio is extremely high, indicating that there is a real difference between the two groups in phonetic ability. In mental age the mean score of the high group is 94.11; and of the low group, 94.36. The difference of the two groups in mental age is .25. The critical ratio is .20. The high group in auditory discrimination is 27.9; and the low group, 27.46. The difference of the means is .56. The critical ratio of the high and low groups in this distribution is .50. The group high in phonetic ability has a mean score in visual discrimination of 18.67; and the group scoring low in phonetics has a mean visual discrimination score of 18.6. The difference between the two groups is .07. The critical ratio is .10. All of the critical ratios

of the variables held constant are too low to be significant.

On the basis of the pairing shown in Table XVIII, above, the children were compared in phonetic ability and reading achievement. Table XIX carries the results of the comparison.

TABLE XIX

COMPARISON OF PHONETIC ABILITY WITH READING ACHIEVEMENT

Mental Age, Auditory Discrimination,
Visual Discrimination Held Constant

Phonetics	Reading Mean	S.D.	S.E.M	Diff. of Means	S.E. Diff.	C.R.
High Group	179.81	49	5.51	32.65	7.87	4.13
Low Group	147.16	50.4	5.63			

In Table XIX, the children were matched for mental age, auditory discrimination, and visual discrimination, while they were differentiated on the basis of ability in phonetics. As shown in Table XIX, the children who scored high in phonetics have a mean reading score of 179.81; those scoring low in phonetics have a mean reading score of 147.16. The standard deviations for both high and low groups are large, being 49 and 50.4 respectively. The difference of the means is 32.65. It is the largest difference shown by the four variables used in the comparisons with reading achievement. The critical ratio is 4.13. This critical ratio is highly significant, and in the light of this study, indicates that

there is a high relationship between knowledge of phonetics and reading achievement.

Summarizing the information contained in the statistics obtained by the pairing technique, it may be noted that between reading achievement and the four variables studied, there is a positive relationship. The relationship between mental age and reading achievement is the lowest, the difference of the means being only 3.5 and the critical ratio .507. This critical ratio is not significant. The relationship between auditory discrimination and reading achievement is significant; the difference of the means is 18.10 and the resulting critical ratio, 2.74. The relationship between visual discrimination and reading achievement is significant; the difference of the means is 32.1, and the critical ratio, 5.85. The relationship between phonetic ability is slightly closer than that between visual discrimination and reading achievement, as shown by the difference of the means of the high and low groups in reading. The difference is 32.65. The critical ratio, 4.13, is lower, however, than the critical ratio for the comparison between visual discrimination and reading achievement.

ANALYSIS OF DATA BY PARTIAL CORRELATION

ANALYSIS OF DATA BASED ON
PARTIAL CORRELATION RESULTS

Since it was desired to reach conclusions through the use of the entire 500 scores in each test, the relation of mental age and of each of the word analysis abilities was sought through the technique of partial correlation. The results of that process bore confirmation of the conclusions derived from the matching or pairing technique. Below in Table XX are recorded the statistics of the partial correlation.

TABLE XX

PARTIAL CORRELATIONS OF EACH VARIABLE WITH READING ACHIEVEMENT
THREE VARIABLES HELD CONSTANT

M. A. vs. Reading (r01.234)--.0000	Vis. vs. Reading (r03.124)--.4509
Aud. vs. Reading (r02.134)--.2575	Phonics vs. Reading (r04.123)--.3215

The coefficient of correlation between mental age and reading achievement, with auditory discrimination, visual discrimination and phonetic ability held constant, is .0000. The coefficient of correlation between auditory discrimination and reading achievement, with mental age, visual discrimination and phonetic ability held constant, is .2575. The coefficient of visual discrimination and reading achievement, with mental age, auditory discrimination and phonetic ability held constant,

is .4509. The coefficient of correlation between phonetic ability and reading achievement, with mental age, auditory discrimination and visual discrimination held constant, is .3215. The order in which the four variables are related to reading achievement is: visual discrimination, phonetic ability, auditory discrimination and mental age. Their beta weights indicate the relative importance of the variables in regard to reading achievement: mental age, -.000022; auditory discrimination, .188429; visual discrimination, .418616; phonetic ability, .281669.

TABLE XXI

INTERCORRELATIONS OF TESTS USED IN ANALYSIS OF DATA

	Aud. Disc.	Vis. Disc.	Phonetics	Reading
M. A.	.307450	.290320	.185015	.231578
Aud. Disc.		.499049	.521055	.544149
Vis. Disc.			.441448	.637031
Phonetics				.564744
Reading				

The correlations among the tests themselves are shown in Table XXI. The correlation between mental age and auditory discrimination is .307450; between mental age and visual discrimination, .290320; between mental age and phonetic ability, .231578. The correlation between auditory discrimination and

visual discrimination, .499049; between auditory discrimination and phonetic ability, .521055; between auditory discrimination and reading, .544149. The correlation between visual discrimination and phonetics is .441448; between visual discrimination and reading, .637031; and the correlation between phonetic ability and reading, .564744.

The multiple correlation of the tests is .6868.

EVIDENCE OF DEVIATIONS FROM MAJOR FINDINGS

SUB-STUDY OF DEVIATES

While the differences in the mean reading achievement of children forming the high and low groups in auditory discrimination, visual discrimination, and phonetic ability, point to a relationship between those word analysis abilities and reading achievement, there are contained in the paired groups some reading scores not consistent with the conclusions suggested by the mean differences and critical ratios listed above.

TABLE XXII

ATYPICAL PUPILS, LOW IN AUDITORY DISCRIMINATION,
HIGH IN READING

High Pupil	Low Pupil	H. L. C.A.	H. L. M.A.	H. L. Vis.Dis.	H. L. Phon.	H. L. Aud.Dis.	H. L. Reading
C 6	F 44	88-90	99-95	21-20	41-41	37-28	144-181
M 44	M 45	96-89	91-92	15-14	3-0	22-14	125-181
B 108	F 2	97-86	98-98	17-16	40-41	34-25	161-208
C 103	M 97	95-87	89-92	19-21	47-47	34-18	175-228
M 79	B 38	111-87	96-95	12-13	0-0	33-17	62-106
A 16	M 73	96-89	104-102	28-28	40-37	39-32	203-240
C 55	B 112	86-92	104-106	19-18	40-43	38-38	175-219
C 111	M 61	92-88	104-102	25-24	43-28	39-32	191-234
M 23	M 64	88-88	96-97	26-26	37-38	37-25	213-233
M 40	M 14	90-96	101-100	26-26	37-39	38-31	193-240

For instance, as indicated in Table XXII, above, in the

comparison between auditory discrimination and reading achievement, there are ten children whose reading scores are the opposite of what one would expect from the findings on the 106 pairs in this comparison. In choosing the cases for illustration, the writer excluded children whose chronological age exceeded their mental age in order that reading scores might not be influenced by extra drill accruing to retardation in the grade. Table XXII shows the extent to which the ten cases differ from the general pattern.

TABLE XXIII
ATYPICAL PUPILS, LOW IN VISUAL DISCRIMINATION,
HIGH IN READING

High Pupil	Low Pupil	H. L. C.A.	H. L. M.A.	H. L. Aud.Dis.	H. L. Phon.	H. L. Vis.Dis.	H. L. Reading
M 77	B 63	93-84	93-94	29-27	0-0	18-10	127-174
A 19	M 10	91-94	108-112	35-35	41-39	25-19	105-218
M 48	C 45	87-88	94-98	33-35	43-48	27-20	175-221
A 41	F 2	84-86	93-98	24-25	41-41	22-16	169-208
B 6	M 30	89-91	101-107	22-16	34-32	22-16	199-214
B 80	B 75	100-87	88-88	37-37	38-38	23-18	159-218

In the matched pairs, used in the comparison of skill in visual discrimination with achievement in reading, the number of atypical cases is smaller. The children whose scores run counter to what would be expected are listed in Table XXIII, above.

TABLE XXIV

ATYPICAL PUPILS, LOW IN PHONETIC ABILITY, HIGH IN READING

High Pupil	Low Pupil	H. L. C.A.	H. L. M.A.	H. L. Aud.Dis.	H. L. Vis.Dis.	H. L. Phon.	H. L. Reading
M 106	A 37	104-83	84-83	26-29	17-17	32-0	178-199
B 58	B 63	84-84	89-94	24-27	11-10	38-0	101-174
M 104	M 19	91-88	94-91	26-29	18-19	30-1	81-115
C 112	M 129	87-95	106-103	35-34	20-20	43-16	183-208
M 120	B 136	101-91	107-103	28-31	16-16	40-21	105-186

Since the total number of children paired for phonetic ability was smaller than the number paired in the other variables, the number of atypical cases, illustrating the ability to read despite phonetic inferiority, is smaller also. Table XXIV shows the extent to which the scores in phonetics fail to be consistent in their relationship to reading achievement as found in the study of the 79 pairs of children.

Summary

The purpose of this study was to discover the relationship between auditory discrimination, visual discrimination, and phonetic ability. In order to ascertain the influence of mental maturity, mental age was added as a fourth variable.

When the tests used in the analysis were analyzed by the pairing technique, the following conclusions were drawn:

1. There is a slight positive relation between mental ability and reading achievement of second grade children.

2. There is a significant positive relation between auditory discrimination and reading achievement of second grade children.

3. There is a highly significant relation between visual discrimination and reading achievement of second grade children.

4. There is a highly significant relation between phonetic ability and reading achievement of second grade children.

However, in the light of the scores of pupils, whose skill in the word analysis abilities is in sharp contrast to their ability in reading, there is reason to think that the conclusions reached in this study are not entirely conclusive. They point to the need of case studies to discover what makes these children good readers despite their inferior skill in the word analysis as tested in this study.

PRELIMINARY STUDY MADE IN PROVIDENCE, RHODE ISLAND

Preliminary Study Made in Providence, Rhode Island

Related to the evidence shown by the sub-study of children whose reading scores do not correspond with the findings of the main study are conclusions drawn from a preliminary study, which the writer made in Providence, Rhode Island, previous to undertaking the main study.

In general outline, the study made in Providence was similar to the larger study. The first purpose was to note the relationship between auditory discrimination, visual discrimination, phonetic ability, and reading achievement of second grade children. A second purpose of the preliminary study was to appraise tests of auditory discrimination,¹ visual discrimination,² and phonetic ability,³ with a view to using those tests in the main study. No test of mental maturity was administered. To test the reading ability of the children, a story whose vocabulary was based on the basal reading text,⁴ was used.

In analyzing the data, the scores of the children in two variables were matched, and the scores of the third variable was compared with their reading scores. The number tested was only 120 second grade children. Therefore, the number of pairs in the table, below, is small.

¹Nason, op. cit.

²Durrell, op. cit.

³Durrell, op. cit.

⁴Easy Growth in Reading. Philadelphia, Pennsylvania: John C. Winston Company, 1949.

TABLE XXV

COMPARISON OF AUDITORY DISCRIMINATION WITH READING ACHIEVEMENT
(Preliminary Study)

Auditory Disc.	No. of Pairs	Reading Mean	S.D.	S.E.M	Diff. of Means	S.E.D	C.R.
High Group	13	113.15	20	5.78	29.98	8.41	3.56
Low Group	13	83.17	21.2	6.12			

As indicated in Table XXV, when the children were matched for visual discrimination and phonetic ability, and their skill in auditory discrimination compared with their reading achievement, there was a large difference between the means of the two groups in reading achievement. The difference is 29.98. That difference yielded a critical ratio, which is 3.56. The critical ratio is significant at the .01 level of confidence.

When auditory discrimination and phonetic ability were held constant and the children's skill in visual discrimination was compared with their reading achievement, the results shown in Table XXVI were obtained.

TABLE XXVI

COMPARISON OF VISUAL DISCRIMINATION WITH READING ACHIEVEMENT
(Preliminary Study)

Visual Disc.	No. of Pairs	Reading Mean	S.D.	S.E. _M	Diff of Means	S.E. _D	C.R.
High Group	21	102.47	27.35	6.34	6.11	7.62	.80
Low Group	21	96.36	22.40	5			

Table XXVI shows the statistical results when the children were matched for auditory discrimination and phonetic ability, and their ability in visual discrimination was compared with their reading achievement. The difference between the means of the high group and the low group is 6.11 and the resulting critical ratio, .80. This critical ratio is not statistically significant.

When the children's scores were compared in phonetic ability and reading achievement, and their scores in auditory discrimination and in visual discrimination were held constant, the computation of statistics showed a low, positive relationship between phonetics and reading achievement. The results of the comparison appear in Table XXVII.

TABLE XXVII
COMPARISON OF PHONETIC ABILITY AND READING ACHIEVEMENT
(Preliminary Study)

Phonetic Ability	No. of Pairs	Reading Mean	S.D.	S.E.M	Diff. of Means	S.E.D	C.R.
High Group	27	88.65	27.50	5.39	1.1	7.85	.14
Low Group	27	89.75	28.85	5.35			

According to Table XXVII, the difference of the means of the reading achievements of the high and low scorers in phonetic ability is 1.1. The critical ratio is .14. This critical ratio is not significant. In the light of the study made in Providence, Rhode Island, there is very little relationship between phonetic ability and reading achievement.

Summary of Preliminary Study

The study done in the second grades of the public schools in Providence, Rhode Island, included 120 children. The tables and their interpretations indicate that, as far as this population is concerned, the writer may draw the following conclusions:

1. There is a statistically significant relationship between auditory discrimination and reading achievement of second grade children.
2. There is no statistically significant relationship between visual discrimination and reading achievement of second grade children.

3. There is no statistically significant relationship between phonetic ability and reading achievement of second grade children.

4. The tests used to measure auditory discrimination, visual discrimination, and phonetic ability are suitable for use in the major study.

The conclusions supported by the findings in this preliminary study are not in harmony with those based on the larger study. In the Providence study, auditory discrimination is first among the word analysis abilities in relation to achievement of second grade children in reading; visual discrimination, second; and phonetic ability, third. In the study of the 500 children in the parochial schools of Boston, visual discrimination ranks first in relation to reading achievement; phonetic ability, second; and auditory discrimination, third.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The writer set out in this study to discover the relationship of certain word analysis abilities to reading achievement of second grade children. Included in the word analysis abilities were auditory discrimination, visual discrimination, and phonetic ability. In order that mental age might be studied as a separate influence, it was added as a fourth variable, to be compared with reading achievement.

The complete testing program of 500 children included one standardized test, the Otis Quick Scoring Mental Ability Test¹ and ten informal tests. The informal tests consisted of group and individual oral tests. To test auditory discrimination, a group test written by Nason² was used; and to test visual discrimination, a group test constructed by Durrell was administered. Four reading tests were built by the writer. Three of the reading tests were measures of the children's ability to read in the vocabulary of their basal text, the Cathedral Readers of Scott, Foresman and Company.³ The three tests consisted of a Group Test of Sight Vocabulary, or a word recognition test, in which the examiner read the words

¹Otis, op. cit.

²Nason, op. cit.

³Cathedral Readers, op. cit. 123

and the children encircled them; a Test of Paragraph Comprehension; and an Individual Oral Reading Test. The fourth measure of reading, a Group Classification Test of Vocabulary, whose words was based on the Dolch list of "First Thousand Words in Children's Reading" was also constructed by the writer. This test was a measure of word meaning because it required classification. To test the phonetic ability, the writer administered an Individual Oral Test of Phonetics, taken from the Durrell Analysis of Reading Difficulty.¹ To the Durrell test were added five items to test the children's ability to recognize the influence of silent "e". Besides this test, a Group Test of Phonetic Elements was given, in which the examiner pronounced the phonetic sound, and the child encircled the letter or combination of letters which stood for the sound. A further check on phonetic skill was given through a list of words, called a Test of Applied Phonetics, in which the children, individually, were asked to read a list of words which presumably were not in their reading instruction. A Group Test of Ability to Identify Letter Names was administered to discover whether the children knew their letters. Copies of all of the tests may be found in the Appendix.

When the tests were studied after scoring had been done, only those having a high reliability and a good range were

¹Durrell, op. cit.

retained for the final analysis of data. Therefore, of the eleven tests administered, only six were employed in the final analysis of the relationship of certain word analysis abilities to the reading achievement of second grade children. Those included in that analysis were: the Test of Auditory Discrimination, the Test of Visual Discrimination, the Individual Oral Test of Phonetic Ability, and the combined reading tests--the Individual Oral Reading Test, and the Group Classification Test of Vocabulary. The other tests were omitted because they proved to be either too easy or too short to be reliable.

Statistics were computed and analyses made of the results of the tests for each school. The schools are listed as School A, School B, School C, School D, and School E in the study.

To answer the questions raised by the purpose of the study:

1. Is mental age related to reading achievement?
2. Is auditory discrimination related to reading achievement?
3. Is visual discrimination related to reading achievement?
4. Is phonetic ability related to reading achievement?

data were analyzed by the following procedures. First, the children were matched by the pairing technique in three of the four variables while their ability in the fourth variable

was being compared with their ability in reading achievement. Second, the scores of all of the 500 children were analyzed, through a partial correlation technique, to determine the influence of each word analysis ability on reading achievement.

In the analysis by pairing, the scores of the variable being compared with reading achievement were held one standard deviation apart, while the scores of the variables held constant were kept within a half a standard deviation of each other. Tables in the chapter on analysis of data reveal the equality with which the children were matched in the variables held constant.

On the basis of the pairing technique, while three variables were held constant and the fourth was compared with reading achievement, the following conclusions were drawn in the analysis of data:

1. There is a slight, positive relationship between mental age and reading achievement. The difference of the mean scores in reading of those making high, and those making low scores on the Otis Test is 3.2. The resulting critical ratio is .507. The possibility, therefore, is little better than chance that there is a real difference in reading achievement of children who have higher mental age.

2. There is a positive relationship between auditory discrimination and reading achievement. The difference between the means of the reading achievement of the high and low scorers in auditory

discrimination is 18.10. The critical ratio is 2.74, which is significant at the .01 level of confidence. The chances are 96 in 100 that there is a real difference in the reading achievement of the children who have higher scores in auditory discrimination.

3. There is a high positive relationship between skill in visual discrimination and reading achievement. The difference between the reading scores of those making high scores in visual discrimination and those making low scores is 32.1; and the critical ratio is 5.85. This critical ratio is significant at the .01 level of confidence. The chances are, as far as this study discloses, that in 99 cases out of 100 there is a real difference between the reading achievements of children who possess a high degree of visual discrimination and those who do not possess it.

4. There is a high positive relationship between knowledge of phonetics and reading achievement. The difference between the mean scores of those making high scores in phonetics and those making low scores, is 32.65. The critical ratio is 4.13. This critical ratio is statistically significant at the .01 level of confidence. Therefore, as far as this study indicates, the chances are 99 out of 100

that there is a significant difference in the reading achievement of children who have a knowledge of phonics, when compared with those who do not have the knowledge.

5. A partial correlation analysis of the data from the entire population confirmed the foregoing findings. The relationships with each factor with reading (holding other factors constant) are as follows: mental age versus reading achievement, .000; auditory discrimination versus reading achievement, .257; phonics versus reading achievement, .322; visual discrimination versus reading achievement, .451.

6. That there are factors relating to reading achievement other than those studied is evident from the number of children whose scores deviated markedly from the general findings.

SUGGESTIONS FOR FURTHER RESEARCH

1. That a similar study be made on four higher levels of instruction: the intermediate grades, the junior high school level, the senior high school level, and the college level.

2. That studies be made in all the five levels comparing and contrasting the reading achievement of schools, using intensive training in the three word analysis abilities-- auditory discrimination, visual discrimination, and phonetic ability--with schools providing no training in these variables.

3. That studies be made on the five levels comparing and contrasting the outcomes of teaching reading with intensive training in the three variables, the outcomes of teaching reading with no formal training in these abilities, and the outcomes of teaching reading with just informal training in the three abilities.

4. That studies be done using tests that measure comprehension and recall, to discover the influence or lack of influence of these three abilities on comprehension and recall of reading matter on the five levels.

5. That studies be made to determine the influence of auditory discrimination, visual discrimination, and phonetic ability in unlocking words, when the power of context clues has been removed.

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APPENDIX A
TESTS AND DIRECTIONS FOR ADMINISTERING TESTS

DIRECTIONS FOR TEST OF AUDITORY DISCRIMINATION

Today we are going to play a game with some brand new words. We are going to see how well each of you can hear sounds and then find the letters that make the sounds.

(Write padlock vegetable barberry on the blackboard.)

Look at the words on the blackboard. Which one has the same sound at the beginning as ball?

Put a circle around the word that begins like ball.

(Have one child go to the board and draw a circle around the correct word.)

Now look at Row 1 on your paper. Draw a circle around the word in row 1 that begins with the same sound as fall.

(Check the papers to see that all have understood the directions.)

In row 2 put a circle around the word that begins like summer.

Row 3 Mark the word that begins like gate.

Row 4 Mark the word that begins like ladder.

Row 5 Mark the word that begins like today.

Row 6 Mark the word that begins like yellow.

Row 7 Mark the word that begins like kite.

Row 8 Mark the word that begins like visit.

Row 9 Mark the word that begins like plant.

Row 10 Mark the word that begins like dress.

Row 11 Mark the word that begins like third.

Row 12 Mark the word that begins like black.

Row 13 Mark the word that begins like chair.

Row 14 Mark the word that begins like quick.

Row 15 Mark the word that begins like white.

(Write these words on the blackboard: harmonica muskrat bent)

Now listen to the sound you hear at the end of hat. Look at the words on the blackboard. Which word rhymes with hat? Draw a circle around the word that rhymes with hat.

(Have one child mark the word that rhymes with hat.)

Look at the words in row 16. Find and mark the word that rhymes with sing.

Row 17 Mark the word that rhymes with sent.

Row 18 Mark the word that rhymes with ran.

Row 19 Mark the word that rhymes with bus.

Row 20 Mark the word that rhymes with rock.

This time listen to the sound at the very end of cried. Then find on the blackboard (forehead crimson different) the word that has the same ending sound as cried.

(Have one child go to the blackboard and mark the word that has the same final consonant as cried.)

Row 21 Draw a circle around the word that ends like crab.

Row 22 Draw a circle around the word that ends like flag.

Row 23 Draw a circle around the word that ends like bus.

Row 24 Draw a circle around the word that ends like half.

Row 25 Draw a circle around the word that ends like picnic.

For the rest of the game you will have to listen and look carefully.

You are to find the word that begins and ends like the word you hear. Which word on the blackboard (figure fault helmet) begins and ends like feet?

(One child marks the correct word.)

Look at Row 26 and mark the word that begins and ends like park.

(Check the individual responses before continuing.)

Row 27 Mark the word that begins and ends like watch.

Row 28 Mark the word that begins and ends like frighten.

- Row 29 Mark the word that begins and ends like dirt.
- Row 30 Mark the word that begins and ends like rock.
- Row 31 Mark the word that begins and ends like glad.
- Row 32 Mark the word that begins and ends like bell.
- Row 33 Mark the word that begins and ends like candy.
- Row 34 Mark the word that begins and ends like ham.
- Row 35 Mark the word that begins and ends like rush.
- Row 36 Mark the word that begins and ends like marbles.
- Row 37 Mark the word that begins and ends like tried.
- Row 38 Mark the word that begins and ends like stop.
- Row 39 Mark the word that begins and ends like jig.
- Row 40 Mark the word that begins and ends like not.

TEST OF AUDITORY DISCRIMINATION

Name _____ School _____

- | | |
|----------------------------------|-----------------------------------|
| 1. tranquil familiar vagabond | 21. crowd grasp job |
| 2. matter rapidity separated | 22. flutter blood tug |
| 3. geyser capitulate petal | 23. loss bantam lynx |
| 4. luck differ wanderer | 24. locust hearty grief |
| 5. deck temperature highway | 25. piccolo fantastic benefit |
| 6. wisdom yacht volcano | 26. peacock derrick pardon |
| 7. gasoline kaolin lariat | 27. water workbench lurch |
| 8. fault vein weight | 28. frontier frozen tradition |
| 9. document blossom plentiful | 29. davenport disease protect |
| 10. jonquils drouth bronco | 30. rotation remark needlework |
| 11. thorough favor tattered | 31. claimed glistened glee |
| 12. broadcast blizzard domestic | 32. bullet farewell bushel |
| 13. choice confer classic | 33. candidate generally cordially |
| 14. guard creak quotation | 34. helium happiness loom |
| 15. thistles whirled hatchet | 35. rusty radish foolish |
| 16. silky remembering napkin | 36. needles margin measles |
| 17. senator department stimulant | 37. dreamed transfer trampled |

18. specimen caravan raffia

38. stirrup stir clamp

19. bungalow radius swish

39. jog jib fig

20. roster struck drydock

40. rot nicest notion

DIRECTIONS FOR VISUAL DISCRIMINATION TEST

(Hold up each flashcard in turn. Expose the first five cards for three seconds each, i.e., count three slowly. Give cards 6 to 10 a four second exposure; cards 11 to 16, a five second exposure; cards 17 to 23, a six seconds exposure; cards 24 to 30, a seven seconds exposure.)

Now we are going to play a game with our eyes. I will hold up a card and you will find the same letters or words on your papers.

Ready - -

(Then hold up the first card. Direct the children to look until you turn the card down.)

TEST OF VISUAL DISCRIMINATION

Name _____ School _____

TEST OF ABILITY TO SEE DIFFERENCES IN PRINTED WORDS

PRESENTED BY FLASH CARDS

- | | |
|----------------------------------|--|
| 1. y b l d g f | 16. clear clean close climb lean |
| 2. m h n r t | 17. pan park trap party quart dark part |
| 3. no on imp in nip | 18. eight sought rough ought taught aught tough |
| 4. goes do go ago dog | 19. quite quick quack point quiet question quit |
| 5. saw war as was waste | 20. state elation tasted station stationed started skating |
| 6. pot tab tap top pat | 21. dinner differ difference different diferent deference deferent |
| 7. girl dog boy dig day | 22. nomination notion mention notion mountain mountains mentioned |
| 8. won no now mow was | 23. quarter portion bracelet particle practice practical poultice |
| 9. and tend on ended end | 24. other the weather wealth whether whither wealthier |
| 10. lack clock black block dark | 25. obscure advice above advise advances dance advance |
| 11. frost first fast firm trust | 26. sure obscure scare secure second server cure |
| 12. same came name some somebody | 27. portable possible probably probable problem practical desirable |
| 13. slat last lost lot blast | 28. contact contain contract convict contracts contacts capital |
| 14. jump just jest jot must | 29. immediate meditates mediate mistake meditate material meditative |

15. drip prep drops rap drop

30. regular regulate regulation
registration negotiation
radiation recognition

Name _____ School _____

INDIVIDUAL ORAL READING TEST

A DAY AT THE CIRCUS

It was Saturday. After breakfast, John and Joe got ready and started out early for the circus. The boys were dressed in their best clean clothes. They had enough money to buy cake, candy, nuts and popcorn.

The circus was not out in the country. It was in a park. The boys had to walk far. On the way to the park they passed the beautiful Blessed Sacrament Church, where they went to pray. Across from the church they saw a large telephone building, and near it a shoe store. In one place they had to wait for a train to go by.

At last they got to the circus grounds. There they watched a wonderful parade of animals. They watched the biggest elephant do some tricks, sniffing the air as he did them.

Many animals that the boys read about in school were not in the circus. There were no little pigs, no calf, no fox, no ground-hog and no bear. John and Joe were having fun, but when they met Bobby and Francis they had more fun.

Guess what the biggest fun for the boys was! A wiggly mouse climbed up Joe's leg when he was watching the elephant's tricks. Joe didn't shout. He caught the mouse. He wanted to carry it home with him. He thought he would hide it in his uncle's bed that night to scare him.

DIRECTIONS FOR GROUP CLASSIFICATION TEST OF VOCABULARY

We want to know how well you can read. (Write the following words on the blackboard: potatoes, dog, rabbit, street, school, kitten).

Who can find the words that are names of pets? (Have a child draw a circle around the words.) Did we draw circles around all of the words? No. Sometimes we may find two. Sometimes we may find five. Be sure to read each word carefully. Listen to my directions and draw circles around just what I tell you to. Ready -

Row 1 Find row 1 on your papers. Put your marker under the line. Draw a circle around the words that are the names of things that children like for pets.

Row 2 Draw circles around the names of things that fly.

Row 3 Draw circles around the names of things that people eat.

Row 4 Draw circles around the things you would see at a circus.

Row 5 Draw circles around the names of things you drink.

Row 6 Draw circles around the names of things that come out in the spring.

Row 7 Draw circles around the names of things we wear.

Row 8 Draw circles around the names of toys.

Row 9 Draw circles around the names of things that have feathers.

Row 10 Draw circles around the names of things that eat grass.

Row 11 Draw circles around the words that tell about a ball game.

Row 12 Draw circles around the names of pieces of money.

Row 13 Draw circles around the names of furniture.

Row 14 Draw circles around the names of vegetables.

Row 15 Draw circles around the names of things that help people to see.

Row 16 Draw circles around the words that tell things Mother does at home.

- Row 17 Draw circles around the names of members of a family.
- Row 18 Draw circles around the names of places where children may play.
- Row 19 Draw circles around the names of things children use to play with.
- Row 20 Draw circles around the names of things that tell about birds.
- Row 21 Draw circles around the names of things that tell about soldiers.
- Row 22 Draw circles around the names of things we have at school.
- Row 23 Draw circles around the names of words that tell about Christmas.
- Row 24 Draw circles around the words that tell about a garden.
- Row 25 Draw circles around the names of things people ride in.
- Row 26 Draw circles around the words that tell about time.

GROUP CLASSIFICATION TEST OF VOCABULARY

Name _____ School _____

1 potatoes dog rabbit street school kitten

2 turtle crow airplane box bird robin

3 bread meat chocolate sky apples cake

4 tricks tents hill clown river elephants

5 dress water cocoa money bricks milk

6 grass buildings leaves street buds flowers

7 overalls coats stockings books shoes sweaters

8 doll garden ball puzzle scooter balloons

9 frog calf chicken goose pig rooster

10 cow fence horse pony goat people

11 play catch heard win door throw

12 penny dime dollar garden nickel quarter

13 mirror stove chimney kitchen table garage

14 potatoes breakfast tomatoes hungry lettuce peas

15 telephone eyes light nose glasses chair

16 cleans washes irons bakes cooks works

17 uncle sister neighbor brother baby father

18 yard house garden lot street park

19 ball bake marbles going round rope

20 egg nest because worms feathers

21 soldier guess war march will brave

22 teacher desk away scissors pencil paper

23 toys Santa trees does loud star

24 plant dig fish how weed rake

25 train wagon automobile ship car boat

26 early tomorrow always evening queen

DIRECTIONS FOR GROUP TEST OF SIGHT READING

We are going to play a game with words. I am going to say some words and I want you to find them on your papers.

We will do one together. (Examiner, write: fox, wolf, pig, dog on the blackboard.)

These words are in the first row on your papers. Listen carefully to the words I say -- wolf, dog. Find them on the blackboard. (Examiner, have someone encircle the words.)

Everybody, draw a circle around wolf and dog on your paper.

Listen carefully to each word I say:

Row 2	knew	full	Row 18	line	near
Row 3	climb	front	Row 19	fence	hair
Row 4	pleasant	place	Row 20	catch	won't
Row 5	gone	game	Row 21	across	tried
Row 6	early	own	Row 22	people	brought
Row 7	around	money	Row 23	better	field
Row 8	high	city	Row 24	wait	their
Row 9	ever	minute	Row 25	outdoors	found
Row 10	deep	light	Row 26	own	eyes
Row 11	more	afraid	Row 27	through	each
Row 12	shout	second	Row 28	asked	ready
Row 13	those	earth	Row 29	floor	large
Row 14	park	use	Row 30	hole	call
Row 15	high	visit	Row 31	went	school
Row 16	quick	would	Row 32	what	house
Row 17	because	both	Row 33	wanted	wish

Row 34	come	that		Row 47	quick	know	his
Row 35	every	some		Row 48	barn	again	worked
Row 36	basket	lives		Row 49	began	store	pocket
Row 37	other	that		Row 50	door	round	dark
Row 38	any	could		Row 51	wind	gray	asked
Row 39	busy	when		Row 52	hurry	which	them
Row 40	paint	has		Row 53	fast	slow	how
Row 41	always	first		Row 54	buy	way	her
Row 42	out	again		Row 55	help	hold	write
Row 43	which	must		Row 56	start	done	open
Row 44	together	yard		Row 57	right	round	new
Row 45	say	five	going	Row 58	enough	letter	heard
Row 46	angels	think	were	Row 59	start	corn	straw
				Row 60	everywhere		next
						galloping	

GROUP TEST OF SIGHT READING

Name _____ School _____

- | | | | | | | | | | |
|----|--------|----------|--------|---------|----|---------|---------|----------|--------|
| 1 | fox | wolf | pig | dog | 16 | quick | about | would | pick |
| 2 | grows | knew | full | late | 17 | front | strings | because | both |
| 3 | climb | large | parade | front | 18 | letter | line | bell | near |
| 4 | even | pleasant | please | place | 19 | tricks | stay | fence | hair |
| 5 | house | gone | gave | game | 20 | roll | catch | won't | mouse |
| 6 | early | tricks | show | own | 21 | across | fool | tried | seeds |
| 7 | forget | couldn't | around | money | 22 | people | told | brought | scare |
| 8 | high | line | city | sign | 23 | better | grows | garden | field |
| 9 | ever | large | window | minute | 24 | wait | honey | their | behind |
| 10 | deep | light | move | push | 25 | today | heard | outdoors | found |
| 11 | people | more | hair | afraid | 26 | always | stand | own | eyes |
| 12 | heard | candy | shout | second | 27 | through | seen | each | right |
| 13 | those | earth | things | blow | 28 | asked | roll | ready | never |
| 14 | got | push | park | use | 29 | floor | read | ever | large |
| 15 | high | visit | stay | nothing | 30 | hold | side | long | call |

31	went	farm	school	say	46	angels	much	think	were
----	------	------	--------	-----	----	--------	------	-------	------

32	guess	what	horse	house	47	quick	quite	know	his
----	-------	------	-------	-------	----	-------	-------	------	-----

33	wanted	would	wish	made	48	barn	again	snow	worked
----	--------	-------	------	------	----	------	-------	------	--------

34	came	come	that	those	49	began	store	book	pocket
----	------	------	------	-------	----	-------	-------	------	--------

35	ever	take	every	some	50	door	other	round	dark
----	------	------	-------	------	----	------	-------	-------	------

36	basket	lives	another	last	51	wind	gray	party	asked
----	--------	-------	---------	------	----	------	------	-------	-------

37	corn	other	house	that	52	hurry	once	which	them
----	------	-------	-------	------	----	-------	------	-------	------

38	any	wind	food	could	53	fast	slow	how	good
----	-----	------	------	-------	----	------	------	-----	------

39	old	busy	time	when	54	buy	away	nest	her
----	-----	------	------	------	----	-----	------	------	-----

40	paint	push	color	has	55	help	hold	write	think
----	-------	------	-------	-----	----	------	------	-------	-------

41	for	always	first	off	56	start	done	together	open
----	-----	--------	-------	-----	----	-------	------	----------	------

42	now	only	out	again	57	thank	right	round	new
----	-----	------	-----	-------	----	-------	-------	-------	-----

43	which	these	soon	must	58	enough	sleepy	letter	heard
----	-------	-------	------	------	----	--------	--------	--------	-------

44	cried	afraid	together	yard	59	start	corn	straw	along
----	-------	--------	----------	------	----	-------	------	-------	-------

45	bless	say	five	going	60	quick	everywhere	galloping	next
----	-------	-----	------	-------	----	-------	------------	-----------	------

DIRECTIONS FOR GROUP TEST OF PARAGRAPH COMPREHENSION

We are going to read some stories. We will finish some sentences that tell about the story. We will do one together. (Have one child read the story orally. Then have children volunteer to finish the sentences under the first story.)

Read the rest of the stories and finish the sentences.

Once there were two little boys. They went fishing with their father. He took them away up the river. There they fished all day. When it was time to go home the boys and their father counted the fish. John had caught one middle size fish. Bobby had caught a small fish and Father had caught a big fish.

1. The fish that Father caught was
big yellow little brown small
2. The boys went fishing with their father in a
pond brook river stream

GROUP TEST OF PARAGRAPH COMPREHENSION

Name _____ School _____

Once there were two little boys. They went fishing with their father. He took them away up the river. There they fished all day. When it was time to go home the boys and their father counted the fish. John had caught one middle size fish. Bobby had caught a small fish and the father had caught a big fish.

1. The fish that the father caught was
big yellow little brown small
 2. The boys went fishing with their father in a
pond brook river stream
-

Ann liked to tell stories to her little sister. She told stories at night. She liked to tell them at bed time. Sometimes the story was one she had read at school. Sometimes it was a story she had made up.

1. The stories were told by
the mother the father Ann the little sister
 2. The stories were told
in the morning at night after school after lunch
-

Ann told a story about a boy. His name was Bobby. Bobby planted a garden. He dug the hard, cold ground. He used a shovel to turn over the soil. He put seeds in little rows and watered them. Then he waited for the garden to grow. And what do you think? The garden did not have potatoes in it. Bobby wanted potatoes, but he had planted cabbage seeds.

1. The ground was
soft dry hard warm
 2. In little rows he put
sticks leaves rocks seeds
 3. He was trying to grow
corn leaves potatoes grass cabbage
-

One day Uncle John said he would take Francis and Joseph for a ride on the train. The day was Saturday. Many neighbors were not awake when Uncle John, Joseph, and Francis started for the train. As the train began to move, the bell went ting-a-ling. The boys saw buildings and telephone poles fly past as the train sped on. The train stopped at a park. The zoo at the park made the boys think of the circus. At the zoo they saw a lion, an elephant and a monkey. A bear climbed up on the bars of the cage to get some honey.

1. When the boys left for the train it was
dark late early warm cold
2. There was no one around to see the boys go because the neighbors were
asleep alone angry away eating
3. At the park the boys saw
chickens animals ariplanes grandfather
4. The bear was hungry for something
sweet cold dry warm salty

DIRECTIONS FOR GROUP TEST OF ABILITY TO NAME LETTERS

We are going to play a game with the names of letters. (Write the following letters on the blackboard: l, o, t, k, g). Who can find g and put a ring around it? (Have a child go to the blackboard and encircle the letter, g.) I am going to name a letter in each row. As I name it, put a ring around it. Ready --

- | | |
|-------|-------|
| 1. g | 14. o |
| 2. r | 15. n |
| 3. c | 16. v |
| 4. o | 17. s |
| 5. m | 18. x |
| 6. t | 19. y |
| 7. f | 20. p |
| 8. j | 21. k |
| 9. z | 22. h |
| 10. i | 23. d |
| 11. l | 24. q |
| 12. a | 25. w |
| 13. b | 26. u |

Name _____ School _____

GROUP TEST OF ABILITY TO IDENTIFY LETTERS

- | | |
|---------------|---------------|
| 1. s m r f g | 14. w o n f e |
| 2. a h r g l | 15. l g z i n |
| 3. m c d f e | 16. d m v j o |
| 4. a z p i o | 17. z n u f s |
| 5. m n e o s | 18. x o m h r |
| 6. d i g m t | 19. y a r l o |
| 7. h r f s n | 20. r t u p i |
| 8. t m o r j | 21. m k s r v |
| 9. o i z l m | 22. g j b d g |
| 10. i z r m t | 23. i h p b v |
| 11. a l t z m | 24. p m t q z |
| 12. r u a i c | 25. t q w f u |
| 13. f e g o b | 26. w v t x u |

DIRECTIONS FOR TEST OF ABILITY TO IDENTIFY SOUNDS OF LETTERS AND BLENDS

(Write the following letters on the blackboard - a, m, r, l.) Say "We are going to play a game using our ears and our eyes. Look at these letters on the board and listen while I say a sound - r. Can you find the letter on the board that says r?" (Have a child circle the letter on the board.) "Now look at your papers. I am going to make a sound for one letter or group of letters in each box. Listen and look carefully. You will mark only one in each group. Be careful. Ready - r."

Row 1	r	Row 16	h	Row 31	wh
Row 2	z	Row 17	v	Row 32	sk
Row 3	m	Row 18	w	Row 33	tw
Row 4	c	Row 19	a	Row 34	st
Row 5	g	Row 20	i	Row 35	gr
Row 6	t	Row 21	o	Row 36	dr
Row 7	n	Row 22	u	Row 37	br
Row 8	s	Row 23	e	Row 38	sw
Row 9	p	Row 24	y	Row 39	fr
Row 10	l	Row 25	sh	Row 40	ee
Row 11	k	Row 26	th	Row 41	oo
Row 12	d	Row 27	cl	Row 42	au
Row 13	f	Row 28	ch	Row 43	oi
Row 14	j	Row 29	sm	Row 44	ow
Row 15	b	Row 30	pl	Row 45	ph

Name _____ School _____

TO TEST ABILITY TO IDENTIFY SOUNDS OF LETTERS AND BLENDS

1. a l o r	16. y h o t	31. sw st wh gr
2. z i p t	17. g h o v	32. sk tw fr sh
3. u b o m	18. t w l d	33. tw br ch sm
4. i w z c	19. v d a l	34. ch th st br
5. k g u l	20. y st z i	35. sw gr dr th
6. r t a f	21. m o tr g	36. wh th dr sw
7. n f sh u	22. w u c l	37. cl sh ing br
8. m s j i	23. y v g e	38. br ch sw wh
9. h n p t	24. b f h y	39. tw ch fr sk
10. c b l t	25. th sh ing tion	40. ee oe ae oi
11. x y r k	26. st gr sw th	41. ae oo ea aw
12. d c o z	27. cl fr tw ch	42. ou ee ae au
13. m l n f	28. tr ch sm pl	43. ie ow aw oi
14. j o r n	29. st wh gr sm	44. oo ow oa ay
15. d e r b	30. pl br wh st	45. ue ou ph ie

INDIVIDUAL ORAL TEST OF APPLIED PHONETICS

Name _____ School _____

sob	tube	chat	grand	Flathead
fig	lope	drag	plan	grandstand
tan	vine	truck	smother	quest
Ned	cane	clam	twist	attachment
rut	Pete	frock	flash	thermometer
			skim	championship

INDIVIDUAL TEST OF APPLIED PHONETIC ELEMENTS

c l a s i b r t j u m h p
e f o g x n v q d w u k z

th st wh sh br ch dr tr cl fr gr pl sm fl sk sw
ini ote ume ase eme

APPENDIX B

TEST SCORES FOR SCHOOLS A, B, C, D, AND E

KEY TO ABBREVIATIONS OF TEST TITLES
USED IN TABLES OF SCORES

<u>Abbreviation</u>	<u>Name of Test</u>
M. A.	Otis Quick Scoring Mental Ability Test Alpha, Form A.
A. D. or Aud. Disc.	Group Test of Auditory Discrimination.
G. P.	Group Test of Phonetics (Identification of Letters and Blends).
V. D. or Vis. Disc.	Group Test of Visual Discrimination.
L. N.	Group Test of Letter Names.
S. V.	Group Test of Sight Vocabulary.
C. V.	Group Classification Test of Vocabulary.
C.	Group Test of Paragraph Comprehension.
I. P.	Individual Test of Phonetics.
I. R.	Individual Oral Reading Test.
A. P.	Applied Phonetics.
C. S. R.	Combined Scores of Individual Oral Reading Test and Group Classification Test of Vocabulary.

TABLE XXXII

SCORES ON TESTS GIVEN TO THE SECOND GRADE OF SCHOOL A

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	C.V.	C.	I.P.	I.R.	A.P.	C.R.S.
501	8-5	7-9	30	39	18	24	132	52	1	43	104	17	156
502	7-10	7-0	27	43	17	26	135	78	2	43	129	21	207
503	6-6	7-8	36	36	19	26	132	61	1	39	129	2	190
504	6-2	7-8	23	35	12	23	128	50	1	36	90	0	140
505	8-2	8-5	28	41	18	26	133	79	8	43	131	12	210
506	8-5	7-5	30	39	22	26	134	70	4	34	129	0	199
507	7-11	6-11	25	31	12	22	94	57	6	30	12	0	69
508	8-4	6-10	31	43	16	25	130	59	4	20	93	0	152
509	7-11	7-9	37	44	22	25	136	97	9	45	136	27	233
510	7-0	8-5	31	38	15	26	129	69	2	28	111	0	180
511	7-3	7-7	24	42	16	26	129	49	4	35	79	0	128
512	7-4	7-8	26	38	15	24	95	56	3	21	50	0	106
513	7-6	7-4	18	42	14	26	133	83	3	36	101	0	184
514	7-10	7-6	38	44	20	26	136	69	5	40	125	14	194
515	10-7	7-2	37	40	22	26	132	68	6	33	102	0	170
516	8-4	7-6	37	42	23	22	136	93	9	41	132	14	225
517	7-4	8-1	24	40	19	24	133	49	3	40	88	0	137
518	7-8	8-4	29	36	15	25	118	50	6	23	73	0	120
519	9-5	7-9	39	44	26	26	135	103	11	48	136	27	239
520	7-8	7-3	23	28	16	26	111	48	4	21	87	0	135
521	8-0	8-0	38	43	21	26	132	49	4	43	89	0	138
522	7-8	7-11	34	38	18	24	133	79	7	21	112	1	191

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	C.V.	C.	I.P.	I.R.	A.P.	C.R.S.
523	7-10	8-4	16	29	20	23	119	79	7	0	71	0	150
524	7-9	8-1	39	42	29	26	130	100	7	148	136	27	2 36
525	7-7	7-1	20	28	9	25	114	49	2	29	41	0	90
526	7-7	7-3	29	40	21	26	128	51	7	21	93	0	144
527	7-5	6-10	28	42	17	26	121	43	3	28	66	1	109
528	7-5	7-7	18	33	13	26	105	44	2	15	66	0	110
529	8-0	7-0	16	28	14	26	86	95	1	0	53	0	148
530	7-6	7-1	20	37	16	26	69	44	7	16	81	0	125
531	8-9	8-10	35	37	16	25	98	70	11	0	20	0	90
532	7-7	7-1	12	27	15	25	94	64	4	0	67	0	131
533	8-7	7-7	36	42	18	26	135	58	2	39	114	22	172
534	7-10	7-0	25	36	20	25	127	79	7	42	115	3	194
535	8-5	7-1	34	39	25	25	135	100	7	43	135	17	235
536	6-9	7-4	33	41	14	26	126	58	3	40	82	0	140
537	7-6	7-3	26	32	19	26	130	57	3	31	69	0	126
538	7-11	7-3	17	27	13	25	46	60	3	0	46	0	106
539	7-11	8-5	20	43	23	26	131	71	7	39	110	0	181
540	8-8	7-6	33	35	17	24	132	66	7	34	97	0	163
541	8-2	8-1	27	37	17	26	129	38	5	18	69	1	107
542	7-6	6-6	24	27	20	26	128	64	6	26	79	0	143
543	6-3	7-5	26	36	17	24	132	73	2	24	113	3	186
544	6-6	7-2	15	38	7	26	120	86	4	0	114	1	200
545	8-5	7-5	28	27	12	25	95	46	3	13	12	0	58
546	8-11	7-3	27	43	27	25	136	103	10	42	136	16	239
547	7-5	6-3	20	41	20	25	133	68	3	43	103	20	171

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	C.	I.P.	I.R.	A.P.C.R.S.	
548	8-6	7-6	38	40	26	25	132	103	6	48	134	27	237
549	8-0	7-0	38	44	26	26	136	95	11	48	136	27	231
550	8-5	7-3	31	40	27	25	136	96	8	43	127	12	223
551	8-3	7-8	40	45	25	26	135	102	11	43	135	21	237
552	6-11	6-3	21	30	17	26	115	67	2	0	69	0	136
553	8-3	7-3	35	43	23	24	134	105	8	48	136	26	241
554	7-2	7-5	35	43	31	25	135	86	6	43	130	9	216
555	7-10	7-0	35	42	23	26	133	88	8	42	114	16	202
556	8-5	8-2	38	45	25	25	133	101	11	42	138	0	237
557	8-7-	8-1	40	44	28	26	134	98	11	48	136	27	234
558	7-5	7-0	24	38	11	25	109	36	0	38	65	0	101
559	8-9	7-6	33	40	19	26	129	83	9	42	117	2	200
560	7-10	7-2	37	44	23	26	132	100	9	47	136	21	236
561	7-10	7-1	35	42	21	26	136	79	3	32	130	13	209
562	6-9	6-10	17	37	17	26	123	62	3	26	72	0	134
563	7-10	7-0	27	33	10	25	116	84	3	0	90	0	174
564	7-10	7-0	32	40	17	25	125	44	8	38	66	0	110
565	8-3	7-1	21	40	15	26	131	57	4	22	98	0	155
566	7-9	7-4	26	39	20	25	126	45	2	41	76	0	121
567	7-5	6-8	23	32	18	24	123	46	4	37	56	0	102
568	7-0	7-5	17	26	15	26	117	50	5	27	81	0	131
569	7-5	7-10	24	31	13	25	104	56	3	21	40	0	96
570	7-5	7-0	28	36	15	26	135	64	6	15	125	0	189
571	7-1	7-8	37	43	27	24	133	88	4	43	124	20	212
572	8-0	7-7	22	33	14	26	126	72	5	0	69	0	141
573	8-2	6-7	32	40	24	26	136	100	9	35	136	20	236

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	C.	I.P.	I.R.	A.P.	C.R.S.
574	7-10	7-1	27	36	11	25	105	47	3	9	40	0	87
575	7-4	7-3	37	38	18	26	136	86	8	38	132	7	218
576	8-6	7-6	38	42	24	25	133	98	10	38	136	22	234
577	8-5	6-3	37	42	24	24	135	101	10	38	136	14	237
578	6-8	7-0	20	42	20	26	135	100	5	39	135	14	235
579	7-6	5-10	19	27	18	23	110	59	2	0	22	0	81
580	7-4	8-4	37	33	23	24	123	80	5	38	79	9	159
581	8-9	7-8	38	42	28	26	134	93	11	48	136	27	229
582	8-2	7-1	22	37	13	26	116	77	0	12	83	0	160
583	9-0	7-5	39	42	26	26	135	84	7	39	134	2	218
584	8-3	7-3	28	38	14	26	130	51	2	35	74	1	125
585	5-6	6-3	14	30	16	24	118	66	7	0	66	0	132
586	8-0	8-3	20	32	17	25	108	74	3	17	24	0	98
587	8-5	7-4	32	43	22	26	135	92	9	43	135	21	227
588	8-5	7-0	29	30	17	25	132	57	6	19	102	0	159
589	8-2	7-8	39	44	23	26	135	86	5	36	123	4	209
590	6-8	7-10	15	36	19	25	112	49	4	0	133	0	182
591	6-2	6-11	25	35	16	25	121	52	5	0	72	0	124
592	7-10	8-2	36	41	19	26	129	94	7	38	134	14	228
593	7-8	7-4	36	45	21	25	134	93	6	47	130	22	223
594	8-6	7-3	36	40	19	25	131	77	5	41	118	1	195
595	8-2	7-4	33	43	16	26	135	67	9	43	126	10	193
596	7-5	7-4	32	40	21	26	132	69	7	42	112	5	181
597	7-3	7-5	31	36	17	26	121	81	3	34	80	0	161
598	7-3	7-6	33	36	14	26	108	52	5	0	72	0	124
599	7-5	7-9	25	38	18	24	123	68	2	38	47	0	115

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	C.V.	C.	I.P.	I.R.	A.P.	C.R.S.
600	7-3	7-7	23	43	10	25	114	56	4	38	73	0	129
601	8-2	6-6	33	42	21	25	136	92	8	42	136	16	228
602	7-7	7-9	21	37	21	25	115	47	4	16	76	0	123
603	7-10	6-5	19	36	15	26	118	47	3	0	72	0	119
604	7-3	7-1	21	34	20	26	129	72	4	36	117	1	189
605	6-6	7-5	21	40	20	26	131	83	2	43	127	15	210
606	7-8	7-7	38	44	24	25	134	84	11	41	135	18	219
607	8-5	8-0	26	37	7	25	134	61	6	35	133	0	194
608	8-2	8-1	34	43	17	26	125	66	5	40	95	12	161
609	7-1	6-4	23	32	15	26	99	61	4	19	47	0	108
610	8-3	7-6	16	34	15	26	114	65	2	24	112	4	177
611	7-3	7-1	21	38	23	26	130	82	5	45	100	16	182
612-	8-10	7-8	28	39	18	26	132	84	7	43	135	0	219
613	9-2	6-9	28	40	23	26	118	56	6	39	107	3	163
614	8-0	7-0	37	45	23	26	135	93	8	44	136	24	229
615	8-3	6-6	27	41	22	26	135	76	8	46	134	20	210
616	8-2	6-6	20	28	21	25	135	83	5	41	119	8	202
617	9-6	7-3	40	42	19	26	136	92	11	48	134	27	226
618	5-11	7-2	25	36	11	25	110	60	3	19	49	0	109
619	8-0	7-6	35	42	18	25	126	45	4	36	76	0	121
620	7-0	7-7	38	42	18	25	124	61	3	13	90	7	151
621	7-10	7-4	37	38	14	25	133	76	6	36	85	0	161
622	8-4	8-5	20	33	21	25	124	77	8	0	78	0	155
623	8-5	7-9	32	29	18	26	132	63	8	30	94	0	157
624	6-3	7-9	38	44	21	25	134	70	8	45	105	16	175

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	C.V.	G.	I.P.	I.R.	A.P.	C.R.S
625	7-5	7-2	18	35	21	26	127	56	5	16	98	0	154
626	7-2	7-8	30	33	22	26	134	93	7	47	35	27	228
627	6-11	6-9	21	36	22	26	114	80	3	0	77	0	157
628	8-2	7-2	29	37	19	26	122	51	4	30	92	0	143
629	7-10	6-11	32	39	20	25	134	93	7	45	131	14	224
630	8-8	7-8	38	43	20	26	135	99	10	47	135	27	285
631	7-3	7-8	33	48	20	26	123	68	4	43	111	10	179
632	7-10	6-9	26	39	18	26	119	63	2	13	65	0	128
633	6-5	7-11	20	32	14	26	98	29	1	0	50	0	79
634	6-10	8-8	35	42	20	25	132	46	3	48	110	8	156
635	8-0	7-5	26	32	20	26	122	51	3	32	76	0	127
636	8-7	7-7	31	33	16	25	133	72	5	21	114	0	186
637	8-0	8-1	17	20	13	23	69	41	9	0	0	0	41
638	7-0	7-4	11	23	17	26	34	30	5	0	38	0	68
639	7-9	7-11	20	41	17	26	136	90	0	19	98	0	188

TABLE XXXIII

SCORES ON READING TESTS GIVEN TO THE SECOND GRADES OF SCHOOL B

Pupil	M.A.	G.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	C.	I.P.	I.R.	A.P.	G.S.R.
701	7-6	7-4	38	44	21	26	136	95	10	46	136	27	231
702	7-10	8-1	25	39	18	25	130	80	6	18	115	0	195
703	8-5	7-4	37	43	20	26	130	91	7	43	133	17	224
704	6-11	7-6	17	24	10	25	102	59	0	13	84	0	143
705	7-8	7-0	36	36	17	25	134	69	6	34	124	0	193
706	7-4	7-3	19	32	14	24	97	60	6	21	7	0	67
707	7-9	8-1	36	43	25	26	135	99	11	35	136	21	235
708	8-7	8-4	40	43	25	26	136	101	10	0	136	26	237
709	7-7	8-2	35	36	21	23	134	84	9	0	117	0	201
710	9-4	7-10	35	43	19	25	135	87	8	39	131	6	218
711	7-10	7-9	19	36	20	24	121	63	4	36	94	16	157
712	7-7	7-3	27	43	22	25	136	93	11	40	136	21	229
713	7-7	7-3	32	41	17	25	136	91	6	24	132	24	223
714	8-4	8-0	31	43	27	26	134	104	9	39	136	20	240
715	8-2	8-4	31	39	25	24	136	92	9	1	118	1	210
716	9-4	8-0	38	41	23	26	135	103	10	42	135	18	238
717	8-10	7-6	36	37	20	24	132	91	10	42	125	17	216
718	7-9	7-6	32	35	13	24	128	56	5	17	75	0	131
719	7-7	7-4	29	37	19	26	121	67	1	1	48	14	115
720	7-8	7-8	37	42	23	25	135	100	11	37	131	7	231
721	6-5	7-3	16	28	16	26	48	30	3	1	57	0	87
722	7-11	9-4	27	40	21	26	135	63	9	37	118	6	181
723	7-12	7-4	37	44	26	25	135	83	8	37	130	15	213

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	C.	I.P.	I.R.	A.P.	C.S.R.
724	8-0	7-5	21	28	19	26	120	55	4	0	82	0	137
725	8-3	7-10	36	43	25	25	133	94	11	39	134	9	228
726	7-9	7-11	38	41	25	26	136	94	10	44	136	21	230
727	7-7	7-2	26	37	26	25	134	85	10	22	112	4	197
728	7-11	7-11	20	26	16	26	83	39	4	5	3	0	42
729	7-10	8-5	32	41	22	26	131	94	5	37	130	5	220
730	8-11	7-7	32	41	16	26	136	86	7	32	128	17	214
731	6-10	7-1	23	32	18	25	112	53	4	39	66	0	119
732	7-10	8-3	22	42	22	26	130	68	8	43	123	6	191
733	7-3	7-4	22	40	18	25	134	85	10	5	126	2	211
734	7-2	7-4	28	42	17	23	94	47	4	12	27	0	74
735	12-10	9-5	35	43	26	26	134	95	11	38	130	10	225
736	7-10	8-0	25	35	25	25	134	83	10	0	125	6	208
737	8-5	7-5	29	42	17	26	128	63	4	32	115	0	170
738	7-4	6-11	39	38	25	26	133	95	11	26	134	21	229
739	8-3	7-6	33	41	20	26	129	91	9	38	122	2	213
740	8-5	7-6	38	42	26	26	133	73	9	37	120	14	193
741	7-7	7-7	37	37	27	26	136	96	10	38	134	18	230
742	9-4	8-3	23	27	13	25	81	58	3	1	19	0	77
743	8-5	7-4	23	40	20	26	131	57	7	35	118	18	175
744	7-7	8-0	22	36	15	25	124	50	4	3	75	0	125
745	8-5	7-5	24	37	18	25	132	54	4	43	91	0	145
746	6-11	7-2	22	39	15	26	112	64	2	18	60	0	124
747	7-7	7-3	31	42	24	26	133	104	10	35	136	19	240
748	7-10	7-3	33	39	27	25	134	63	10	43	112	9	175

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	G.	I.P.	I.R.	A.P.	G.S.R.
749	7-3	7-6	32	43	19	25	108	40	4	21	24	0	64
750	8-2	7-5	31	35	18	25	114	73	5	13	43	0	116
751	8-6	8-8	26	39	14	23	133	70	7	27	119	0	189
752	9-1	7-9	27	38	25	26	132	77	11	25	115	1	192
753	8-5	7-9	34	41	23	26	136	93	10	36	134	15	227
754	7-6	7-3	28	38	20	25	122	58	6	0	83	1	141
755	8-3	7-8	22	42	23	26	135	100	10	35	136	16	236
756	6-10	7-5	21	40	12	24	99	33	3	31	38	0	71
757	8-1	8-0	28	41	16	26	123	54	4	38	91	0	145
758	8-8	7-7	36	45	26	25	136	101	11	38	131	16	232
759	7-4	9-0	38	42	27	26	135	96	11	42	134	23	230
760	10-8	7-6	29	41	21	26	136	89	8	3	128	0	217
761	8-6	7-4	32	37	24	25	134	99	11	38	135	23	234
762	7-7	7-9	18	29	11	22	89	60	2	7	16	0	76
763	7-6	7-2	18	32	20	25	134	82	6	48	136	27	218
764	8-1	7-4	25	43	26	24	136	99	11	38	134	22	233
765	7-5	7-6	20	43	25	26	134	98	10	36	134	18	232
766	7-7	7-5	36	36	18	24	124	72	7	2	102	3	174
767	8-2	7-7	40	43	23	24	136	99	11	38	133	15	232
768	8-1	7-9	39	40	21	24	136	104	11	33	135	11	139
769	10-2	7-5	39	45	26	26	136	103	11	40	135	27	138
770	7-3	7-9	37	45	26	26	134	107	11	30	135	16	242
771	9-4	7-7	38	42	21	26	135	93	11	42	136	20	229
772	7-11	7-10	32	42	19	26	128	68	6	28	105	0	173
773	8-6	7-5	32	44	28	26	136	105	11	37	135	19	240
774	7-5	8-3	21	27	15	26	92	33	1	0	3	0	361

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	C.	I.P.	I.R.	A.P.	C.S.R.
775	8-11	8-4	40	44	27	26	135	94	11	38	134	15	228
776	8-9	7-7	36	41	20	26	130	59	7	38	107	9	166
777	7-9	7-9	29	32	18	24	111	88	8	39	39	0	127
778	6-7	7-1	17	23	10	23	103	60	6	17	87	0	147
779	8-0	9-3	33	29	12	4	86	56	3	0	6	0	62
780	8-1	8-0	33	38	13	26	131	56	4	20	102	0	158
781	7-5	7-5	33	40	22	26	135	95	10	34	135	2	230
782	8-8	8-0	36	39	19	24	134	74	6	36	108	0	182
783	8-0	7-9	32	22	19	26	134	93	10	35	135	18	228
784	6-9	7-1	23	39	24	25	132	98	10	44	131	27	228
785	8-10	7-9	38	41	19	25	131	90	8	33	125	19	215
786	7-8	7-6	35	43	21	26	124	99	8	48	133	27	232
787	7-2	7-6	22	35	21	26	135	101	10	26	136	0	237
788	8-4	7-4	30	39	20	23	77	58	4	21	43	0	101
789	8-0	7-5	21	35	16	25	103	54	5	1	57	0	111
790	7-8	7-5	26	35	15	22	109	41	7	0	88	0	129
791	7-2	7-11	25	36	19	26	124	62	9	20	57	0	119
792	10-11	7-10	37	44	24	26	136	98	11	44	133	17	231
793	9-0	7-10	38	44	29	26	136	105	11	48	136	25	241
794	7-3	8-1	22	37	14	25	90	34	4	0	45	0	79
795	7-7	7-7	34	43	19	26	129	67	10	48	136	20	203
796	6-2	7-8	30	41	21	24	136	65	3	36	126	8	191
797	7-8	7-3	18	42	21	26	135	92	11	47	136	23	228
798	9-1	7-11	35	42	26	25	136	92	11	34	134	3	226
799	8-9	7-1	39	42	20	26	136	91	11	38	133	23	224

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	G.	I.P.	I.R.	A.P.	C.S.R.
800	8-4	8-2	20	33	20	25	113	41	4	37	60	0	101
801	7-5	8-7	23	41	21	26	133	98	6	41	131	22	229
802	7-9	8-3	20	35	17	19	133	74	7	0	133	0	207
803	8-2	8-5	27	35	24	26	136	74	10	17	115	14	189
804	7-10	7-7	26	39	18	24	114	44	4	30	37	0	81
805	8-8	9-7	28	37	14	25	121	51	1	0	53	0	104
806	7-0	8-8	26	33	17	26	129	63	5	32	115	0	178
807	7-9	7-6	38	41	24	26	136	105	11	41	136	19	241
808	7-5	8-2	26	39	22	26	136	101	11	13	135	13	236
809	8-6	7-9	34	43	22	26	136	105	10	35	133	15	238
810	6-7	7-8	17	38	17	26	125	50	6	38	70	0	120
811	7-11	7-8	31	42	22	26	127	97	9	37	131	0	208
812	7-11	8-11	24	24	16	26	79	57	3	13	50	0	107
813	8-0	7-8	33	37	12	26	115	52	2	42	82	0	134
814	10-0	7-8	38	42	29	26	136	103	11	40	136	22	239
815	6-5	8-3	18	33	14	25	91	66	4	28	28	0	94
816	7-11	7-4	35	33	18	26	128	62	7	17	115	1	177
817	8-9	7-11	36	37	24	25	136	95	10	39	134	25	229
818	8-0	7-7	29	40	15	26	116	33	3	37	55	0	88
819	5-10	8-1	22	35	20	25	118	39	3	40	78	0	117
820	8-11	8-5	28	37	16	24	103	54	3	40	51	0	105
821	7-11	7-9	29	36	18	26	122	62	6	21	80	0	142
822	9-5	7-10	37	44	29	26	135	96	11	38	130	12	226
823	8-3	8-1	28	36	12	26	121	60	3	28	94	0	154
824	7-2	7-9	19	25	18	25	97	51	3	0	25	0	76

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	C.V.	G.	I.P.	I.R.	A.P.	G.S.R.
825	8-1	7-9	21	44	23	25	133	98	10	43	135	12	233
826	8-0	7-8	34	45	23	25	136	72	10	0	132	1	204
827	8-9	7-4	27	32	12	25	105	29	4	23	45	0	74
828	7-11	9-9	24	34	17	26	109	59	8	27	31	0	90
829	8-7	7-11	34	34	20	24	135	86	7	16	122	1	208
830	8-0	7-2	28	37	20	25	114	43	3	15	62	0	105
831	8-6	7-6	28	38	25	26	136	95	11	42	134	17	229
832	6-5	8-1	13	16	5	17	71	53	2	0	4	0	57
833	7-2	7-7	20	27	13	25	86	42	0	3	53	0	95
834	7-9	7-7	32	39	18	26	134	72	7	42	125	1	197
835	8-9	7-6	39	41	17	25	133	97	9	39	128	8	225
836	7-7	8-2	17	26	11	26	83	34	4	7	32	0	66

TABLE XXXIV

SCORES ON TESTS GIVEN TO THE SECOND GRADES, SCHOOL C

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	C.	I.P.	I.R.	A.P.	C.S.R.
101	6-7	7-11	22	20	18	25	64	70	4	13	111	0	181
102	6-8	7-6	23	40	22	26	128	58	6	37	65	0	123
103	5-11	8-5	27	43	24	26	135	90	10	42	127	9	217
104	6-11	9-2	27	39	30	26	136	83	10	36	135	20	218
105	5-4	7-0	28	38	21	25	121	40	4	27	107	0	147
106	6-11	7-2	32	44	27	26	135	91	7	42	135	17	226
107	8-4	7-2	39	43	30	26	136	96	11	48	136	27	232
108	7-9	6-10	32	43	24	26	135	93	9	0	134	16	227
109	7-10	7-3	33	39	25	26	134	95	9	37	132	1	227
110	7-4	7-5	22	31	23	25	136	70	11	0	127	1	197
111	6-6	7-7	37	38	25	26	134	45	7	41	126	0	171
112	7-8	9-2	36	39	28	26	134	91	10	0	134	22	225
113	6-9	6-9	27	34	19	26	136	82	9	21	93	2	175
114	7-2	7-4	29	34	19	26	130	48	6	26	93	1	141
115	7-11	7-2	37	40	15	26	134	85	10	40	120	5	205
116	9-0	7-7	35	42	25	26	131	74	8	41	121	5	195
117	6-10	7-0	20	37	21	26	131	61	7	35	76	0	137
118	7-6	8-4	31	36	19	25	121	73	7	21	28	0	101
119	8-8	8-0	39	44	28	26	136	80	10	40	123	9	203
120	6-10	8-0	29	38	23	26	131	96	8	1	126	2	222
121	7-3	8-4	19	31	9	24	113	68	6	39	114	2	182
122	5-11	7-8	25	23	15	26	115	35	4	24	59	0	
123	7-7	8-0	31	33	23	25	131	75	9	0	113	0	188

Pupil	M.A.	G.A.	A.D.	G.P.	V.D.	L.N.	S.V.	C.V.	C.	I.P.	I.R.	A.P.	C.S.R.
124	6-6	7-6	25	42	23	26	137	84	8	43	135	21	219
125	6-1	7-7	14	31	16	26	119	41	3	36	47	7	88
126	6-11	7-7	16	33	22	26	137	88	10	38	129	3	217
127	9-4	7-4	36	44	27	26	136	99	10	38	135	12	234
128	5-10	8-0	20	32	18	26	127	57	7	27	103	0	160
129	7-5	7-11	29	44	13	26	134	75	8	37	113	10	188
130	8-2	7-10	35	40	13	25	135	86	11	37	137	1	223
131	7-11	7-2	18	36	25	26	133	67	7	12	113	0	180
132	8-0	6-8	34	42	29	26	136	98	10	4	135	27	233
133	7-9	7-5	36	39	25	26	134	93	8	39	98	3	191
134	6-0	6-9	15	34	14	26	129	90	5	29	128	0	218
135	9-6	7-5	32	40	22	25	129	58	7	34	86	0	144
136	7-0	7-8	21	34	28	24	128	84	0	7	132	0	216
137	6-11	6-11	29	34	17	26	131	77	6	0	122	1	199
138	6-5	7-7	26	35	26	26	131	67	4	41	97	3	164
139	7-9	7-2	35	38	15	26	132	93	11	48	128	18	221
140	6-2	7-7	13	32	21	26	134	57	5	0	77	0	134
141	7-9	7-0	24	40	22	26	129	64	8	41	105	3	169
142	7-5	8-1	33	43	26	26	136	87	7	43	131	20	218
143	9-11	7-9	32	42	20	26	136	85	11	10	99	0	184
144	6-0	6-10	15	38	20	26	135	49	6	23	109	0	158
145	8-6	7-3	30	37	21	23	132	72	9	21	108	0	180
146	8-2	7-10	16	25	16	26	104	48	4	10	83	0	131
147	8-0	7-7	33	42	25	26	136	88	5	48	124	18	212
148	7-5	7-7	25	35	18	26	129	70	8	35	111	1	181

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	C.	I.P.	I.R.	A.P.	G.S.R.
149	7-0	7-3	26	36	24	26	136	91	10	21	145	3	216
150	6-10	7-2	22	32	14	24	123	52	3	26	87	0	139
151	7-7	7-0	35	40	27	26	135	94	10	47	135	18	229
152	5-10	7-2	33	43	28	23	136	79	11	39	130	6	209
153	8-2	7-10	33	40	23	26	136	82	10	39	128	5	210
154	5-0	7-3	11	30	9	25	78	70	2	26	47	6	117
155	7-6	8-5	26	40	26	26	131	85	7	0	116	0	201
156	6-9	7-7	28	34	23	24	128	50	4	28	64	0	114
157	8-2	7-3	38	43	20	24	134	52	8	43	131	3	183
158	6-9	7-2	15	36	9	26	112	31	5	26	97	2	128
159	6-9	7-11	33	43	23	26	136	81	8	47	136	21	217
160	8-3	6-10	21	41	24	26	135	96	7	47	135	23	231

TABLE XXXV

SCORES ON TESTS GIVEN TO THE SECOND GRADES OF SCHOOL D

Pupil	M.A.	C.A.	A.	G.P.	V.	L.N.	S.V.	C.V.	C.	I.P.	I.R.	A.P.C.S.R.	
301	8-9	7-2	33	40	28	26	136	98	3	48	136	25	234
302	8-5	7-2	37	42	23	26	136	100	10	48	136	27	236
303	8-0	7-2	37	42	24	26	133	103	10	48	136	25	239
304	9-1	7-6	30	43	22	26	136	94	4	46	136	21	230
305	7-5	7-9	26	44	17	26	131	65	2	48	113	23	178
306	8-3	8-4	37	37	21	26	115	48	6	41	96	0	144
307	9-2	8-1	40	45	24	26	133	95	11	45	135	24	230
308	11-10	7-10	40	44	28	25	135	104	11	48	139	27	240
309	9-1	7-10	39	45	26	26	135	102	10	48	136	27	238
310	8-7	8-0	40	45	21	26	135	88	9	41	133	14	221
311	9-10	7-7	39	43	15	26	135	95	8	48	135	27	230
312	7-6	7-5	36	43	19	26	130	67	6	36	103	16	170
313	7-5	8-1	35	44	22	26	134	95	10	43	136	23	231
314	6-9	7-2	40	42	24	26	119	98	6	48	136	27	234
315	8-1	7-4	33	42	23	26	135	64	7	43	119	12	183
316	10-4	7-4	37	43	26	26	133	104	11	36	98	27	202
317	7-11	7-1	40	44	26	26	135	88	10	48	131	26	219
318	8-2	7-10	37	43	22	26	130	69	4	41	91	160	8
319	8-9	7-0	32	43	23	26	126	97	8	48	134	231	25
320	8-5	7-3	32	43	22	26	136	93	5	46	131	224	26
321	8-5	8-0	30	32	9	26	134	66	7	35	130	196	2
322	9-6	8-11	40	40	20	26	128	60	6	26	49	109	0

Pupil	M.A.	C.A.	A.	G.P.	V.	L.N.	S.V.	C.V.	G.	I.P.	I.R.	A.P.	G.S.R.
323	8-1	7-5	23	41	22	26	131	78	34	41	92	170	7
324	6-3	9-3	37	43	18	26	135	62	5	48	124	22	186
325	8-2	7-5	33	36	15	24	109	87	5	46	124	24	211
326	9-1	7-9	39	45	26	26	136	105	11	48	136	27	241
327	8-2	7-4	33	41	16	25	134	90	3	48	123	20	213
328	8-0	7-11	38	34	24	26	134	98	7	48	136	21	234
329	9-3	7-2	31	45	27	26	136	105	11	48	136	27	241
330	7-10	8-4	38	45	21	26	134	97	11	48	136	27	233
331	7-10	7-2	39	42	17	26	135	87	8	48	134	23	221
332	8-3	7-7	34	43	23	26	135	95	7	43	136	25	231
333	6-10	7-1	34	44	22	26	135	87	3	47	131	22	218
334	9-4	7-11	34	36	16	26	124	72	2	12	93	12	185
335	8-3	7-3	37	39	23	26	127	85	10	48	134	25	219
336	8-2	7-11	38	44	22	26	134	100	10	48	134	21	234
337	7-8	7-10	31	45	23	26	135	96	7	21	131	21	227
338	12-1	7-7	40	44	27	26	136	104	10	48	136	27	240
339	9-9	7-2	40	44	26	26	136	99	9	48	136	27	235
340	11-10	7-9	40	43	28	26	135	104	11	48	136	27	240
341	12-12	7-8	40	42	29	26	133	104	10	47	131	27	235
342	7-8	7-8	40	41	25	26	134	100	8	47	136	21	236
343	8-0	8-3	21	40	17	25	131	82	4	47	136	21	218
344	10-1	7-4	38	42	21	25	133	79	5	46	124	18	203
345	8-2	7-4	35	43	20	26	131	87	0	48	134	24	221
346	9-5	8-0	30	39	13	23	111	33	5	0	21	0	51
347	6-5	8-5	25	43	24	26	125	54	1	36	95	0	149

Pupil	M.A.	C.A.	A.	G.P.	V.	L.N.	S.V.	C.V.	G.	I.P.	I.R.	A.P.	C.S.R.
348	7-1	7-11	38	33	22	26	135	95	2	43	135	24	220
349	7-10	7-3	34	44	19	26	133	92	6	43	134	20	226
350	8-0	7-4	24	41	18	23	131	56	4	47	111	0	167
351	9-10	8-0	40	42	30	26	135	104	10	45	136	27	240
352	8-0	7-5	24	39	18	26	136	61	5	40	108	3	169
353	8-10	7-7	40	45	26	26	135	104	10	48	131	27	235
354	8-1	7-5	39	41	25	26	134	89	4	45	136	24	225
355	8-8	7-2	38	40	19	26	127	67	7	40	108	14	175
356	8-8	8-1	34	41	22	25	136	97	11	48	136	27	233
357	7-11	7-4	40	40	28	26	135	99	11	48	136	27	235
358	8-3	8-11	28	42	25	26	121	73	6	36	128	11	201
359	8-2	7-9	26	40	18	26	127	78	9	48	88	25	166
360	10-4	7-7	34	42	25	26	133	97	10	45	136	25	233
361	9-4	7-9	39	40	22	25	134	79	6	43	127	18	206
362	10-3	8-3	40	43	25	26	132	93	11	44	129	18	222
363	8-2	7-9	39	40	21	25	123	90	9	42	97	0	187
364	7-11	7-7	35	41	24	26	135	96	6	41	133	18	229
365	8-2	7-9	30	43	20	26	128	82	5	39	77	27	159
366	7-7	7-9	40	45	21	26	133	77	11	44	128	19	205
367	12-11	7-11	39	44	23	26	135	74	10	46	134	23	208
368	9-7	6-11	40	42	26	26	134	96	11	25	135	25	231
369	9-3	6-11	40	44	23	26	135	103	7	44	136	24	239
370	7-9	7-1	40	38	27	26	135	95	11	48	136	25	231
371	9-1	7-8	40	43	27	26	136	100	9	48	136	27	236
372	8-6	7-11	38	39	18	26	134	92	10	46	133	22	225

Pupil	M.A.	C.A.	A.	G.P.	V.	L.N.	S.V.	C.V.	C.	I.P.	I.R.	A.P.	C.S.R.
373	7-7	8-6	16	34	21	25	86	64	8	36	15	0	75
374	6-11	7-4	36	41	21	26	129	69	6	39	107	1	176
375	7-2	7-5	36	39	24	26	131	68	6	48	123	8	191
376	8-5	7-8	38	33	18	26	110	50	6	48	97	18	147
377	8-5	7-9	37	41	25	25	136	85	4	40	96	19	181
378	9-1	7-2	36	43	24	25	136	103	11	48	136	26	239
379	8-2	7-3	40	44	26	26	134	98	9	48	136	27	234
380	8-0	7-6	35	44	29	26	135	96	9	48	136	26	232
381	8-0	7-1	40	43	19	20	134	84	5	43	126	12	210
382	7-11	8-1	37	37	21	26	129	78	6	37	115	2	193
383	8-8	7-3	40	42	21	25	136	99	11	48	136	27	235
384	8-1	7-11	36	44	25	26	135	95	11	43	135	20	230
385	9-9	7-7	35	40	20	26	136	84	9	43	129	22	213
386	7-8	7-5	40	45	21	26	131	84	7	42	132	15	216
387	9-9	7-8	39	43	17	26	133	66	8	43	125	12	191
388	7-3	7-10	40	41	20	26	129	79	6	41	125	17	204
389	9-3	8-0	40	44	23	26	135	96	8	48	119	26	215
390	9-4	7-11	38	44	26	26	135	83	8	44	126	16	209
391	9-7	7-7	35	43	23	26	133	95	11	44	135	21	230
392	7-11	7-6	31	40	22	26	126	95	3	38	136	16	231
393	8-4	8-0	27	42	23	26	134	81	2	41	120	21	201
394	8-6	7-2	39	41	24	26	131	85	2	48	136	27	221
395	8-9	7-11	40	45	24	26	133	99	10	45	132	12	231
396	8-4	8-1	34	43	18	26	133	91	6	48	132	27	223
397	9-3	7-8	38	43	20	26	135	92	11	48	135	25	227

Pupil	M.A.	C.A.	A.	G.P.	V.	L.N.	S.V.	C.	I.P.	I.R.	A.P.	S.C.R.	
398	9-2	7-7	39	45	27	26	135	95	11	48	136	26	231
399	8-1	7-8	38	45	27	26	135	102	10	48	136	26	238
400	8-1	7-7	40	25	25	26	133	94	7	48	134	27	228
401	9-3	7-9	34	43	17	26	135	103	11	48	135	24	238
402	7-4	7-7	35	38	23	26	135	100	1	48	136	27	236
403	7-5	7-11	34	37	19	22	83	77	3	47	98	22	175
404	7-11	7-3	38	44	24	26	134	99	8	38	103	0	202
405	7-6	7-3	20	38	21	26	117	39	4	23	86	0	125
406	7-5	7-7	38	39	23	25	133	90	5	48	132	27	222
407	7-10	7-2	35	36	15	25	133	74	4	40	116	20	190
408	8-6	8-6	37	39	15	26	129	79	5	48	107	26	186
409	8-0	7-5	40	44	27	25	135	104	9	48	136	27	240
410	6-2	7-0	27	35	15	25	125	83	5	42	115	12	198
411	8-8	7-8	39	44	25	26	132	78	4	43	113	2	191
412	8-10	7-3	35	43	20	26	133	71	6	43	112	24	183

TABLE XXXVI

SCORES ON TESTS GIVEN TO THE SECOND GRADE OF SCHOOL E

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	C.	I.P.	I.R.	A.P.	G.R.
201	6-5	8-9	15	39	21	26	133	103	8	38	136	4	236
202	8-2	7-2	25	41	16	26	130	77	3	41	131	0	208
203	9-3	7-9	32	42	29	18	134	104	9	40	136	26	240
204	6-9	7-0	28	40	21	25	136	98	9	48	136	25	234
205	9-0	7-3	35	39	23	26	133	103	10	38	136	14	239
206	7-4	7-9	30	37	22	24	132	79	3	43	134	11	213
207	8-3	7-5	32	42	19	25	129	79	11	39	135	0	214
208	7-4	8-9	31	44	23	25	122	83	10	42	128	9	211
209	8-4	7-0	25	41	18	25	134	86	8	48	134	16	220
210	8-1	8-1	27	38	20	26	128	87	11	39	118	27	205
211	9-0	7-5	35	40	28	22	129	100	5	48	136	25	236
212	6-7	7-2	18	36	9	24	121	85	9	0	123	1	208
213	8-7	7-8	34	39	27	26	134	81	10	40	135	13	216
214	7-7	7-8	19	37	22	23	124	55	2	39	55	0	110
215	6-5	7-11	32	40	18	23	134	72	3	44	130	7	202
216	8-1	8-4	28	11	16	25	129	84	6	36	123	0	207
217	6-11	7-10	19	38	24	26	133	95	6	40	136	7	231
218	6-8	7-6	16	35	22	24	132	90	6	38	134	3	224
219	10-9	7-9	28	44	28	26	135	104	10	48	136	27	240
220	8-6	8-7	29	41	21	8	118	57	6	32	38	0	95
221	8-5	7-9	38	42	24	25	134	89	9	40	135	9	224
222	7-4	7-7	22	29	21	25	129	73	7	40	129	0	202

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	G.V.	C.	I.P.	L.R.	A.P.	C.R.
223	7-10	7-9	33	40	21	22	127	77	4	39	134	3	211
224	7-11	7-3	28	40	21	24	132	74	5	40	127	0	201
225	7-7	7-11	34	35	17	25	127	70	6	30	92	2	162
226	8-2	7-10	37	44	20	24	134	92	7	38	134	4	226
227	9-11	7-10	31	41	19	25	127	64	7	39	90	0	154
228	7-7	7-8	38	39	26	25	134	105	11	48	136	27	241
229	9-2	8-3	23	41	17	24	124	37	2	40	59	0	96
230	5-9	7-0	36	41	25	17	132	95	7	48	136	23	231
231	8-5	7-2	33	37	18	26	128	54	5	43	109	4	163
232	8-5	8-2	26	44	29	26	135	99	6	48	136	23	235
233	6-11	8-3	33	37	14	26	121	73	5	36	33	0	106
234	6-7	8-0	35	35	22	22	131	82	7	45	134	18	216
235	8-3	7-7	36	43	22	25	132	106	9	39	135	14	241
236	11-6	7-7	29	43	26	26	135	100	11	48	136	25	236
237	8-10	7-9	32	41	27	24	134	97	11	48	137	24	233
238	8-10	7-7	38	44	27	9	134	104	6	43	136	26	240
239	7-4	7-3	34	41	21	24	130	80	6	39	128	2	208
240	9-5	7-9	37	42	28	25	133	103	10	45	136	19	239
241	7-2	7-10	37	43	22	26	133	62	8	43	131	18	193
242	8-2	7-6	40	43	29	25	134	103	8	48	136	27	239
243	8-0	8-0	36	43	25	25	136	99	11	48	135	27	234
244	7-11	7-6	28	41	20	25	125	61	6	41	120	0	181
245	7-8	7-9	14	6	14	22	120	58	3	0	123	0	181
246	7-9	7-5	31	40	18	25	134	78	6	42	136	19	214
247	7-8	7-6	28	34	12	25	128	65	6	25	122	2	187
248	8-2	7-3	24	33	16	26	107	47	6	32	76	4	123

Pupil	M.A.	C.A.	A.D.	G.P.	V.D.	L.N.	S.V.	C.V.	G.	I.P.	I.R.	A.P.C.R.
249	8-7	7-7	35	42	26	24	132	67	11	38	116	1 183
250	7-1	7-5	22	39	20	24	131	71	8	34	122	22 193
251	9-0	8-0	34	40	25	25	136	89	10	43	136	3 225
252	6-3	7-9	18	38	16	24	132	78	3	45	133	13 211
253	6-10	7-6	37	40	21	26	135	94	9	43	136	23 230

APPENDIX C
DATA USED IN PAIRING TECHNIQUE

TABLE XXVIII

COMPARISON OF MENTAL ABILITY WITH READING ACHIEVEMENT
OF 107 PAIRS OF PUPILS

High In M.A.	Low In M.A.	H. L. Aud.Dis.	H. L. Vis.Dis.	H. L. Phon.	H. L. M. A.	H. L. Reading
F20	A56	29-28	21-23	32-28	102-81	95-114
M37	B27	29-28	17-17	32-28	101-89	178-109
A14	A5	29-28	19-21	26-27	86-64	141-147
M121	A13	29-27	18-19	21-21	95-81	142-175
M127	F47	27-28	12-12	28-25	105-92	74-187
M60	M54	29-28	21-20-	3- 0	128-90	217-141
M45	C5	24-26	18-17	43-48	101-89	145-178
C68	M38	40-39	26-25	25-26	115-88	231-229
B31	B98	35-33	16-14	0 0	105-87	90-124
B40	F25	33-34	17-17	34-30	104-91	163-162
B123	B97	32-31	18-17	30-34	101-87	157-161
A35	B6	32-30	22-22	34-34	114-101	144-199
B126	M13	31-32	16-17	21-24	103-91	186-223
A45	A15	30-31	21-19	21-21	102-90	180-101
A43	M50	32-31	20-18	10-13	119-98	184-116
F27	F7	31-32	19-19	39-39	119-99	154-214
M83	M96	32-30	19-21	35-36	96-74	229-191
F46	F15	31-32	18-18	42-44	93 -71	214-202
G4	B96	30-32	22-21	46-42	109-89	230-181
G20	B126	32-30	22-22	46-47	101-86	224-228
B87	F6	32-30	22-22	43-43	101-88	227-213

High In M.A.	Low In M.A.	H. L. Aud.Dis.	H. L. Vis.Dis.	H. L. Phon.	H. L. M. A.	H. L. Reading
B19	F8	32-31	23-23	48-42	105-88	231-211
F37	A6	32-32	27-27	48-42	106-83	233-226
G101	B95	34-33	17-16	48-43	111-98	238-193
F31	C103	33-34	18-19	43-47	101-89	163-175
C8	C57	40-40	28-28	48-48	142-95	240-235
M99	C88	39-40	20-20	38-41	105-87	224-204
M69	B83	39-39	26-26	40-39	122-108	138-218
C76	C24	38-37	18-18	46-48	101-75	147-186
M17	B93	36-36	20-21	42-47	106-92	216-223
C97	A57	38-38	20-20	48-43	111-98	227-183
M71	M1	38-38	21-21	42-46	112-90	229-231
C44	C30	38-38	21-21	46-48	121-94	203-233
B22	F53	38-37	21-21	43-43	96-82	138-230
B9	B124	37-38	22-21	45-45	95 -75	233-175
C36	F41	38-37	22-22	48-43	98-86	234-193
C2	C106	37-38	23-23	48-48	101-89	236-222
M16	C35	38-37	23-23	42-48	112-99	238-219
C78	C75	36-36	24-24	48-48	109-86	239-191
M92	C84	37-36	24-25	44-43	132-97	231-230
B56	F30	38-36	25-25	42-48	101-69	237-231
C90	B49	38-38	26-26	44-48	112-96	209-231
B131	F28	38-38	20-26	47-48	104-91	235-241
F38	M59	38-38	27-27	43-42	106-88	240-230
C99	B71	38-37	27-27	48-43	97-85	238-212
F19	B46	28-27	28-27	48-42	129-107	240-239

High In M.A.	Low In M.A.	H. L. Aud.Dis.	H. L. Vis.Dis.	H. L. Phon.	H. L. M. A.	H. L. Reading
M131	A3	28-27	25-24	42-42	102-71	229-217
B115	F4	27-28	22-21	46-48	99-81	210-234
B2	C110	27-27	17-15	43-42	94-74	207-198
B113	F24	28-28	23-21	39-40	110-95	163-201
C51	A7	40-39	30-30	45-48	118-100	240-232
C71	C70	40-40	27-27	48-48	109-103	236-231
C89	C17	40-40	23-26	48-48	111-95	215-219
C39	C42	40-40	26-25	48-47	117-92	235-236
C95	B51	40-40	24-24	45-43	115-99	231-237
C61	C18	39-37	22-22	43-41	112-98	206-160
F35	C74	36-36	22-21	39-39	99-83	241-176
C83	C66	40-40	21-21	48-44	104-91	235-205
C87	C31	39-39	17-17	43-48	117-94	191-221
M31	M119	23-22	18-20	39-40	82 -70	119-117
F29	B67	23-23	17-18	40-37	110-89	96-102
B65	A50	21-22	15-14	22-26	99-82	155-139
M89	B52	21-21	16-17	1- 0	96-83	111-136
M42	B72	23-22	13-14	1- 0	112-96	77-141
B39	A17	20-20	23-21	39-35	95-82	181-137
M11	B78	19-20	20-20	36-39	94-80	157-235
M100	B104	20-21	20-20	37-36	100-87	101-189
M28	B133	20-20	16-14	5- 0	95-75	42- 79
B103	M133	19-20	15-13	0- 3	94-76	119-95
B110	B68	16-17	15-15	24-27	99-84	177-131
B29	M21	16-16	14-16	0- 1	96-77	148-87

High In M.A.	Low In M.A.	H. I. Aud.Dis.	H. I. Vis.Dis.	H. I. Phon.	H. I. M. A.	H. I. Reading
F45	B85	14-14	14-16	0-0	92-66	181-132
M64	A38	25-26	26-26	38-41	97-77	233-164
A41	C47	24-25	22-24	41-36	93-77	169-149
C52	B11	24-24	18-16	40-35	96-75	169-128
FD48	M106	24-26	16-17	32-32	98-84	123-178
M128	B43	24-26	17-17	27-24	95-75	90-186
B12	A22	26-25	15-15	21-24	88-71	106-94
M51	B69	26-24	14-13	27-21	102-89	189-96
M90	B91	26-25	15-16	0-0	92-74	129-124
A60	M84	21-23	24-24	47-44	99-81	231-228
M32	B105	22-21	22-20	43-43	94-78	192-210
C23	A2	23-23	22-22	41-37	97-80	170-123
M43	M101	23-23	20-21	35-41	101-89	175-229
B33	B75	36-37	18-18	39-38	103-88	172-218
B94	B3	38-36	19-19	41-39	102-78	195-190
M76	C12	36-36	20-19	38-26	105-90	166-170
C69	B80	40-37	23-23	44-38	111-88	239-159
C67	C104	39-38	23-24	46-38	131-95	208-202
C7	B106	40-38	24-24	45-41	110-92	230-219
C94	C14	39-40	24-24	48-48	102-81	221-234
C100	A12	40-37	25-25	48-41	97-78	228-171
F51	A33	34-36	25-25	43-39	108-93	225-191
C62	C54	40-39	25-25	44-45	125-97	222-225
C38	C109	40-40	27-27	48-48	145-96	240-240

TABLE XXIX

COMPARISON OF AUDITORY DISCRIMINATION WITH READING ACHIEVEMENT
OF 106 PAIRS OF PUPILS

High	Low	M. A.	Vis.	Phon.	Aud.	Reading
F24	B116	95-98	21-21	40-41	28-20	201-202
C6	F44	99-95	21-20	41-41	37-28	144-181
M3	F10	101-97	20-20	43-39	37-27	224-205
C79	B50	98-101	26-27	48-43	40-31	234-223
B98	M94	87-85	14-14	0-0	33-22	124-79
B10	B68	84-84	15-15	28-27	31-17	180-131
M106	B62	84-81	17-17	32-26	26-17	178-134
B52	BL38	83-84	17-17	0-0	21-11	136-68
M49	M91	87-86	19-19	21-20	32-25	64-119
BL31	B104	87-87	20-20	43-36	33-21	179-189
C88	F50	87-85	20-20	41-34	40-22	204-193
C74	A17	83-82	21-21	39-35	36-20	176-137
F53	F4	82-81	21-21	43-48	37-28	230-234
BL26	B111	86-87	22-23	47-45	30-21	228-182
F41	A26	86-83	22-22	43-38	37-16	193-217
A20	B127	82-83	23-22	1-0	29-21	222-157
C75	M84	86-81	24-24	48-44	36-23	191-228
B70	M6	89-88	15-14	15-21	28-19	189-67
M74	B32	89-91	15-15	0-0	21-12	36-131
M44	F45	91-92	15-14	3-0	22-14	125-181
C100	A47	97-96	25-25	48-48	40-33	228-212

High	Low	M. A.	Vis.	Phon.	Aud.	Reading
C28	A60	96-99	24-24	48-47	38-21	234-231
M96	F1	74-77	21-21	36-38	30-15	191-236
B93	M63	92-90	21-20	47-48	36-18	223-218
C96	F9	100-100	18-18	48-48	34-25	223-220
A23	All	91-88	23-23	0- 0	31-22	188-197
F8	A41	88-93	23-22	42-41	31-24	211-169
B55	F14	94-91	23-22	42-39	35-19	202-110
M20	M12	92-91	23-22	37-40	37-27	231-229
C13	M32	89-94	22-22	43-43	35-22	231-191
B80	F6	88-88	23-22	38-43	37-30	159-213
F31	M45	101-101	18-18	43-43	33-24	163-145
C76	B1	101-101	18-18	46-43	38-30	147-156
C81	F7	96-99	19-19	43-39	40-32	210-214
M83	C52	96-96	19-18	35-40	32-24	228-169
F39	F22	88-87	21-21	39-40	34-22	208-202
B96	M101	89-89	21-21	42-41	32-23	181-229
B108	F2	98-98	17-16	40-41	34-25	161-208
B119	F48	96-98	17-17	36-32	35-24	121-123
B8	B86	100-96	16-17	20-17	31-20	152- 98
M112	A46	95-98	16-16	13-10	24-16	107-131
M5	B27	92-89	17-17	34-28	36-28	193-109
C103	M97	89-92	19-21	47-47	34-18	175-228
F35	B39	99-95	22-23	39-39	36-20	241-181
M68	B135	97-96	21-20	33-32	39-26	139-127
M22	M100	95-100	21-20	37-37	27-20	181-101

High	Low	M. A.	Vis.	Phon.	Aud.	Reading
G82	M43	95-101	21-20	37-35	37-23	193-175
F26	G65	98-98	20-20	38-39	37-30	226-159
M79	B38	96-95	12-13	0- 0	33-17	62-106
M18	B69	93-90	13-13	17-21	32-24	131- 96
A29	B13	89-90	13-14	37-36	29-18	188-184
B63	M62	94-91	10-11	0- 7	27-18	174- 76
A2	A34	71-72	15-14	24-29	25-15	94-218
B74	M136	94-91	11-11	9-7	27-17	87- 66
B91	M21	74-77	16-16	0-1	25-16	124-87
G89	G4	111-109	23-22	48-46	40-30-	215-280
M16	B113	112-110	23-23	42-39	38-28	238-163
F34	B105	79-78	21-20	45-43	35-21	216-210
B57	G1	103-103	28-28	48-48	40-33	234-234
A16	M73	104-102	28-28	40-37	39-32	203-240
M135	M120	105-107	17-16	39-40	39-28	225-105
F38	B46	106-107	27-27	43-42	38-27	240-239
G55	B112	104-106	19-18	40-43	38-28	175-219
G53	F37	106-106	26-27	48-48	40-32	235-233
B124	B78	75-80	21-20	45-39	38-20	175-239
B11	M110	75-79	16-17	35-38	24-17	128-120
M99	F20	105-102	20-21	38-32	39-29	224- 95
B76	M131	102-102	24-25	38-42	38-28	234-229
G111	M61	104-102	25-24	43-38	39-32	191-234
M71	B47	112-113	21-20	42-43	38-20	229-171
A30	B7	98-95	13-12	37-20	35-25	223- 69

High	Low	M. A.	Vis.	Phon.	Aud.	Reading
M90	B103	92-94	15-15	0- 0	26-19	129-119
M23	M64	96-97	26-26	37-38	37-25	213-233
M40	M14	101-100	26-26	37-39	38-31	193-240
A18	B84	95-99	15-14	40-35	37-28	205-125
C80	F32	96-101	29-29	48-48	35-26	232-235
C70	A42	93-89	27-26	48-43	40-33	231-218
A8	M36	93-94	24-25	0- 0	36-25	227-208
M47	M61	91-89	24-25	35-36	31-20	240-232
M103	A31	98-95	24-25	17-12	27-18	189-180
F21	C58	101-99	24-25	40-36	38-28	224-201
C12	A48	90-89	19-18	36-35	36-25	170-181
B20	M2	92-94	18-18	21-18	34-25	191-195
B92	B17	94-88	19-19	38-40	36-24	228-137
M66	B79	91-90	18-18	2- 0	36-19	174- 81
B75	B99	88-89	18-18	38-38	37-25	218-115
C31	B2	94-94	17-17	48-43	39-27	221-207
M13	B18	91-92	17-16	24-21	32-23	223-135
C26	C43	96-98	16-17	48-47	33-21	213-218
C30	B66	94-93	21-20	48-41	38-26	233-121
C66	B129	91-94	21-20	44-45	40-32	205-224
B14	C73	94-91	20-21	40-36	38-16	194- 75
C86	F23	92-94	21-21	42-39	40-33	216-211
B26	C105	91-90	21-21	21-23	29-20	144-125
M1	B34	90-94	21-21	46-42	38-25	231-194
B61	M11	94-94	21-20	32-36	35-19	209-157

High	Low	M. A.	Vis.	Phon.	Aud.	Reading
M9	M54	91-90	21-20	0- 0	35-28	201-141
A24	F18	78-80	23-22	43-38	25-16	219-224
A12	Ch7	78-77	25-24	41-36	37-25	171-141
EL6	C93	100-100	23-23	41-41	37-27	225-201
M53	M55	101-99	23-23	36-35	34-22	227-236
C2	B115	101-99	23-22	48-46	37-27	236-210
M67	B6	98-101	23-22	38-34	40-30	232-199
C18	C23	98-97	22-22	41-41	37-23	160-170
B114	M125	96-97	23-23	44-44	37-21	229-233
B89	M111	98-95	23-22	36-37	39-31	209-208

TABLE XXX

COMPARISON OF VISUAL DISCRIMINATION WITH READING ACHIEVEMENT
OF 134 PAIRS OF PUPILS

High	Low	M.A.	Aud.	Phon.	Vis.	Reading
B102	B30	91-90	21-20	16-16	21-16	123-125
A7	C63	100-98	39-39-	48-42	30-21	232-187
C42	C81	92-96	40-40	47-43	25-19	236-210
C70	C66	93-91	40-40	48-44	27-21	231-205
B24	C86	93-92	39-40	48-42	29-21	236-216
C71	B117	109-114	40-40	48-48	27-19	236-226
C89	C87	111-117	40-39	48-43	23-17	215-191
C79	C31	98-94	40-39	48-48	26-17	234-221
C68	C22	115-114	40-40	25-26	26-20	231-109
B128	M123	98-99	29-28	30-28	19-12	143-154
B26	B19	91-92	29-29	21-23	21-15	144-120
M52	M127	109-105	27-27	25-23	25-12	192- 74
M121	F47	95-92	29-28	21-25	18-12	142-187
M103	B41	98-98	27-27	17-18	24-17	189-107
A20	A37	82-83	29-29	1- 0	23-17	222-199
M77	B63	93-94	29-27	0- 0	18-10	127-174
B135	B7	96-95	26-25	32-30	20-12	127- 69
M27	M128	91-95	26-24	22-27	26-17	197- 90
A49	B12	84-88	26-26	21-21	24-15	216-106
B42	B69	90-89	24-24	26-21	20-13	143- 96
M108	M112	89-95	26-24	13-13	22-16	236-107

High	Low	M. A.	Aud.	Phon.	Vis.	Reading
A55	M90	90-92	26-26	0- 0	26-15	201-129
B71	C48	85-85	37-38	43-43	27-22	212-220
M59	M1	88-90	38-38	42-46	27-21	230-231
F28	B93	91-92	38-36	48-47	26-21	241-223
B49	A57	96-98	38-38	48-43	26-20	231-183
C99	M3	97-101	38-37	48-43	27-20	238-224
B81	M17	105-106	38-36	48-42	28-20	229-216
F38	B130	106-104	38-38	43-47	27-20	240-235
C90	C97	112-111	38-38	44-48	26-20	209-227
C2	C72	101-102	23-18	48-46	23-18	236-225
B56	C76	101-101	38-38	42-46	25-18	237-147
F30	C24	69-75	36-37	48-48	25-18	231-186
B48	B108	102-102	38-37	48-48	26-15	237-186
F13	M109	103-102	34-34	40-35	27-22	216-238
F33	F39	83-88	33-34	36-39	14-21	106-208
A53	A30	98-98	33-35	39-37	23-13	210-223
A9	B108	94-98	33-34	37-40	25-17	227-161
F47	B119	91-96	35-35	38-36	26-17	183-121
C64	C107	95-94	35-35	41-40	24-15	229-190
A19	M10	108-112	35-35	41-39	25-19	195-218
F11	C112	108-106	35-35	48-43	28-20	236-183
A42	B131	89-87	33-33	43-43	26-20	218-179
A51	C13	91-89	35-35	47-43	27-22	229-231
B55	A39	94-93	35-35	42-48	25-15	202-221
C80	C15	96-97	35-33	48-43	29-23	232-183

High	Low	M. A.	Aud.	Phon.	Vis.	Reading
B53	B95	99-98	35-33	48-46	23-16	241-193
C1	C56	103-104	33-34	48-48	28-22	234-233
C91	C101	115-111	35-34	44-48	23-17	230-238
C32	C96	99-100	34-34	43-48	23-18	231-223
M48	C45	94-98	33-35	43-48	27-20	175-221
B35	C26	101-98	34-33	43-48	25-16	235-213
B101	C25	98-98	33-33	42-46	21-15	228-211
A47	M113	96-96	33-33	48-42	25-12	212-134
M14	M83	100-96	31-32	39-35	27-19	240-228
B73	F7	98-99	32-32	35-39	24-19	236-214
M73	C65	102-98	32-30	37-39	28-20	240-159
M47	B64	91-94	31-32	35-38	24-17	240-110
M61	C21	102-101	32-30	38-35	24- 9	234-196
F37	C20	106-101	32-32	48-46	27-22	233-224
A6	B126	83-86	32-30	42-47	27-22	226-228
F8	M134	88-93	31-32	42-42	23-18	211-197
C29	C4	111-109	31-30	48-48	27-22	241-230
B50	B1	101-101	31-30	43-43	27-18	223-156
A60	A43	99-96	21-21	47-47	24-17	231-218
A2	B4	80-81	23-23	37-36	22-12	123-140
F22	B100	88-87	22-23	40-38	21-10	202-129
A41	F2	93-98	24-25	41-41	22-16	169-208
M64	C52	97-96	25-24	38-40	26-18	233-169
A38	B11	77-75	26-24	41-35	26-16	164-128
B66	B58	93-89	26-24	41-38	20-11	121-101

High	Low	M. A.	Aud.	Phon.	Vis.	Reading
F32	M45	101-101	26-24	48-43	29-18	235-145
M22	M57	95-97	27-28	37-38	21-16	181-145
C93	F16	100-97	27-28	41-36	23-16	201-207
B113	B120	110-107	28-28	39-40	23-16	163-105
C58	B84	99-99	28-28	36-35	25-14	201-125
M12	M118	91-96	27-29	40-37	22-15	229- 88
A4	A29	83-89	27-29	36-37	30-13	218-188
F42	B51	98-99	40-40	48-43	29-24	239-237
C51	C95	118-115	40-40	45-45	30-24	240-231
C98	C61	110-112	39-39	48-43	27-22	231-206
B57	C83	103-104	40-40	48-48	28-21	234-235
C10	C11	103-118	40-39	41-48	21-15	221-230
M75	M99	107-105	40-39	38-38	27-20	228-224
A16	M135	104-105	39-39	40-39	28-17	203-225
B83	M85	108-106	39-38	39-33	26-19	218-215
A10	M66	92-91	36-36	0- 2	28-18	225-174
M81	F25	89-91	33-34	34-30	22-17	230-162
M98	B40	109-104	35-33	34-34	26-17	226-163
M116	M80	95-97	35-33	17-20	18-13	177-158
A32	M102	96-93	34-20	4- 0	29-17	233-207
M9	B98	91-87	35-33	0- 0	21-14	201-124
M126	M79	96-96	34-33	0- 0	23-12	204- 62
B6	M30	101-107	30-32	34-32	22-16	199-214
C37	M13	92-91	31-32	21-24	23-17	227-223
A45	B136	102-103	30-31	21-21	21-16	180-186

High	Low	M. A.	Aud.	Phon.	Vis.	Reading
M41	B14	91-94	37-38	38-40	27-20	230-194
B80	B75	88-88	37-37	38-38	23-18	159-218
M23	C82	96-95	37-37	37-37	26-21	213-193
A40	M132	74-75	13-13	0-0	21-5	134-57
B90	B44	80-78	15-15	0-0	19-7	182-200
B115	B2	99-94	27-27	46-43	22-17	210-207
A3	C110	71-74	27-27	42-42	24-15	217-198
M131	B5	102-98	28-28	42-43	25-18	229-210
B46	B112	107-106	27-28	42-43	27-18	239-219
B122	B137	100-96	20-17	0-0	21-13	155-41
F18	M110	30-79	16-17	38-38	22-17	224-120
B73	C13	91-90	16-18	36-36	21-14	75-184
B125	B28	89-89	18-18	16-15	21-13	154-110
A31	M136	95-91	18-17	12-7	25-11	180-66
B23	B29	94-96	16-16	0-0	20-14	150-148
M21	F12	77-79	16-18	1-0	16-9	87-208
F1	A25	77-73	15-14	38-36	21-16	236-88
F50	M56	85-82	22-21	34-31	20-12	193-71
M87	A50	86-82	22-22	26-26	21-14	237-139
A36	A1	84-79	21-22	7-13	28-18	216-181
A11	M74	88-89	22-21	0-0	23-15	197-36
B127	M94	83-85	21-22	0-0	22-14	157-79
M24	B72	96-96	21-22	0-0	19-14	137-141
M65	M11	89-94	20-19	36-36	25-20	232-157
B104	A21	87-87	21-19	36-39	20-9	189-182

High	Low	M. A.	Aud.	Phon.	Vis.	Reading
C105	M6	90-88	20-19	23-21	21-14	125- 67
M40	C6	101-99	38-37	37-41	26-21	193-144
M58	M76	104-105	36-36	38-38	26-20	232-166
A12	B3	78- 78	37-36	41-39	25-19	171-190
A33	B12	93-90	36-36	39-36	25-19	191-170
M7	B92	93-94	36-36	35-38	25-19	235-228
B106	B121	92-94	38-37	41-36	24-14	219-161
C77	M82	101-104	37-36	40-36	25-19	181-182
C104	A18	95-95	38-37	38-40	24-15	202-205
M25	B94	95-102	36-38	39-41	25-19	228-195
M117	B33	105-103	36-36	39-39	24-18	229-117
M93	M16	108-112	38-38	48-42	29-23	241-238
F40	M71	113-112	37-38	45-42	28-21	239-229

TABLE XXXI
 COMPARISON OF PHONETIC ABILITY WITH READING ACHIEVEMENT
 OF 79 PAIRS OF PUPILS

High	Low	M. A.	Aud.	Vis.	Phen.	Reading
B75	M66	88-91	37-36	18-18	38- 2	218-174
M131	M124	82-86	23-19	18-18	39- 0	119- 76
M91	M33	86-87	25-22	19-18	20- 5	119-211
B97	M34	87-86	31-28	17-17	34-12	161- 74
M106	A37	84-83	26-29	17-17	32- 0	178-199
A50	M94	82-85	23-22	14-14	26- 0	139- 79
B10	B98	84-87	31-33	15-14	28-0	180-124
B2	B18	94-92	27-23	17-16	43-21	207-135
B139	M102	93-93	20-20	17-17	19- 0	188-207
C5	B27	89-89	26-28	17-17	48-28	178-109
B12	M44	88-91	26-22	15-15	21- 3	106-125
B13	B103	90-94	18-19	14-15	36- 0	184-119
B70	M90	89-92	28-26	15-15	15- 0	189-129
M6	M74	88-89	19-21	14-15	21- 0	67- 36
F31	M116	101-95	33-35	18-18	43-17	163-177
C96	B123	100-101	34-33	18-18	48-30	223-157
B1	M50	101-98	30-31	18-18	43-13	156-116
F9	B128	100-98	25-29	18-19	48-30	221-143
C59	M121	98-95	26-29	18-18	48-21	166-142
M45	M24	101-96	24-21	18-19	43- 0	145-137
C26	M37	98-101	33-29	16-17	48-32	213-178

High	Low	M. A.	Aud.	Vis.	Phen.	Reading
B95	B8	98-100	33-31	16-16	43-20	193-152
F2	B41	98-98	25-27	16-17	41-18	208-107
F16	B88	97-101	28-29	16-17	36-19	207-159
F48	M112	98-95	24-24	16-16	32-13	123-107
B96	B26	89-91	32-29	21-21	42-21	181-144
F22	B102	88-91	22-21	21-21	40-16	202-123
M63	C105	90-90	18-20	20-21	48-23	218-125
M11	B125	94-89	19-18	20-21	36-16	157-154
B34	M54	94-90	25-28	20-20	42- 0	194-141
C73-	B23	91-94	16-16	21-21	36- 0	75-150
C30	M9	94-91	38-35	21-21	48- 0	233-201
B66	B42	93-90	26-24	20-20	41-26	121-143
M86	B61	92-94	35-35	21-21	48-32	232-209
A30	M79	98-96	35-33	13-12	37- 0	223- 62
F52	M21	75-77	18-16	16-16	45- 1	211- 87
B11	B91	75-74	24-25	16-16	35- 0	128-124
M115	B133	77-75	18-20	14-14	28- 0	94-79
B9	B45	95-101	25-28	12-12	30-13	69- 58
B58	B63	89-94	24-27	11-10	38- 0	101-174
M95	A15	91-90	34-31	19-19	48-21	203-101
C49	M72	94-95	34-32	19-19	43-28	226-173
F46	M77	93-93	31-29	18-18	42- 0	214-127
M104	M19	94-91	26-29	18-19	30- 1	81-115
A48	B132	89-94	25-26	18-18	35-13	181-128
B17	M2	88-94	24-25	19-18	40-18	137-195

High	Low	M. A.	Aud.	Vis.	Phen.	Reading
G103	B20	89-92	34-34	19-18	47-21	175-191
M97	B79	92-90	18-19	21-18	47- 0	228- 81
M113	M80	96-97	33-33	12-13	42-20	134-158
M127	M42	105-112	27-13	12-13	23- 1	74- 77
F18	A40	80-74	16-13	22-21	38- 0	224-134
G71	G68	109-115	40-40	27-26	48-25	236-231
B76	M8	102-103	38-40	24-25	38- 0	234-237
G58	M103	99-98	28-27	25-24	36-17	201-189
A60	A31	99-95	21-18	24-25	47-12	231-180
B73	M15	98-98	32-31	24-25	35- 1	236-210
G32	M126	99-96	34-34	23-23	43- 0	231-204
F14	A11	91-88	19-22	22-23	39- 0	110-197
M12	M108	91-89	27-26	22-22	40-13	229-236
M29	M23	94-91	32-31	23-23	37- 0	220-188
F6	G37	88-92	30-31	22-23	43-21	213- 227
A9	A8	94-93	33-32	25-24	37- 0	227-227
M26	M38	93-88	38-39	25-25	44-26	230-229
B24	A10	93-92	39-36	29-28	48- 0	236-225
G99	M70	97-100	38-37	27-26	48-30	238-242
G45	M68	98-97	35-39	20-21	48-33	221-139
B116	B122	98-100	20-20	21-21	41-0	202-155
B65	B72	99-96	21-22	15-14	20- 0	155-141
B110	B29	99-96	16-16	15-14	24- 0	177-148
G65	M130	98-96	30-28	20-20	39-15	159-105
B101	M88	98-100	33-30	21-20	42-21	228-101

High	Low	M. A.	Aud.	Vis.	Phon.	Reading
C43	M28	96-95	21-20	17-16	47- 5	218- 42
B86	M89	96-96	20-21	17-16	17- 1	98-111
G112	M129	106-103	35-34	20-20	43-16	183-208
M120	B136	107-103	28-31	16-16	40-21	105-186
M135	B31	105-105	39-35	17-16	39- 0	225- 90
M51	M105	102-104	26-28	14-14	27- 0	189-104
M71	C22	112-114	38-40	21-20	42-26	229-109
C85	A43	117-119	35-32	20-20	43-10	213-184