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**A Fuctional Reading Program and Its Effect Upon the General Achievements of Pupils of Grades Eight Through Twelve, Lincoln High School, Coldspring, Texas**

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A FUNCTIONAL READING PROGRAM AND ITS EFFECT UPON  
THE GENERAL ACHIEVEMENTS OF PUPILS OF GRADES  
EIGHT THROUGH TW ELVE, LINCOLN HIGH  
SCHOOL, COLDSRING, TEXAS

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SCOTT

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EIGHT THROUGH TWELVE, LINCOLN HIGH SCHOOL,  
COLDSRING, TEXAS

By

Chlorine Levanda W. Scott

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A Thesis Submitted in Partial Fulfillment  
of the Requirements for the Degree of

Master of Arts

in the

Graduate Division

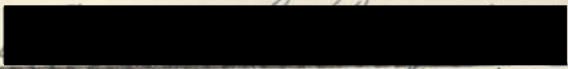
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Prairie View Agricultural and Mechanical College

Prairie View, Texas

August, 1954

Approved for the  
Department of English  
and the Graduate School by

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Chairman of English Department

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Dean of the Graduate School

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To Mr. M. C. Jones, superintendent of Coldspring Independent School District, and Mr. A. J. Porter, principal of Lincoln High School, Coldspring, Texas, I owe a debt of gratitude for generosity and liberality in making much of the material available for use in this study.

I wish, also, to acknowledge the assistance of the teachers in helping with the testing of the students.

Chlorine L. W. Scott

Dedication

This thesis is dedicated to my husband,  
Mr. Alfred T. Scott, and to my parents, Mr. and  
Mrs. Will Williams.

C. L. W. S.

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## CHAPTER I

### INTRODUCTION

#### Nature of the Problem

The teachers of grades nine through twelve of Lincoln High School, Coldspring, Texas, voiced loud complaints about the standard of work done by the pupils in any subject in which silent reading and independent study skills were involved. They expressed the belief that something could be and should be done about the matter; yet very little except complaining was undertaken prior to the 1953-1954 school year.

Every year for the past six years some of the students who left school in May without having graduated did not return in September. Some went to other towns and entered schools, while others failed to enroll any more in any school. Most of the drop-outs occurred in grades eight through ten. They were pupils whose scholastic achievements were low in all subjects listed on their permanent records.

Many of the students who entered the high school department and many of those who were promoted were passed on from grade to grade to relieve the congestion in the elementary grades or because of psychological reasons.

Test results for a period of several years showed that there were serious reading difficulties among the students who

enrolled year after year. The investigator, in reading the literature of her field, discovered the widespread seriousness of the reading difficulties of students on the high school level, and resolved to do intensive study of the problem in her teaching situation.

### Scope of the Problem

The research done in this thesis was conducted in Lincoln High School, Coldspring, Texas, in the school year 1953-1954. The pupils used in the study were those taught by the writer, who had charge of the English classes for grades eight through twelve.

Lincoln High School is an accredited school for grades one through twelve. Located in the county seat of San Jacinto County, Coldspring, Texas, this school has an enrollment of four-hundred, twenty pupils. Of this number, only ninety-nine were enrolled in grades eight through twelve for the 1953-1954 school year.

The principal occupations of inhabitants of the school district are farming and forestry work. Many of the families own their homes, but few have large enough holdings of land for family-sized farms. Therefore, many of the families are sharecroppers, while some are tenant farmers, and some are farm owners.

The principal profit-making crop for most farmers of the district is cotton. The labor of the children is often needed to cultivate and to harvest a great deal of the cotton crop. In 1953, the cotton crop for many of the families was unusually poor, and as a result, many of the children attended school very irregularly through the harvesting season. They helped to add to the income of their families by gathering cotton on surrounding large farms of the county and in an adjoining county, Polk County, Texas.

Of the forty-two boys in grades eight through twelve, several were irregular in attendance. They were absent occasionally to cut pulpwood to supplement the income of the parents.

Lincoln High School, Coldspring, had its beginning in 1938. Prior to that time there was only one high school for Negro boys and girls in the county, Dixon High School, Shepherd, Texas. Therefore, very few of the patrons of the children of Lincoln High School have had more than elementary school education, which was obtained in one to three-teacher schools.

Coming from these economic and educational backgrounds, the children have very little reading matter in the homes other than a farm magazine, a love story magazine, or comic books.

#### Purpose of the Problem

This study was undertaken (1) to determine the general educational levels of the pupils of grades eight through twelve

of Lincoln High School, Coldspring, Texas, (2) to find the reading level of each pupil, (3) to locate the major reading weaknesses of the pupils in study-type reading, (4) to adjust the English curriculum to meet the needs shown, and (5) to relate the pupils' reading abilities to their achievements in content subjects.

### Delimitations

Although a survey of the reading abilities of ninety-nine students of grades eight through twelve was made, the data used in this thesis have to do with the abilities shown by the fifty-nine students who participated in all formal tests given during the school year 1953-1954, at Coldspring, Texas.

This study has to do only with silent reading done from a basic and functional standpoint in an effort to help the students improve in their reading abilities. Recreational reading was used as a contributing force to induce more reading, which makes for increased reading ability. Oral reading was used only as a means for adding variety, stimulating interest, and increasing speed of perception.

### Definitions

Functional reading as used in this thesis means reading for study and work purposes rather than recreational purposes.

Program is used here to mean a plan of procedure.

General achievements is used in this thesis to mean average accomplishments in a group of content subjects including ten common areas of academic learning.

### Hypothesis

This study is based on the hypothesis that improvements in reading comprehension will produce comparable improvements in other content subjects.

### Sub-Problems

1. A limited vocabulary restricts one's reading ability.
2. Availability of reading material on the interest and achievement level of the student encourages reading.
3. Reading ability in English will benefit the student in all content subjects.

### Significance of the Problem

It is of paramount importance that all youths learn to read well, for they live in a reading age. Never before have there been more occasions for using one's reading ability. It is highly important that the reader read critically, for there are organizations and individuals who make strenuous efforts to use the printed page to win supporters for subversive activities against law and order.

On many jobs, employees must read instructions for performing the work efficiently. Study-type reading is essential, in most instances, to the efficient operation of many of the household apparatuses used in most homes, rural and urban, today.

Often in rural areas, one's ability to read with accurate comprehension determines the success or failure of his farm projects. There is a wealth of printed material which offers the rural dweller much in the way of modern education for a happy life in rural surroundings. However, this has little or no value to many because of reading difficulties.

In view of the recent decision of the Supreme Court pertaining to the separate school systems for Negro and white pupils, the Negro child must be neglected in no areas of learning, but especially must he be taught those skills so necessary to acquiring information to thinking clearly, and to making reasonably sensible decisions. These are very essential, regardless of one's school affiliation, but if Negro boys and girls must attend integrated schools, it is highly important they be able to read well in order that they not become discouraged and terminate their school attendance before graduation.

It is the hope of this writer that the research done in this study will be of benefit to other teachers who find conditions in their respective schools similar to those found in Lincoln High School, Coldspring, Texas.

## Related Studies

So widespread has the problem of low reading ability among high school pupils throughout the nation become, that numerous studies have been made on the problem. One such study was made by Florence Vaughn in 1943. Using an activity program with a ninth grade class of twenty-five students of St. Paul High School, Greenville, Texas, she found that by increasing the reading interests of the pupils through various activities, 54.5 per cent of the group increased in rate of reading, 24 per cent in vocabulary, and 88.8 per cent in paragraph comprehension.<sup>1</sup>

In 1950-1951, Clifford Swenby and Margaret Zielsdorf made a study to improve the reading of a group of pupils selected by means of reading and intelligence tests. They found that in Wausau Senior High School, Wausau, Wisconsin, 75 per cent of the students made gains of two years or more in one year. Those who failed to gain in a year had poor attendance records. The researchers found that these gains were made with slight outlay for materials and without disruption of the school program.<sup>2</sup>

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<sup>1</sup> Florence Vaughn, A Reading Program for the Ninth Grade of the St. Paul High School, Greenville, Texas, (unpublished Master's thesis, Prairie View A & M College, 1943).

<sup>2</sup> Clifford Swenby and Margaret Zielsdorf, "A Remedial-Reading Program in a Senior High School," School Review, LXI (September, 1951), 350-57.

William C. Johnston did a research study on the relationship between vocabulary and scholastic achievements of a group of students of Prairie View State College in 1945. Using data from the Registrar's Office and scores derived from the Michigan Profile Test, he arrived at the conclusion that a significant relationship between vocabulary and scholastic achievement did exist. He found, however, that vocabulary alone did not assure success.<sup>1</sup>

Addie Sankey Brown did a research study in reading in the seven junior high schools for Negroes in Pike County, Alabama. She found, through the use of three different standardized tests to determine the relationship between mental ability, general silent reading ability and scholastic achievements, that there was low positive relation between the mental ability and scholastic achievements of the one hundred, seventy-three pupils of the seventh, eighth, and ninth grade pupils used in her study. She found low positive relation between reading ability and scholastic achievements.<sup>2</sup>

Naomi S. Troxwell, an adjustment teacher in the Crieger Branch of the McKinley High School, Chicago, Illinois, tells of

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<sup>1</sup>William C. Johnston, The Relationship Between Vocabulary and Scholastic Achievements of a Group of Students of Prairie View State College, (unpublished Master's thesis, Prairie View State College, 1945).

<sup>2</sup>Addie Sankey Brown, An Attempt to Determine the Relationship Between Mental Ability, General Silent Reading Ability and Scholastic Achievements in the Junior High Schools of Pike County, Alabama, (unpublished Master's thesis, Alabama State College, 1951).



a program for improving the reading abilities of two hundred, twenty-eight ninth grade pupils who could not read on their grade level. Many of them had reading abilities from two to four years below the ninth grade norm in the fall at the beginning of the experiment. By centering units to be taught in English around the interests of the students, she found that among other results the reading ability of the students increased. This, she comments, resulted in the pupils making progress generally.<sup>1</sup>

J. Harlan Shores and J. L. Saupe made a study in determining the relation of reading efficiency to problem-solving in science and were convinced that the rate of reading and comprehension of students are largely affected by the kind of material read, that each content subject calls for a different reading skill. Therefore, it is recommended that various reading comprehension skills be taught in the secondary schools. The researchers say, "Certainly, good readers in one content area can be expected to read well in other areas, and poor readers in one area can be expected to read poorly in other areas. . ."<sup>2</sup>

At Theodore Roosevelt High School, New York City, New York, Stella S. Center and Gladys L. Persons carried out a study

<sup>1</sup> Naomi S. Troxwell, "Teaching the Non-readers to Read," English Journal, XXXIII (April, 1944), 195-98.

<sup>2</sup> J. Harlan Shores and J. R. Saupe, "Reading for Problem Solving in Science," Journal of Educational Psychology, XLIV (March, 1953), 149-50.

to increase the reading efficiency of a group of ninth grade pupils after testing the class and finding that 64 per cent of them read below their school grade level. At the beginning of the program, the writers found that in that group, many of the students had only fourth grade reading abilities. They found, also, that grouped heterogeneously, some children will not be helped. It was recommended that the English department come to the rescue of the children and provide a program of reading instruction that will improve the reading ability of all ability groups, retarded, average, and superior. Center and Persons say, "Pupils should be equipped with a modern, liberal textbook on the English language and integrate the study of language closely with the study of silent-reading materials. . . ." <sup>1</sup>

In an investigation made by Esther J. Swenson at Folwell Junior High School, Minneapolis, Minnesota, she found that those students who were poor readers of general reading materials were poor readers of specialized science materials. <sup>2</sup>

J. Harlan Shores conducted a study at Central Junior High School, Kansas City, Missouri. The study involved three

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<sup>1</sup> Stella S. Center and Gladys L. Persons, Teaching High School Students to Read, p. 143.

<sup>2</sup> Esther J. Swenson, "A Study of Relationship Among Various Types of Reading Scores on General and Science Materials," Journal of Educational Research, XXXVI (October, 1942), 90.

hundred, eighty cases who had pronounced reading disabilities. At the close of the study Harlan concluded that the study of science and history involve many common reading skills.<sup>1</sup>

Walter C. Hopkins did research in finding the relation of reading ability to scholastic achievements in Ohio in 1935. He used standardized tests scores to substantiate his conclusion that there did exist some relation between reading ability and scholastic achievements, but because the group dealt with was small, the results were only indicative of the trends.<sup>2</sup>

Hopkins' study included twenty students of the ninth grade who were divided into two groups of ten pupils each. His experimental group made a 3.5 per cent gain in scholarship during the semester of the program. The control group made a gain of 1.4 per cent during the same period. The gains for the experimental continued to increase through the second semester, but the control group lost rather than gained at that time.

Hopkins observed that scholastic improvement followed rather than accompanied the program. He comments that readers can be expected to improve in proportion to their intellectual capacities.

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<sup>1</sup>J. Harlan Shores, "Skills Related to Ability to Read History and Science," Journal of Educational Research, XXXVI (April, 1943), 584-593.

<sup>2</sup>Walter C. Hopkins, The Relation of Reading Ability to Scholastic Achievement and the Effects of Remedial Reading in the Ninth Grade, (unpublished Master's thesis, Wittenberg College, 1935).

## Review of Literature

Although reading and reading skills are taught throughout the entire primary and lower elementary grades, in the typical ninth grade class, according to DeBoer and his co-authors, the reading levels range from below the fourth grade to above eighth grade. They go farther to say that it is estimated that one-half of the adult population of this country is unable to read with ordinary comprehension the books and magazines which have been designed for the unselected lay audience.<sup>1</sup>

To help the student improve in his reading ability, the co-authors suggest that the teacher have the pupil approach the printed page with expectancy and with some definite purpose in view. "Reading is valuable only in so far as it contributes to the wholesome personality, the enrichment of life and the building of intelligent, democratic citizenship."<sup>2</sup> Since the student has to read in all content subjects if he is to learn from them, it is essential that each has help of some kind in reading.<sup>3</sup> There are many factors to be considered in attempting to encourage growth in reading. Some of these are mental factors and some are emotional. Yet

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<sup>1</sup>John J. DeBoer, Walter V. Kaulfers and Helen Rand Miller, Teaching Secondary School English, p. 165.

<sup>2</sup>Ibid., p. 170.

<sup>3</sup>Ibid., p. 174.

the school should do what it can to encourage growth rather than take it for granted that the total cause for one's reading difficulties lies out of the realm of the teacher's responsibility.

Constance M. McCullough states that, "Unless the reader has a substantial supply of sight words in his reading vocabulary he is slow and often unsuccessful in extracting meaning from printed material."<sup>1</sup> She suggests that pupils be taught how to get the meaning of words, regardless of subject matter field, from context; that they should be taught the skill of seeing in unfamiliar words something familiar.

That it is the responsibility of the secondary school to teach reading, even though the elementary school has done its share, is pointed out by Bond and Bond. They assert that "a student must be a good reader to do good work in any subject;" that there must be developed in him broad concepts, generalizations and appreciations in addition to factual experiences.<sup>2</sup> Bond and Bond admit that various subjects require different reading skills, but that some help can be given in the English classroom through a reading program which stresses basic skills, such as reading to follow directions, reading to organize material

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<sup>1</sup>Constance M. McCullough, "Word Analysis in the High School Program," English Journal, XLI (January, 1952), 15.

<sup>2</sup>Guy L. Bond and Eva Bond, Developmental Reading in High School, p. 6.

in sequence, reading to note details and vocabulary development. All of these Bond and Bond define as developmental processes, in as much as they result in growth in the ability to use and to understand speech, spoken and written.<sup>1</sup> They advocate the developing of any reading ability when that development will be useful to the student; therefore those abilities essential to high school work should be stressed in the high school.<sup>2</sup>

Witty and Kopel emphasize the fact that research confirms the general observation that in the typical school population the development of effective reading skills has not been continued to the point where pupils can successfully master the subject matter presented to them in print. These authors contend that this situation is serious, in that the impossible demands made upon many of the children result in impaired understanding, interests and mental health.<sup>3</sup> The English teacher, in most cases, say the authors, must initiate the programs needed to improve the silent-reading abilities of the large numbers of students who enter secondary schools with pronounced low silent reading competency.<sup>4</sup> This can be

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<sup>1</sup>Ibid., p. 51.

<sup>2</sup>Ibid., p. 65.

<sup>3</sup>Paul Witty and David Kopel, Reading and the Educative Process, p. 12.

<sup>4</sup>Ibid., p. 119.

done in regular English class programs in which instruction is altered to attain the desired goal--the improvement in general ability, according to Witty and Kopel. They admit that there are many factors involved in reading difficulties, but they are certain that a reading program for improving general abilities can alleviate some of the deficiencies.

Gates, in "What Research Says About Teaching Reading," states emphatically that "what the pupil does in all areas of learning depends in great measure on how the development of his reading abilities is guided in all his daily activities."<sup>1</sup> He agrees with others that each subject matter area requires certain specialized patterns of reading abilities which should be taught in connection with regular school activities.<sup>2</sup>

W. W. Theisen, assistant superintendent of Milwaukee Public Schools, Milwaukee, Wisconsin, expresses the idea that one who cannot read and write is not an effective member in a highly integrated and literate society and may find himself having difficulties in making a living.<sup>3</sup>

An associate professor of education, College of Education, Wayne University, Detroit, Michigan, has this to say: "Improvement of reading skills in arithmetic results in better work in

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<sup>1</sup> Arthur I. Gates, "What Research Says About Teaching Reading," National Education Association Journal, XLII (October, 1953), 402.

<sup>2</sup> Ibid., p. 402.

<sup>3</sup> W. W. Theisen, "We Teach Today's Fundamentals," National Education Association Journal, XL (November, 1951), 525.

in problem-solving."<sup>1</sup> She adds that many children experience difficulty in solving verbal problems because of inability to sense relationship within the problem.

The best tool for learning, the most basic tool of all learning, says Elizabeth A. Simpson, Director of Reading Service, Institute of Psychological Services, Illinois Institute of Technology, Chicago, Illinois, is reading. She holds that all students on all levels of education can be helped to do better work, academically, if they are helped to increase their reading powers. Because at each successive level of academic progress one meets with new situations that call for new or better reading skills, the school's efforts, declares Simpson, must not stop as long as one learns. Four basic skills which she advocates that every reading program make efforts to build are: word recognition, word meaning, comprehension, and speed. Among aids, she suggests reading tests through which pupils can ascertain their standing and progress.<sup>2</sup>

Gertrude Whipple, Supervisor of Reading, Detroit Public Schools, in answering questions about teaching reading makes the assertion that reading guidance leads to improved achievements in content subjects.<sup>3</sup>

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<sup>1</sup>Charlotte W. Junge, "Good Teachers of Arithmetic Teach for Meaning," N. E. A. Journal, XLII (March, 1953), 167.

<sup>2</sup>Elizabeth A. Simpson, "The Best Tool for Learning," N. E. A. Journal, XL (December, 1951), 643-44.

<sup>3</sup>Gertrude Whipple, "About the Teaching of Reading," N. E. A. Journal, XLI (September, 1952), 346.



It is generally agreed that every teacher in a subject content field should teach reading skills necessary for understanding the subject, but Carl F. Brown states that the teachers of literature and social studies have excellent opportunities to help their students to grow in reading skills, since in these two subjects students must be able to do many different kinds of reading and for many purposes. He makes the observation that both junior high school and senior high school teachers are becoming aware of the necessity for them to help children increase their reading abilities.<sup>1</sup>

Bond says that reading is not to be thought of as an isolated subject. He observes:

Reading finds its subject matter in all fields of endeavor. When the child is learning to read during the periods devoted to acquiring abilities and skills in reading, he is at the same time building backgrounds of information that are or will be useful to him in his learnings in science, in social studies, in mathematics, in literature, and in other areas. In fact, the greater his background of knowledge and vocabulary become the greater will be his chance of success in other subjects. The child needs to become a facile reader in order to be a successful learner in the modern school; the modern school is a reading school.<sup>2</sup>

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<sup>1</sup>Carl F. Brown, "Developing Reading Skills Through Literature," The High School Journal, XXXVI (October, 1952), 13.

<sup>2</sup>Guy L. Bond and Eva Bond, Teaching the Child to Read, p. 11.

According to William E. Young,<sup>1</sup> Center and Persons,<sup>2</sup> and many other persons of note, reading is a complex process, the development of which is a long-term process. The process is far too complex to be completed by the time one enters secondary school or even college. It grows gradually.

Since reading is the basic tool by which academic learning is largely acquired, it is extremely important that definite efforts be exerted to improve the reading abilities of all pupils. This investigator read authoritative discussions by several outstanding persons in the field of language arts and from those sources got ideas pertaining to how to carry on a reading program for improving reading abilities. Carol Hovious' Suggestions for Teachers of Reading Grades VII-XII, Teaching High School Students to Read by Center and Persons, and Reading Aids by David H. Russell and Etta E. Karp gave invaluable aid in this experiment.

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<sup>1</sup>William E. Young, "Recent Research on Reading in the Social Studies," Education, LXII (September, 1941), 26.

<sup>2</sup>Stella S. Center and Gladys L. Persons, Teaching School Students to Read, p. 13.

## CHAPTER II

### EXPERIMENTAL PROCEDURE

This researcher was granted permission to make this study with grades eight through twelve in regular class situations and with considerations for the course requirements for small rural high schools. This meant that for each of the classes there was one semester in which the state adopted text for literature was used as a "common denominator", and one semester in which the classes used the grammar and composition textbook as prescribed by the Texas Educational Agency.

Textbooks used by eighth through twelfth grade respectively were: for the eighth grade, Literature, A Series of Anthologies - Understanding Literature by E. A. Cross and others, and Using Good English by Harold G. Shane and others; ninth grade, Adventures in Reading by Jacob M. Ross and Blanche Thompson, and English in Action, Course One, fourth edition, by J. C. Tressler; for the tenth grade, Adventures in Appreciation by Louella B. Cole and others, and English in Action, Course Two, fourth edition, by J. C. Tressler; eleventh grade, Adventures in American Literature by Inglis and others, and English in Action, Course Three, fourth edition, by J. C. Tressler; and twelfth grade, Adventures in English Literature

by Inglis and others, and English in Action, Course Four, fourth edition, by J. C. Tressler.

Early in the first semester the writer began preparing the students for the study by giving brief talks on the advantages of being a good reader. Posters, slogans, and quotations about reading were also used to stimulate interest.

The researcher collected the data for this thesis from the pupils' entrance cards, Gray-Votaw-Rogers General Achievement Tests Forms S and Q, a diagnostic reading test, "How Well Do You Read?" Forms A and B from Read magazine, a semi-monthly publication of American Education Publications, and Thorndike-Lorge Reading Tests Forms A and B.

Form S of the Gray-Votaw-Rogers General Achievement was administered in October, 1953. The tests were scored, and on the basis of the total average score for each child, his educational grade was found.

From the reading comprehension and reading vocabulary tests, it was revealed that the students were far below their respective grade norms. These facts were made known to the pupils and encouragement was offered to each to strive to show all the improvement of which he was capable. General educational grades were low.

These tests were followed by a diagnostic test, "How Well Do You Read?" from Read magazine. This test was designed

to test the student's ability to read (1) for specific details, (2) for inferred details, (3) to grasp the meaning of words in context, and (4) to get the main idea of single paragraphs, groups of paragraphs or whole selections.

The reading program set up for each grade was similar to that of each of the other grades. This was done because there was so much in common in the reading deficiencies found in the five classes. For instance, the vocabulary weakness was more pronounced than any other in the tests. The enrichment materials were more varied because of interests and the chronological ages of pupils.

Since most persons like stories, each class studied a unit in stories. For the eighth grades the stories were old favorites and modern adventure stories. From the testbook the students of the eighth grade read "Leopard on the Loose" by Frank Buck, "How Odysseus Outwitted Polyphemus," "The Two Rogues," and Washington Irving's "Rip Van Winkle."

Factual and thought questions were drawn from the stories and put on the blackboard for students to find answers supported by some direct evidence or implications in the story being studied. Both objective and essay-type questions were given.

"Leopard on the Loose" aroused the pupils' interest in such things as the climate of India and the kinds of people living there since there are East Indians who live in America. This led to exercises requiring the use of the encyclopedias

and maps. Pupils found pictures of people of India, relics and costumes of the people, what their chief occupations are, and what they import and export. Individuals reported to the class on other stories about Odysseus. They found that Odysseus and Ulysses were the same person to different nations.

The class was divided into committees. Each committee selected scenes from "Rip Van Winkle" to dramatize or to illustrate through drawings. To do these things successfully, the pupil had to read carefully. He needed to understand the vocabulary well enough to get shades of meanings. He had to use critical judgment as well. He needed to understand similes, metaphors and personifications. However, these words were not used with the eighth grade class in order not to confuse the pupil's mind with terminology.

The study of these stories gave opportunity for the class to read maps, for no one in the class knew where the places were located on the world globe nor on maps. A study of Longfellow's "Evangeline" gave good reason for study of geography and history during the period set aside for literature.

Examples of questions asked about the stories were:

Underline the word in the question which means the same or near the same as the underlined word in the statement.

Rip Van Winkle had a termagant wife. Was Rip's wife kind, beautiful, old, thin, quarrelsome, healthy?

How was the leader of the little men who gave Rip the drink dressed?

What type of man do you think Rip's son became since he was so neglected by his father and scolded by his mother? Why?

Some of the short poems related to love and appreciation of America were "America for Me" by Henry Van Dyke, "America the Beautiful," "I Am An American," and "A Song for Flag Day." These were read orally and in unison. Some were memorized by some students.

The group did a choral reading of the poem, "Pirate Don Durk of Dowdee" by Merryman in assembly. The preparation of this selection for assembly presentation gave pupils work in using the glossary in their textbook and in reading without regressions -- one of their serious oral reading difficulties. The reading of this poem gave pupils reason to read about Sir Francis Drake and other real pirates in history.

The poem "Robin Hood and the Golden Arrow" led to individual reading of other stories in prose from Heal's book, Robin Hood. These were told to the rest of the class orally. Student groups pantomimed or dramatized any scenes which they especially enjoyed reading.

The ninth grade used as its basic text for literature, Adventures in Reading by Jacob M. Ross and Blanche Thompson. This book is an anthology as is the literature text for each high school grade in Lincoln High School, Coldspring, Texas. The ninth grade pupils ranged in ages from thirteen to sixteen years with twelve pupils under fifteen years of age. They

enjoyed animal stories and stories about teen-age girls and boys. Their first stories were stories about dogs, "Gulliver, the Great" and "That Greek Dog" found in their textbook. The study of "That Greek Dog" had allusions in it which led to the use of encyclopedias and ancient and medieval history. Pupils had individual assignments in reporting to the class facts found about Pericle, for instance. The entire class then was asked to try to explain the reason the author had for bringing each allusion into the story.

Each student then was asked to read and tell to the class one story found in a magazine of the Scholastic publications available. Some chose stories of sports. Some read stories of boy-girl themes and some chose stories with mystery themes. Many found that they were attracted to stories by the illustrations which accompanied them. Later when they read stories they were given the opportunity to collect pictures to illustrate passages. These pupils read stories from far and near included in their textbook. Among those read and told were "The Bedquilt," "A Retrieved Reformation," "The Buffalo Dance," "Baa, Baa Black Sheep," "The Necklace," "The Emperor's New Clothes," "Mr. Brownlee's Roses," "The Redheaded League," and "The Losing Victory."

Poems which tell stories were studied and reproduced in prose form. Some poems such as "Baby Lon" were dramatized by students. "Gunga Din" and "Mandalay," poems by Kipling,



furnished reasons for studying about China. "The Eve of the Waterloo" gave good opportunity for factual study about the Battle of Waterloo. Students enjoyed illustrating "The Skater of Ghost Lake." They found details about the disappointments and reasoning of the two youths in "Haying."

To inspire the pupils to try to develop into worthwhile Americans, the teacher led the pupils from the study of fictitious characters to a study of real persons. "Plowman of the Starry Skies," "A Momentous Decision," and "Son of the South," supplied material for developing student's ability to get details and main ideas and to draw conclusions.

The tenth grade class used as a textbook Adventures in Appreciation by Luella B. Cook and others. This class read stories of courage -- "The Old Demon," "Leonard the Barber," "The Unfamiliar," "The Last Class," "R. M. S. Titanic," and "The Man Who Won the War" -- and stories of fun and fantasy -- "Zenobia's Infidelity," "Windwagon Smith," and "The Monkey's Paw." Thought questions and questions for which answers required careful reading to miss no detail were given students. The pupils were warned to be able to defend an answer by giving facts or hints from the stories.

The class enjoyed W. W. Jacob's "The Monkey's Paw" so well that an original play based on the story was written by the group. For this project the class was divided into three committees. Each group worked out dialogue, movement and setting

for one scene. Then a committee combined and edited the entire play. The play was prepared for assembly presentation by the class.

Silas Marner furnished reading matter for practice of the reading abilities mentioned in Chapter II as well as others. There was much time given to reading the first chapter for background. Students read silently during class time to answer questions involving locating specific details and drawing inferences. Word meanings in context were studied and if necessary the glossary in the textbook or the Webster's New International Dictionary was used.

The class read some of Tennyson's "Idylls of the King" which proved to be rather difficult for many of the members of the class to read. They enjoyed the discussion of the poems, however. The only test exercises given on the "Idylls of the King" were some in which pupils completed lines or sentences in which omissions were made by the teacher.

Eleventh grade pupils used Adventures in American Literature by Inglis and others. This class read orally only to verify statements. They read "The Biscuit Eater," "Boone over the Pacific," and "Henry the Great" as a group. "The Biscuit Eater" led to discussions of prejudices -- racial, social, and religious. Students discussed freely, orally, and supported opinions with evidence from the story. "Boone over the Pacific" carried the story into the reading of American

legends, especially stories of Daniel Boone, David Crockett, Paul Bunyan, and John Henry. "Henry the Great" was read while the "Miss America Contest" for 1953 was in the news.

Stories studied for plot, sequence of happenings, character development and for improving ability to draw inferences and word meaning were "To Build a Fire," "Ring Around a Rosy," "The Cop and the Anthem," "The Devil and Daniel Webster," "Split Cherry Tree," and "Sixteen."

Novels read by members of this class were Mama's Bank Account by Forbes, Silver Chief, Dog of the North, and Valiant by O'Brien, Mary Donavan by Downes and Lassie Come Home by McKnight.

Essays studied to give practice in functional reading were "University Days," by James Thurber, "Microbe Hunters," by Paul De Kruif, and "Once More to the Lake" by E. B. White.

Magazine and newspaper articles read were "The Paradox of Poverty and Plenty," "Mary White," and "So Long Son." These were very good items for questions involving drawing conclusions.

Adventures in English Literature by Inglis contains prose introductions pertaining to the social and historical background of a period before the literature of the period is presented. These introductions supplied material for much of the functional reading of the twelfth grade. Study of these frequently resulted in use of library references.

For some of the narrative literature studied by the twelfth grade, pupils were required to read them carefully and write up episodes as front page news for the Houston Post. Headlining the news gave practice in summarizing.

Selections used in this class included "Beowulf," "Get up and Bar the Door," "Lord Randall," "Sir Gawain and the Green Knight," "Prologue to the Canterbury Tales," excerpts from "Paradise Lost," and "Pilgrim's Progress," "The Deserted Village," "The Cotter's Saturday Night," "Song of the Shirt," "Rape of the Lock," "Essay on Studies," and "Macbeth." Most of this reading was done during class period. Questions were given for pupils to answer in writing during the class period.

Each pupil read two novels and gave one oral and one written report. The reports were informal ones. Some of the novels read were Dickens' A Tale of Two Cities, Hardy's The Return of the Native, Bronte's Jane Eyre, Hilton's Goodbye Mr. Chips, Goldsmith's Vicar of Wakefield, Thackeray's Vanity Fair, and Stevenson's Treasure Island. Of course, the students' interest had to be aroused for this reading. The writer mentioned highly dramatic scenes or incidents in the novels, allowed the students to browse through them and encouraged them to read a few pages near the middle of the novel to arouse the students' curiosity. Then they selected novels for individual reading.

Each class read stories and accounts of happenings from library periodicals. They were directed to books for further reading along their lines of interest after completing assignments. Extra grades were offered for outside reading reported on in class.

During the study of grammar and composition, eighth grade pupils used as their textbook Using Good English by Shane, Ferris and Keener. Units in building sentences starting with the subject, then subject-verb skeleton followed by addition of direct object and modifiers. This gave the students the idea of how to retain what is read by giving particular attention to the skeleton of the sentence.

Paragraphing and outlining were studied and practical exercises were done in using the information learned. Word building by adding prefixes and suffixes to root words gave practice in vocabulary building.

The test used for grammar and composition for grades nine through twelve in Lincoln High School was English in Action, courses one through four respectively, by J. C. Tressler.

Units taught in the ninth grade included letter writing - business and friendly letters -, using the library with special emphasis on using encyclopedias and unabridged dictionaries, reading and following directions, and using words which say exactly what is meant. Activities included dictionary games, note-taking, vocabulary tests, contests in using the index of

the textbook, and writing of short themes about one's environment.

The tenth grade class, after taking the Thorndike-Lorge Reading Test Form A, in January, as did each of the five classes, spent additional time in studying how to read functionally. The class units included one in using the library with special emphasis on studying and answering questions efficiently. Questions to be answered were placed on separate cards and pupils chose ones to be answered. The title of the book to be used was on the card, but pages were not given. Laboratory time for locating and writing answers to questions was allowed. Then one or two class periods were allotted for giving answers orally. Another unit for this class was one in observing and describing. With this unit pupils studied shades of meanings of words, similes and metaphors. Short themes based on the results of personal observations were written. Proper mechanics of writing were expected. Students were graded on mechanics as well as on interest.

Both the eleventh and twelfth grades studied units in reading. The eleventh grade read magazines to rate them and to get acquainted with what the ones in the library offered in the way of profit and pleasure. This class also read newspapers. It studied how to read for summaries. It wrote headlines for the school news. It selected titles for paragraphs and articles. It read to follow directions for performing assignments.

The twelfth grade read maps, graphs, charts, directions and passages for comprehension. It did practice activities in understanding words in context, drawing conclusions from what was read, and identifying errors in thinking.

Ninth through tenth grade students were requested to prepare and submit in good form six themes of varying lengths. One involved the use of library references correctly accounted for. Eleventh through twelfth grades were required to write no less than eight themes of varying lengths not to exceed eight pages in long hand. One of these required the use of footnotes and a bibliography of not less than three books and magazines from the school's library.

The various classes were supplied with worksheets in reading for comprehension furnished free by Scott's Foresman Company. These were in the form of a booklet, "It's Perfectly Possible to Be a Better Reader." These were used as practice materials. Pupils also were issued "Interesting Origins of English Words from Webster's New International Dictionary."

These devices along with library and classroom library materials supplied the pupils with reading matter on many levels and centers of interest.

In April, 1954, Form S of the Gray-Votaw-Rogers General Achievement Test was given. The educational grade for each child was found on the individual achievement chart. This was recorded beside the educational grade made in October, 1953.

The grades for reading were also recorded in the same manner.

The Thorndike-Lorge Reading Test Form B for grades 7-9 was administered as was the Read "How Well Do You Read" Form B. The reading quotient for the Thorndike-Lorge and the grade equivalent given in the manual for the individual's performances were recorded for future study.

This chapter has dealt with the program and procedure used in making this study. Chapter III will deal with analysis of the data secured during the study.

A list of textbooks and supplementary materials will be found in Appendix A.

Fortunately, the writer had charge of the library in her school during the 1953-1954 school year, and was extended the privilege of selecting almost all of the new materials for the library. She selected these on the basis of what the tests given in October, 1953 revealed as to the reading levels and the students' interests.

Whenever a supply of new books arrived, they were displayed in the library for a week or more before they were put on the shelves. Their attractive covers interested many students. Students were extended the invitation to browse through these new books. After the books were accessioned, covers of some books already on hand and covers of new ones were displayed in various classrooms to catch the pupils' attention and to inspire the children to read more.



## CHAPTER III

### ANALYSIS OF DATA

The plan of this study provided for an experimental program to be carried on over a period of one school year so that the results would indicate more exactly the influence of methods of teaching and choice of materials upon improvements of reading and general achievements. The results would also be indicative of the diagnostic and predictive value of achievement tests. Seven months will have transpired between the first general achievement testing in the fall and the subsequent testing in the spring of the following year.

For this study six tests were given to eighth, ninth, tenth, eleventh, and twelfth grades: (1) The Gray-Votaw-Rogers Test, Form S; (2) The Gray-Votaw-Rogers Test, Form Q; (3) Read Diagnostic Reading Test, Form A; (4) Read Diagnostic Reading Test, Form B; (5) Thorndike-Lorge Reading Test, Form A; and (6) Thorndike-Lorge Reading Test, Form B.

Two forms of each test were given in order that reading and general achievements could be determined by the same type of measurement used at the beginning of the study. The test at the end of the experiment is the core of the experiment, for in the comparison of grade equivalents will be revealed the value of the program expressed in reading ability and achievements in content subjects.

For an adequate measure of general achievement, the Gray-Votaw-Rogers General Achievement Tests were chosen. Ten subjects make up the battery. They are (1) elementary science, (2) language, (3) literature, (4) spelling, (5) reading vocabulary, (6) reading comprehension, (7) social science, (8) health and safety, (9) arithmetic computation, and (10) arithmetic reasoning. According to the authors, these tests may be given for diagnostic and supervisory purposes at any time during the school year. Diagnosis may be made of individual pupils and also of classes. The authors recommend that at least four weeks of school work elapse in the fall before the tests are administered. That much time is ordinarily required for recovery and adjustment of pupils. Remedial work may then be applied where it is needed, and another form may be used near the end of the school year to measure progress.<sup>1</sup>

In order to get a clear picture of each child's educational status, an educational grade equivalent can be determined for each raw score of each subject of the battery. A total average score, corresponding grade equivalent, and educational age can also be determined for the total battery score. This is possible by each child's respective subject score and total average score on an individual educational profile chart on the

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<sup>1</sup>Hob Gray, David F. Votaw and J. Lloyd Rogers, Gray-Votaw-Rogers Manual of Directions and Interpretations, (Austin: 1948), p. 6.

front of each test booklet. A line graph may be drawn to show graphically a child's chronological age, educational age, subject-grade placement, total educational grade placement, and actual grade placement in comparison with test norms. The educational performance of an individual or an entire class or grade can also be charted in like manner.

References to pupils are made by numbers rather than names. A pupil's number was determined by his position after the Gray-Votaw-Rogers Tests, Form R, total scores were arranged in order of magnitude. The pupil making the highest total score is designated as pupil 1, the next highest is number 2, and so on to the lowest score. This procedure was used in each class.

Grades on the tables are read thus: The figure on the left indicates the grade and the figure on the right shows the nearest month of the grade. This applies to all tables and each test.

The Read Diagnostic Reading Test Forms A and B is one designed to indicate the reading weaknesses of a student in (1) observing details specifically stated, (2) interpreting material by use of implications given, (3) understanding the meaning of words in context, and (4) getting main ideas from what is read.<sup>1</sup> The grade equivalent to correct responses in intervals of four from four to sixty, the largest possible raw

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<sup>1</sup>"How Well Do You Read?" Diagnostic Reading Test - Form B, Read, III (April 15, 1954), 13.

score, was furnished by the publishers.

The Thorndike-Lorge Reading Test is a general test which measures the pupil's attainment in (1) getting the meaning of words and phrases in context, (2) understanding constructions, (3) inferring meanings of words from their component parts and their resemblances to known words, (4) keeping in mind parts of a sentence or paragraph and using them to understand the whole sentence or paragraph, and (5) organizing and using meanings of sentences and paragraphs for informational and aesthetical purposes.<sup>1</sup>

Grade equivalents on this test are determined by the total number of correct responses as are designated in the manual.

For convenience in analyzing the data, tables have been made. These tables show the grade equivalent for each student in each grade in the subject being discussed.

The grade equivalents in each column labeled "October" or "January" is that attained by the student on the first test of a series. The grade in columns labeled "April" or "May" shows the grade performance for the pupil in the subject during the second test of each series. Columns marked "Gain" show the difference, negative or positive, for the student in the second test of the series as compared to that of the first test of the

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<sup>1</sup>E. L. Thorndike and Irving Lorge, Manual, Thorndike-Lorge Reading Test, 1947.

series. This figure was found by subtracting figures in the October column from those in January columns.

Table I shows the reading grade equivalents and gains for the nine members of the twelfth grade who participated in the program to the extent that they took each test shown on the table.

Table I shows that the twelfth grade had in it in October nine pupils whose level of reading comprehension range was from a low of slightly below fourth grade (3.8) to high eighth (8.6) grade on the Gray-Votaw-Rogers "Reading Comprehension Test" in Form S battery. Pupils of this group showed that there were five reading levels in the class. There was one who read on the third grade level, two on the fourth grade level, four on fifth grade, one on sixth grade, and one on eighth grade level.

Seven months later the same group exhibited reading abilities ranging from fourth grade (4.8) to twelfth grade (12.-). One read as a fourth grade student should have read, five as sixth grade students should, one as a seventh grade pupil, one as eighth grade, and one as twelfth grade.

Each student made some progress according to the Gray-Votaw-Rogers Tests. The gains ranged from three months (.3) to three grades during the program. Two students made less than one grade of progress, three made 1.0 to 1.3 grade improvement, two gained from two grades one month to two grades seven months, and two made three grades or slightly more progress.

TABLE I

GRADE EQUIVALENTS AND GAINS MADE BY TWELFTH GRADE  
PUPILS ON READING COMPREHENSION TESTS

Pupil	Gray-Votaw-Rogers			Read Diagnostic			Thorndike-Lorge		
	Oct.	April	Gain	Oct.	May	Gain	Jan.	May	Gain
1	8.6	12.0	+3.4	6.9	7.7	+.8	10.0	9.6	-.4
2	6.3	7.4	+1.1	6.3	6.9	+.6	5.8	7.1	+1.3
3	5.4	6.7	+1.3	6.2	6.9	+.7	7.1	9.3	+2.2
4	5.7	6.0	+ .3	6.0	6.9	+.9	8.7	7.1	-1.6
5	5.4	6.0	+ .6	6.0	6.8	+.8	7.1	9.3	+2.2
6	4.0	6.7	+2.7	5.4	6.8	+1.4	8.7	9.2	+ .5
7	5.7	8.8	+3.1	6.5	6.9	+ .4	6.4	7.7	+1.3
8	4.7	6.8	+2.1	5.4	6.5	+1.1	4.5	7.7	+3.2
9	3.8	4.8	+1.0	6.3	6.8	+ .5	6.0	8.7	+2.7
Range	3.8- 8.6	4.8- 12.0	.3- 3.4	5.4- 6.9	6.5- 7.7	.4- 1.4	4.5- 10.0	7.1- 9.6	.5- 3.2
Number who gained			9			9			7
Average gain			1.7			.8			2.9

The performances on the Read test in October ranged from fifth (5.4) to sixth grade (6.9). Two students fell within the fifth grade level on the test, and seven showed sixth grade performance (6.0-6.9). When the Form B was given in May, 1954, eight of the students read on the sixth grade level (6.5-6.9) and one advanced to seventh grade (7.7).

The gains made ranged from four months (.4) to one grade, four months (1.4). The average gain by May was nine months for nine pupils.

On the Thorndike-Lorge test Form A the twelfth grade group had a reading level range of fourth grade (4.5) to tenth grade (10.0). There was one student who read on the fourth grade level, one on fifth grade level, two on sixth grade, two on seventh grade, one on eighth grade, and one on tenth grade level.

In May the reading level range showed improvements for seven pupils (77.7 per cent of the group). Four read within seventh grade range, one eighth grade, and four ninth grade level. The positive gains ranged from five months to above three grades (.5-3.2). The average gain for the seven who made improvements was slightly below two grades (1.9).

Nine eleventh grade students participated in the entire program. Table II shows their reading grade equivalents for each time tested and the gains on the second tests.

TABLE II

GRADE EQUIVALENTS AND GAINS MADE BY ELEVENTH GRADE  
PUPILS ON READING COMPREHENSION TESTS

Pupil	Gray-Votaw-Rogers			Read Diagnostic			Thorndike-Lorge		
	Oct.	April	Gain	Oct.	May	Gain	Jan.	May	Gain
1	6.3	12.0	+5.7	6.6	6.8	+ .2	7.1	9.9	+2.8
2	8.0	7.0	-1.0	5.0	7.0	-2.0	9.8	8.0	-1.8
3	4.7	7.8	+3.1	4.9	6.6	+1.7	5.8	8.0	+2.8
4	4.7	11.1	+6.4	6.3	6.5	+ .2	3.7	7.1	+3.4
5	4.0	11.1	+7.1	6.6	6.8	+ .2	7.5	7.5	0
6	6.8	10.2	+3.4	4.9	6.5	+1.6	7.8	6.5	-1.3
7	4.0	6.3	+2.3	5.1	6.3	+1.2	5.5	6.8	+1.3
8	4.5	8.0	+3.5	5.8	6.6	+ .8	6.8	7.1	+ .3
9	4.7	10.2	+5.5	6.8	5.0	-1.8	2.1	4.9	+2.8
Range	4.0- 8.0	6.3- 12.0	2.3- 7.1	4.9- 6.8	5.0- 7.0	.2- 1.7	2.1- 9.8	4.9- 9.9	.3- 3.4
Number who gained			8			7			6
Average Gain			4.6			.8			2.2



When the eleventh grade took the Gray-Votaw-Rogers "Reading Comprehension Test" of the Form S test in general achievements, their grades in reading comprehension ranged from fourth grade (4.0) through eighth grade (8.0). Six (66  $\frac{2}{3}$  per cent) students of the group read on the fourth grade level (4.0-4.7), two on sixth grade, and one on eighth grade level. The April test in reading comprehension from Form Q of the same series showed that the students of the group had a reading grade range of sixth grade to twelfth grade (6.3-12.0). By mathematical calculation, subtraction of grades in the October column from the April column, positive gains of the group are found to range from more than two grades individually. 88.8 per cent of the group made an average gain of 4.6 grades. None read with comprehension below sixth grade in April. One had a reading grade of slightly more than sixth grade (6.3), two showed seventh grade abilities (7.0-7.8), two, tenth grade (10.2), two, eleventh grade, and one, twelfth grade.

The Read Diagnostic Test further revealed the reading efficiency and reading gains of these students. From a reading level of slightly below fifth grade to one, two months below seventh grade, (4.9-6.8) the group's scores increased to 5.0 to 7.0. Two students made slightly below fifth grade reading level on the test, Form A, given in October; three fell within the fifth grade; and four within the sixth grade level. The lowest reading grade made on Form B in April was fifth grade, made by

one pupil. Seven students (77.7 per cent of the class) read within sixth grade level, and one read on seventh grade level. The individual gains ranged from two months to one grade, seven months (2 to 1.7). The average gain for the seven students (77.7 per cent of the class) was eight months.

On the Thorndike-Lorge Reading Test given in January, the grade levels ranged from second grade through ninth grade (2.1-9.8). In May they extended from slightly below fifth grade to slightly below tenth grade (4.9-9.9). The distribution of reading levels in January according to the test were; one second grade, one third grade, two fifth grade, one sixth grade, three seventh grade, and one ninth grade. In May the reading results showed increases for six (66 2/3 per cent) of the group. The distribution of grades were: one near fifth grade, two sixth grade (6.5 and 6.8), three seventh grade, two eighth grade, and one ninth grade.

Table III presents data of the sixteen tenth grade students' performance on the reading tests.

TABLE III

GRADE EQUIVALENTS AND GAINS MADE BY TENTH GRADE  
PUPILS ON READING COMPREHENSION TESTS

Pupil	Gray-Votaw-Rogers			Read Diagnostic			Thorndike-Lorge		
	Oct.	April	Gain	Oct.	May	Gain	Jan.	May	Gain
1	12.0	12.0	0	7.0	7.0	0	11.2	9.3	-1.9
2	7.2	8.0	+ .8	6.7	6.9	+ .2	7.8	7.9	+ .1
3	9.4	9.0	- .4	6.1	7.0	+ .9	5.2	8.7	+3.5
4	6.8	7.8	+1.0	6.9	7.0	+ .1	9.6	8.9	- .7
5	6.0	7.4	+1.4	5.9	6.9	+1.0	4.5	8.9	+4.4
6	12.0	6.3	-5.7	6.6	7.5	+ .9	9.2	7.8	-1.4
7	4.7	6.3	+1.6	6.6	6.9	+ .3	8.7	9.3	+ .6
8	3.8	5.7	+1.9	6.6	6.6	0	9.2	6.8	-2.4
9	4.4	5.7	+1.3	5.0	6.6	+1.6	4.3	5.5	+1.2
10	6.0	5.7	- .3	4.9	6.3	+1.4	4.0	7.4	+3.4
11	3.8	5.7	+1.9	6.3	6.5	.2	6.0	5.5	- .5
12	3.8	5.7	+1.9	6.2	5.0	-1.2	6.0	4.3	-1.7
13	4.7	4.6	- .1	5.1	6.3	+1.2	4.3	7.1	+2.8
14	4.4	6.6	+2.2	5.9	6.8	.9	5.5	5.0	- .5
15	6.8	7.0	+ .2	5.8	6.4	.6	2.1	6.8	+4.7
16	5.1	6.0	+ .9	3.9	6.2	+2.3	3.7	5.2	+1.5
Range	3.8- 12.0	4.6- 12.0	.2- 5.7	3.9- 7.0	5.0- 7.0	.1- 2.3	2.1- 11.2	4.3- 9.3	1.6- 4.7
Number who Gained			11			13			9
Average Gain			1.4			1.0			2.5

On the Gray-Votaw-Rogers Reading Comprehension Test, Form S, given in October, three pupils scored equivalent to third grade level; four, fourth grade; one, fifth grade; four, sixth grade; one, seventh grade; one, ninth grade; and two, twelfth grade. In April, only one fell within the fourth grade in reading on the same type of test, Gray-Votaw-Rogers, Form Q; five within fifth grade; four within sixth grade; three, seventh grade; one, eighth grade; one, ninth grade; and one, twelfth.

Eleven students (87.8 per cent) made gains of two months to five years, seven months. The average gain for the eleven was one grade, four months.

On the Read Diagnostic Test Form A given in October, there was one student who read on slightly below fifth grade (4.9); five read on fifth grade level, nine on sixth grade level, and one on seventh grade level. When they were tested with Form B of the same test, thirteen or 81.25 per cent had made gains of from one month to two grades, three months. This amounted to an average gain of one grade for each of the eleven who made positive gains. Reading grades for May ranged from fifth grade to seventh grade (5.0-7.0).

On the Thorndike given in January, the sixteen tenth grade pupils showed reading levels ranging from the first month of the second grade (2.1) to the second month of the eleventh grade. One read at second grade level, one at third

grade, four at fourth grade, two at fifth grade, two at sixth grade, one at seventh grade, one at eighth grade, two at ninth grade, and one at eleventh grade level. Their May scores showed one reading at fourth grade level, four at fifth grade level, two at sixth grade level, four at seventh grade level, three at eighth grade level, and two at ninth grade level. In January, reading grades ranged from the first month of second grade to the second month of the eleventh grade. In May they ranged from the third month of the fourth grade to the third month of the ninth grade. Gains ranged from six months to four grades, seven months, with nine students (56.25 per cent) of the group making gains. The average gained by them was two grades, five months.

In Table IV is shown the reading grade equivalents made by the seventeen ninth grade pupils included in the study.

On the October Gray-Votaw-Rogers Test Form S, the ninth grade made reading grade equivalents as follows: One made third grade (3.8), five made fourth grade (4.0-4.7), four made fifth grade, six made sixth grade, and one made seventh grade. In April, on the Form Q test, the reading grade equivalents were one fourth grade (4.5), two fifth grade, four sixth grade, four seventh grade, one eighth grade, two tenth grade, and one eleventh grade.

There was a gain range of two months to six years, nine months with sixteen pupils, 94.1 per cent of the seventeen, sharing. The average gain for the sixteen was two grades, three months (2.3).

TABLE IV

 GRADE EQUIVALENTS AND GAINS MADE BY NINTH  
 GRADE ON READING COMPREHENSION TESTS

Pupil	Gray-Votaw-Rogers			Read Diagnostic			Thorndike-Lorge		
	Oct.	April	Gain	Oct.	May	Gain	Jan.	May	Gain
1	6.0	8.8	+2.8	6.7	6.9	+ .2	7.8	7.1	- .7
2	6.0	7.4	+1.4	6.3	6.7	+ .4	6.7	7.7	+1.0
3	5.4	6.7	+1.3	6.2	6.3	+ .1	6.7	6.0	- .7
4	5.1	7.4	+2.3	6.6	6.6	0	8.1	8.1	0
5	5.7	10.2	+4.5	6.6	6.9	+ .3	6.7	6.9	+ .2
6	6.3	12.0	+5.7	5.8	7.0	+1.2	7.4	9.7	+2.3
7	6.8	7.0	+ .2	6.3	6.7	+ .4	8.1	6.2	-1.8
8	5.1	5.7	+ .6	6.4	6.6	+ .2	7.1	5.7	-1.4
9	4.7	11.6	+6.9	5.8	6.5	+ .7	6.7	8.0	+1.3
10	6.8	7.4	+ .6	5.8	6.9	+1.1	7.1	6.2	- .9
11	4.7	6.3	+1.6	6.6	6.4	- .2	7.4	8.5	+1.1
12	4.7	10.2	+5.5	6.8	6.8	0	8.7	6.2	-2.2
13	4.0	4.5	+ .5	6.8	6.4	- .4	4.0	5.7	+1.7
14	6.0	7.8	+1.8	5.8	6.2	+ .4	8.7	6.8	-1.9
15	7.4	5.4	-2.0	6.0	6.5	+ .5	5.5	6.8	+1.3
16	4.5	6.0	+1.5	5.8	6.4	+ .6	4.5	5.9	+1.4
17	3.8	6.7	+2.9	6.0	5.8	- .2	4.8	5.7	+ .9
Range	3.8- 7.4	4.5- 11.6	.2- 6.9	5.8- 6.7	5.8- 7.0	.1- 1.2	4.0- 8.7	5.7- 9.7	.2- 2.3
Number who gained	16			12			9		
Average gain	2.3			.5			1.2		

Read Diagnostic Reading Test Form A, given in October, shows that there were five students of seventeen who had fifth grade reading abilities, while twelve had sixth grade reading competency. When the results for the Form B of the same test were compiled, they showed that there was only one pupil reading below the sixth grade level and only one reading above the sixth grade level. The reading levels ranged from fifth grade, eight months, to sixth grade, seven months in January, and from fifth grade, eight months to seventh grade in May. Gains ranged from one month to one grade two months in May. The average positive gain was five months for the twelve students (70.6 per cent of the group), was five months.

The reading grades on the Thorndike-Lorge Reading Test Form A covered from the beginning of the fourth grade to the seventh month of the eighth grade in January. Three read on fourth grade level, one on fifth grade level, four on sixth grade level, five on seventh and three on eighth grade levels. On the Form B, in May, these students had reading levels beginning with the seventh month of the fifth grade and extending through the seventh month of the ninth grade. Four students fell within the fifth grade bracket, seven came within the sixth grade level, two came within the seventh grade bracket, three read on eighth grade level, and one on ninth grade level.

Individual gains ranged from two months to two grades, three months. Nine students, which represented 52.4 per cent of the group, shared in the improvements. The average gain for

nine was nine months.

In Table V the data from the reading comprehension tests for the eight participants from the eighth grade class are given.

TABLE V

GRADE EQUIVALENTS AND GAINS MADE BY EIGHTH GRADE PUPILS ON READING COMPREHENSION TESTS

Pupil	Gray-Votaw-Rogers			Read Diagnostic			Thorndike-Lorge		
	Oct.	April	Gain	Oct.	May	Gain	Jan.	May	Gain
1	7.0	11.1	+4.1	6.9	7.6	+ .7	8.7	9.9	+1.2
2	3.8	4.6	+ .8	6.5	6.5	0	6.2	5.5	- .7
3	3.8	4.6	+ .8	6.0	6.4	.4	6.0	3.7	-2.3
4	4.7	7.4	+2.7	6.9	6.9	0	6.0	8.2	+2.2
5	4.4	5.7	+1.3	6.0	6.4	.4	6.4	4.9	-1.5
6	4.4	3.9	- .5	5.9	6.3	.4	4.3	7.7	+3.4
7	3.8	5.1	+1.3	5.4	6.5	1.4	4.3	6.8	+2.5
8	3.8	5.7	+1.9	6.2	6.4	.2	5.2	6.2	+1.0
Range	3.8- 7.6	3.9- 11.1	.5- 4.1	5.4- 6.9	6.3- 7.6	.2- 1.4	4.3- 8.7	3.7- 9.9	1.0- 3.4
Number Who Gained			5			6			5
Average Gain			1.8			.6			2.1

From the data on the Reading Comprehension Test of the Gray-Votaw-Rogers Tests Form S given in October, it is revealed that the reading grade range extended from the eighth



month of the third grade to the sixth month of the seventh grade. Four pupils (50 per cent of the group) were reading on the third grade level in October. Three were reading on the fourth grade level and one on the seventh grade level. In April, when they took the Form Q of the same test, their performance showed that one pupil made a score equivalent to the ninth month of the third grade. Two made fourth grade in the same test, two came within fifth grade range, one read on seventh grade level, and one scored equivalent to eleventh grade, one month.

Their individual gains ranged from five months to four grades, one month. Five students ( $62\frac{1}{2}$  per cent) made positive gains. The average gain was one grade, eight months.

On the Read Diagnostic Test Form A, two students read on the fifth grade level. The remaining six, (75 per cent of the group) read within the sixth grade level. In May, on the Form B test, seven read within the sixth grade range and one read on the seventh grade level.

The individual gains ranged from two months to one grade, four months, for six who made positive gains. The average gain for them was six months.

Five pupils made positive gains averaging two grades, one month from January to May according to data taken from the Thorndike-Lorge Reading Tests Form A and B, given in January and May respectively.

In January the reading achievements ranged from the third month of the fourth grade to the seventh month of the eighth grade. In May the reading range was from the seventh month of the third grade to the ninth month of the ninth grade. Gains ranged from one grade to three grades, four months.

This analysis has shown the progress or lack of progress made by the nine twelfth grade, nine eleventh, sixteen tenth grade, seventeen ninth grade, and eight eighth grade students who took each of the tests mentioned. Of the fifty-nine students participating, two students (number 2, eleventh grade, and number 1, tenth grade) showed no positive gains. Students numbers 2 of the eighth grade, 4 of the ninth grade and 12 of the tenth grade made positive gains in only one of the three spring tests. Fifty-four students showed gains on two or three tests.

Pupils' achievements as were measured by the two Gray-Votaw-Rogers Tests, Form S and Form Q in language, literature, spelling, social science, health and safety, arithmetic reasoning, arithmetic computation, reading vocabulary, and reading comprehension, have been tabulated to give a graphic picture of the effect of the functional reading program upon pupils' achievements in content subjects taught as separate subjects or in correclation with other subjects in some instances. For instance, elementary science was not taught in grades represented in this study. However, the ninth grade was taught general

science but no social science. Therefore a science grade for ninth grade is listed under the title elementary science.

The numbers in each column 1 gives the data taken from the results of the Form S test given in October. The data in columns 2 represent the performance on the Form Q test given seven months later in April, 1954. By subtracting the grade in each subject under columns 1 from that in columns 2, the positive gain is found. In each class the grades gained in each subject were added and the total sum divided by the number of pupils who registered improvements in the particular subject. In this way the average gain for that part of the group was ascertained.

Table VI contains data by subjects listed above except elementary science for the eighth, tenth, eleventh, and twelfth grades, and social science for the ninth grade.

In language, only one pupil of the nine twelfth grade participants made any gain according to the test. That pupil (pupil 9) gained six grades, three months (6.3).

In literature, five pupils made gains of from seven months to three grades, eight months. The average gain for them was two grades, two months. In October, their grade levels in literature ranged from the sixth month of the fourth grade to the first month of the eleventh grade. In April, the range was from the first month of the fourth grade to the ninth month of the ninth grade.



Of this group whose grade equivalents in spelling in October ranged from the ninth month of the fifth grade to the twelfth grade, four made gains of from three months to two grades, one month on the April test. This amounted to an average gain of eight months for four pupils. The grade range in spelling for April was from the ninth month of the third grade to the twelfth grade.

The range in social science in October was 3.5 grade to 8.6 grade. In April, the range was 5.3 grade to 12.0 grade. There were six pupils, 66  $\frac{2}{3}$  per cent of the group, who made gains of 1.4 grade to 7.0 grades during the experiment. The average gain for the six students was 3.5 grades, three grades, five months.

In health and safety, all pupils of this group gained. The range of gain was one grade, five months to five grades, seven months (1.5-5.7 grades). The average gain was three grades, one month.

Five gained in each of the two phases of arithmetic. The average gain in reasoning was three months more than the one grade, two months average in computation.

The increase in vocabulary ranged from five months to two grades nine months for seven pupils (77.7 per cent of the group). The average gain was one grade, four months (1.4).

Each student gained in reading comprehension from three months to three grades, four months. The average gain was one grade, seven months.

In each subject recorded the pupils made gains averaging more than seven months of progress. All students of this group of nine high school seniors made gains in reading comprehension and in health and safety. Six (66 2/3 per cent) gained more than one grade each in social studies. Five students (55.5 per cent) gained in literature, arithmetic reasoning, and arithmetic computation. Seven (77.7 per cent) gained more from five months to almost three grades in reading vocabulary. The average gain for each in reading comprehension was 1.7.

This was indicative of the effect of the functional reading program upon the general achievements of the twelfth grade pupils of Lincoln High, Coldspring, Texas.

Table VII shows the grade equivalent achievements of each of nine eleventh grade pupils.

These data were collected and processed in the manner used with the data from the twelfth grade. By subtracting data in columns 1 from those in columns 2, adding the positive gains, and dividing the sum by the number of pupils who made the positive gains, the average gain for each who gained was found.

From Table VII it was found that the average gain for the two pupils who gained in language usage on the Gray-Votaw-Rogers Tests Form Q over what they had made in October, 1953, was 1.8, one grade, eight months. Grades in October represented six different language levels in a group of nine classmates. In April there were five language levels in this same group.

TABLE VII

ACHIEVEMENTS BY SUBJECTS FOR ELEVENTH GRADE PUPILS ACCORDING TO  
 GRAY-VOTAW-ROGERS GENERAL ACHIEVEMENT TESTS, FORMS "S"  
 AND "Q", OCTOBER, 1953 AND APRIL, 1954, RESPECTIVELY

Pupil	Language	Literature	Spelling	Social Science	Health and Safety	Arithmetic Reasoning	Arithmetic Computation	Reading Vocabulary	Reading Comprehension
1.	10.2	7.2	8.4	7.0	7.2	7.4	7.8	8.8	6.3
2.	10.2	8.4	7.6	8.0	7.4	6.5	5.2	8.4	8.8
3.	7.4	6.3	8.4	6.7	11.2	9.9	8.8	6.5	4.7
4.	4.5	5.7	9.1	8.0	8.8	8.6	9.1	7.6	4.9
5.	6.8	5.4	8.8	7.6	8.0	4.7	6.7	5.0	4.0
6.	8.2	4.4	8.2	6.3	8.8	4.7	4.3	5.4	6.8
7.	4.4	5.2	9.9	3.9	8.2	4.7	3.8	5.4	4.0
8.	3.5	7.2	4.1	3.5	6.3	4.7	4.7	5.4	4.5
9.	3.6	5.4	4.1	3.5	8.4	4.7	4.0	7.2	4.7

Number who gained	Range of Gains	Average gain for those who progressed
4	.8-3.7	1.8
2	.3-.4	.35
6	.2-1.1	.6
5	.2-1.8	.6
7	1.2-4.6	3.1
4	.4-2.8	1.2
6	.1-3.2	1.1
7	.1-3.4	1.5
8	2.3-7.1	4.6

In literature the educational level ranged from fourth grade, one month, to ninth grade, one month (4.1-9.1) in October, and from fourth grade, one month, to eighth grade, eight months, in April. There were two pupils who made gains which averaged three and one-half months. Six pupils gained an average of .6 grade in spelling with individual gains ranging from .2 to 1.1 grade. In social studies the gains ranged from two months to one grade, eight months (.2-1.8). The average gain for five pupils was six months (.6). Seven pupils, 77.7 per cent of the group, made gains of from 1.2 to 4.6 grades in health and safety, with an average gain of three grades, one month (3.1). In arithmetic reasoning, four pupils (44.4 per cent of the group) made positive progress averaging 1.2 grade. Individual gains ranged from four months to two grades, eight months. In arithmetic computation, six pupils (66 2/3 of the group) made gains of .1 to 3.2 grades. The average was 1.1. In reading vocabulary, the education level started at 3.8 grade for two students and extended to 8.6 grade for one with the other seven having fifth grade vocabularies. Seven (77.7 per cent) made gains ranging from one month to three grades, four months. In reading, the entire group gained an average of one year, one month.

This group made averages of more than one grade in all subjects except literature, spelling and social science.

Table VIII presents the achievements of the sixteen tenth grade students in language, literature, spelling, social science, health and safety, arithmetic reasoning, arithmetic computation,



TABLE VIII

ACHIEVEMENTS BY SUBJECTS FOR TENTH GRADE PUPILS ACCORDING TO  
 GRAY-VOTAW-ROGERS GENERAL ACHIEVEMENT TESTS, FORMS "S"  
 AND "Q", OCTOBER, 1953 AND APRIL, 1954, RESPECTIVELY

Pupil	Language		Literature		Spelling		Social Science		Health and Safety		Arithmetic Reasoning		Arithmetic Computation		Reading Vocabulary		Reading Comprehension		
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	
1.	11.4	6.8	9.6	7.0	12.0	12.0	8.8	8.2	9.1	9.1	6.5	8.2	8.0	9.6	7.4	8.4	12.0	12.0	
2.	11.6	9.4	6.3	7.0	12.0	11.1	8.0	7.0	9.1	8.6	9.6	8.6	8.6	9.6	8.0	7.0	7.2	8.0	
3.	9.4	6.8	5.9	5.7	7.4	8.2	5.1	6.5	6.5	8.3	8.4	4.3	10.7	10.7	5.1	9.6	9.4	9.0	
4.	7.4	8.0	9.4	6.5	11.1	10.5	7.4	7.2	10.5	4.3	8.4	9.9	10.7	10.7	7.6	6.5	6.8	7.8	
5.	6.0	5.2	5.4	5.3	11.1	8.4	8.8	6.3	4.8	5.2	8.4	6.3	10.7	10.7	5.9	5.4	6.0	7.4	
6.	5.7	6.3	5.1	5.7	8.4	8.8	5.1	7.4	7.4	3.9	7.2	5.0	8.0	8.0	6.5	5.7	12.0	6.3	
7.	10.2	8.0	7.7	7.7	6.8	8.6	3.6	4.5	9.1	3.9	6.7	4.8	4.8	8.4	5.3	7.6	4.7	3.8	
8.	5.1	6.0	7.6	7.0	6.3	7.0	7.2	5.3	6.8	5.9	5.7	5.2	5.2	5.2	5.3	5.7	3.4	5.7	
9.	6.3	8.4	8.4	7.0	7.4	7.0	4.6	6.5	5.3	3.9	7.2	3.9	8.2	9.1	3.9	3.9	6.0	5.7	
10.	4.9	5.0	4.7	5.7	6.3	6.3	5.7	6.3	4.5	4.7	4.4	4.4	4.4	4.7	4.0	3.9	3.8	5.5	
11.	3.6	5.4	5.9	4.1	8.2	9.1	3.5	8.4	8.0	8.4	8.4	7.8	7.4	4.6	4.3	4.4	3.8	3.7	
12.	3.2	6.8	4.1	6.5	5.7	6.3	6.3	7.2	11.1	5.7	5.9	8.2	4.8	4.5	4.5	4.4	4.4	4.6	
13.	3.6	4.5	5.4	5.0	7.6	7.6	6.3	3.7	6.8	4.3	4.3	6.8	4.5	4.5	4.0	5.9	4.4	6.6	
14.	5.4	5.6	4.4	4.6	7.4	6.8	5.3	4.5	5.1	4.7	4.7	4.3	5.1	5.2	4.0	5.0	4.4	7.0	
15.	4.5	4.5	4.6	4.5	7.4	6.2	6.8	4.5	5.1	3.9	3.9	3.9	5.1	5.1	3.8	3.8	5.1	6.0	
16.	3.5	3.8	4.5	3.8	6.5	6.2	3.6	6.5	3.8	3.9	3.9	3.9	3.9	3.9	3.8	3.8	5.1	6.0	
Number who gained	10	10	7	7	7	7	10	10	13	12	12	14	7	11					
Range of gains	.1-3.6	.6-2.9	.4-2.0	.7-2.5	1.1-5.4	.7-3.3	.1-6.4	.4-4.5	.2-2.2										
Average gain for those who progressed	1.1	1.2	1.0	1.3	2.3	2.3	2.3	2.3	1.9	1.9	2.3	2.3	1.9	1.4					

reading vocabulary, and reading comprehension.

The table shows that ten ( $62\frac{1}{2}$  per cent) of this group of students made gains of .1 to 3.6 grades in language; seven (43.75 per cent) made gains ranging from .6 to 2.9 grades in literature; seven made gains of .4 to 2.0 grades in spelling; ten ( $62\frac{1}{2}$  per cent) gained from .7 to 2.5 grades in social science; thirteen (81.25 per cent) made from 1.1 to 5.4 grades, gain in health and safety; twelve (75 per cent) improved from .7 to 3.3 grades in arithmetic reasoning; fourteen (87.5 per cent) made from .1 to 6.4 grades improvement; seven made gains ranging from .4 to 4.5 grades gain in reading vocabulary, and eleven made gains ranging from .2 to 2.2 grades. The average gains ranged from 1.0 grade to 2.3 grades in the above named subjects. The actual range of gain, the number of pupils who shared the gains, and the average for those who gained are shown at the bottom of Table VIII.

Grade achievements in the various content subjects of the ninth grade are given in Table IX.

TABLE IX

ACHIEVEMENTS BY SUBJECTS FOR NINTH GRADE PUPILS ACCORDING TO  
 GRAY-VOTAW-ROGERS GENERAL ACHIEVEMENT TESTS, FORMS "S"  
 AND "Q" OCTOBER, 1953 AND APRIL, 1954, RESPECTIVELY

Pupil	Language	Literature	Spelling	Elementary Science	Health and Safety	Arithmetic Reasoning	Arithmetic Computation	Reading Vocabulary	Reading Comprehension								
1.	7.4	9.4	5.9	12.0	11.4	10.5	7.8	9.6	11.1	8.0	10.7	9.1	12.0	5.7	8.0	6.0	8.8
2.	6.0	7.6	7.6	9.9	9.9	7.6	6.7	4.5	6.7	6.0	6.3	8.0	8.6	8.0	8.0	6.0	7.4
3.	8.2	4.7	9.4	10.2	10.2	5.9	7.2	6.0	8.6	4.7	8.6	7.8	6.5	4.1	5.4	5.4	6.7
4.	10.2	6.7	10.2	4.7	4.7	5.4	6.7	5.7	8.0	6.0	8.0	5.4	7.6	8.8	7.0	5.1	7.4
5.	9.4	7.1	9.4	7.0	7.2	6.5	7.6	8.6	9.9	6.0	7.8	4.8	6.5	7.4	8.0	5.7	10.2
6.	8.6	6.5	7.0	10.5	4.3	3.8	7.8	10.5	8.0	7.4	8.4	6.7	8.6	4.5	5.9	6.3	12.0
7.	6.3	6.3	7.0	7.6	8.2	3.8	7.0	5.0	9.1	5.2	8.2	7.4	5.8	7.4	5.0	7.6	5.8
8.	8.8	6.5	5.0	5.0	10.7	5.9	6.3	6.5	10.7	3.8	8.2	5.7	8.2	5.7	5.7	5.9	7.0
9.	7.8	6.3	5.9	8.4	7.4	3.8	7.2	5.7	8.8	5.7	6.3	6.7	7.4	6.7	4.7	6.8	11.6
10.	7.4	3.9	4.5	7.4	10.7	5.9	6.3	8.0	7.6	3.8	9.6	5.3	5.9	5.7	4.7	4.7	7.4
11.	6.8	5.2	5.1	6.5	8.0	5.4	9.4	5.0	7.6	6.0	10.5	7.0	8.0	8.0	4.0	4.7	10.2
12.	5.7	7.2	6.3	9.1	9.6	3.8	4.7	7.6	8.4	7.4	7.2	6.2	6.2	4.3	6.3	4.0	4.5
13.	4.4	4.5	4.1	7.4	10.5	5.4	5.8	9.1	8.4	4.8	6.7	3.9	5.6	5.3	5.2	6.0	7.8
14.	5.3	4.7	4.7	6.3	7.0	4.5	5.7	5.4	6.5	5.7	5.7	4.6	6.8	4.8	5.4	7.4	5.4
15.	5.3	5.0	4.4	6.3	6.5	6.0	5.0	6.0	8.2	4.3	8.2	3.9	5.1	5.1	6.3	4.5	6.0
16.	6.3	4.7	5.1	6.3	10.5	6.0	5.4	6.0	8.2	5.2	8.8	5.1	4.8	3.9	4.5	4.5	6.0
17.	3.5	5.7	4.1	4.1	7.6	3.8	5.4	3.6	6.5	5.2	6.5	5.1	4.8	3.8	3.8	3.8	6.7

Number who gained	5	9	11	14	16	15	12	13	16
Range of gains	.1-2.0	.2-3.7	.2-5.9	.5-5.6	.2-4.2	.3-5.8	.6-2.9	.6-2.3	.2-6.9
Average gain for those who progressed	1.0	2.0	2.5	1.9	2.2	2.6	1.6	1.1	1.6

Of the seventeen ninth grade pupils represented here, five made .1 to 2.0 grades gains in language during the study. Nine gained in literature. The range of gains was .2 to 3.7. In spelling, eleven gained with a gain-range of .2 to 5.9 grades. Of the seventeen, fourteen (82.3 per cent) gained from .5-5.6 grades in science. Sixteen (94 per cent) made improvements in health and safety, with a gain-range of .2 to 4.2 grades. Fifteen (88.2 per cent) gained from .3 to 5.8 grades in arithmetic reasoning. Twelve (70.6 per cent) gained from .6 to 2.9 grades in arithmetic computation; thirteen (76.4 per cent) made gains ranging from .5 to 2.0 grades in reading vocabulary, and sixteen (94 per cent) made from .2 to 5.7 grades in reading comprehension.

The number of pupils who gained, the range of gain, and the average gain are shown on the bottom of the table.

The data shown in Table X show the achievements of the eighth grade in content subjects.

TABLE X

ACHIEVEMENTS BY SUBJECTS FOR EIGHTH GRADE PUPILS ACCORDING TO  
 GRAY VOLTAW ROGERS GENERAL ACHIEVEMENT TESTS, FORMS "G"<sup>1</sup>  
 AND "Q"<sup>2</sup>, OCTOBER, 1953 AND APRIL, 1954, RESPECTIVELY

Pupil	Language	Literature	Spelling	Social Science	Health and Safety	Arithmetic Reasoning	Arithmetic Computation	Reading Vocabulary	Reading Comprehension
1.	8.6	6.4	6.2	8.8	8.0	11.1	7.2	7.2	11.1
2.	4.5	7.0	5.8	4.5	5.7	7.2	6.7	5.0	4.6
3.	5.3	5.4	5.9	3.7	5.0	4.7	4.0	5.7	3.8
4.	6.8	4.1	7.0	6.5	5.0	6.4	5.0	6.5	4.7
5.	4.9	4.1	3.7	3.9	8.8	3.9	4.0	3.9	4.4
6.	5.3	5.9	7.2	3.7	5.9	5.4	4.6	4.8	3.9
7.	3.8	5.4	5.9	7.6	8.4	4.8	4.0	3.9	3.8
8.	4.2	6.3	7.0	7.0	7.0	4.4	4.6	3.8	5.7
Number who gained	2	3	4	4	8	7	7	5	7
Range of gains	.1-.2	1.9-2.4	.7-3.2	.3-4.0	.8-3.8	.1-4.6	.2-3.5	.1-1.7	.8-4.1
Average gain for those who progressed	.15	1.5	2.4	2.1	2.0	1.5	1.2	.7	1.8

This table shows that two of the eight pupils gained from .1 to .2 grades in language; three gained from 1.9 to 2.4 grades in literature; four improved from .7 to 3.2 grades in spelling; 4 gained .3 to 4.0 grades in social science; eight made .8 to 3.8 grades gain in health and safety; seven made gains ranging from .1 to 4.6 grades in arithmetic reasoning; and seven made .2 to 3.5 gains in arithmetic computation. The gains in reading vocabulary ranged from .1 to 1.7 grades for five students. In reading comprehension, the gains for the seven who improved ranged from .8 to 2.7 grades.

## CHAPTER IV

### SUMMARY AND CONCLUSIONS

This analysis of the data of the Gray-Votaw-Rogers Tests Form S and Q has revealed that of the total number of the students included in the test -- fifty-nine students-- thirty-nine (66.1 per cent) gained in social science;\* twenty-two (37.7 per cent) made gains in language; twenty-six (44 per cent) made gains in literature; thirty-two (54.2 per cent) gained in spelling; fifty-three (89.8 per cent) gained in health and safety; forty-three (72 per cent) made gains in arithmetic reasoning; forty-four (72.9 per cent) made gains in arithmetic computation; thirty-nine (66.1 per cent) gained in reading vocabulary; and fifty-three (89.8 per cent) made improvements in reading comprehension. Thirty-nine (66.1 per cent) gained more than one grade each.

Average gains ranged from six months to seven years in social science; from one month to six grades, three months in language; three and one-half months to two years, two months in literature; six months to two grades, six months in spelling; two grades to three grades, one month, in health and safety; one grade, two months to two grades, six months, in arithmetic

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\*This includes general science for the ninth grade.

reasoning; one grade, one month to two grades, three months in arithmetic computation; six months to one grade, nine months in reading vocabulary, and one grade, four months to four grades, six months in reading comprehension.

There is evidence that the program in functional reading did have favorable effects upon the general achievements of some of the students of grades eight through twelve. The data here showed that each student except one (number 2, eleventh grade) made some progress in reading during the study.

The program was profitable to more students in health and safety than in any other subject beside reading comprehension. The second largest group made gains averaging more than a complete grade in arithmetic computation, which did not require much reading. This was followed by the progress made in arithmetic reasoning. In social science and reading vocabulary, the numbers who gained were the same. Only thirty-two (54.2 per cent) gained in spelling, twenty-six (44 per cent) in literature, and twenty-two (37.7 per cent) in language.

The writer, then, concludes that under ordinary classroom situations and with enrichment materials suited to the reading interests and their levels of reading abilities, students can make appreciable improvements in reading comprehension through functional reading. She also concludes that the improvements in reading comprehension do affect the majority of the



students favorably in social science, spelling, arithmetic reasoning and arithmetic computation, and health and safety.

The low scores in literature, which consisted of items taken from standard lists of books for grades one through nine, are explained by the authors of the tests. They say that the gross level of achievement on the literature test is lower than in any other tests of this battery. They comment:

To the authors, this indicates the strong possibility that many of these books which authorities say should be read by pupils are not available to them, and that they have had no opportunity to become acquainted with these books. . . .<sup>1</sup>

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<sup>1</sup>Gray-Votaw-Rogers, op. cit., p. 5.

## RECOMMENDATIONS

In the light of the study, the writer recommends that the program be continued in Lincoln High School, Coldspring, Texas. She recommends that more time be given to reading improvement during the school day. She further recommends that there be some person with special training in developing reading abilities work with the various classroom teachers in order that they may understand how to handle the reading situation more effectively within their classrooms, whether it be a science classroom or an English classroom.

Since the data reveal that the students who showed the most efficiency in October did not make as much gain as many who fell within the third through sixth grades, the writer recommends that students be divided in groups of not more than four levels of reading abilities in order that the pupils at both extremes of competency get the attention which inspires them to do their best.

A P P E N D I X

## APPENDIX A

TEXTBOOKS USED IN LINCOLN HIGH SCHOOL,  
COLDSRING, TEXASEighth Grade

Cross, E. A. and others. Literature, A Series of Anthologies, Understanding Literature.  
New York: Macmillan, 1944.

Shane, Harold G., and others. Using Good English.  
New York: Laidlaw, 1952.

Ninth Grade

Ross, Jacob M., and Thompson, Blanche. Adventures in Reading. New York: Harcourt, 1949.

Tressler, J. C. English in Action. Course one.  
Fourth edition. Boston: Heath, 1945.

Tenth Grade

Cook, Luella B. and others. Adventures in Appreciation.  
New York: Harcourt, 1949.

Tressler, J. C. English in Action. Course two. Fourth  
edition. Boston: Heath, 1945.

Eleventh Grade

Inglis, Rewey Belle and others. Adventures in American Literature. New York: Harcourt, 1949.

Tressler, J. C. English in Action. Course three.  
Fourth edition. Boston: Heath, 1945.

Twelfth Grade

Inglis, Rewey Belle, and others. Adventures in English Literature. New York: Harcourt, 1949.

Tressler, J. C. English in Action. Course four. Fourth edition. Boston: Heath, 1945.

## APPENDIX B

ENRICHMENT MATERIALS IN THE LIBRARY OF LINCOLN  
HIGH SCHOOL, COLDSRING, TEXAS

## Books

Title	Reading Grade Diffi- culty	Author	Publisher	Date
"All American"	6-9	Tunis, John	Harcourt	1942
"America's Treasure"	5-9	Reed, W. M.	Harcourt	1939
"And That's Why"	3-7	Reed, W. M.	Harcourt	1932
"Allen, Ethan"	6-9	Holbrook, S. H.	Houghton	1949
"Behave Yourself"	7-9	Allen, Betty & B. Mitchell	Lippincott	1945
"Boy Grows Up"	7-10	McKnown, Harry	McGraw	1949
"Boy's King Arthur"	6-9	Malory, Sir Thom.	Scribner	1917
"By His Own Right"	5-9	Hosford, Dorothy	Holt	1947
"Chimney Corner Stories"	3-5	Hutchinson, V. S.	Putnam	1925
"Cokesbury Game Book"	6-12	Depew, A. M.	Abingdon	1939
"Crockett, David"	4-6	Tousey, Sandford	Whitman	1948
"Fables, Aesops"	5-8	Aesop	Macmillan	1923
"Fortune, Amos"	7-9	Yates, Elizabeth	Alladin	1950
"Fun with Clay"	5-9	Fedder, Ruth	McGraw	1948
"Girl Grows Up"	7-10	Leeming, Joseph	Lippincott	1944
"Good Stories for Great Birthdays"	4-8	Olcott, Frances	Houghton	1922

Title	Reading Grade Diffi- culty	Author	Publisher	Date
"Good Housekeeping See and Sew"	4-8	Karasz, Meriska	Lippincott	1943
"High Pockets"	6-9	Tunis, John	Morrow	1948
"How Your Body Works"	4-9	Schneider, Herman & Nina	Scott	1949
"It's More Fun When You Know the Rules"	6 up	Pierce, Beatrice	Rinehart	1935
"Insect Guide"	9-12	Swain, Ralph B.	Doubleday	1948
"Jack Tales"	5-9	Chase, Richard	Houghton	1943
"Let's Do Better"	3-6	Leaf, Munro	Lippincott	1945
"Let's Make More Things"	5-9	Zarchy, Harry	Knopf	1943
"Let's Make Some Things"	5-9	Zarchy, Harry	Knopf	1941
"Little Geography of the United States"	3-5	Pyle, Mabel H.	Houghton	1941
"Lives of Girls Who Became Famous"	7-9	Bolton, Sarah	Crowell	1947
"Marionettes"	5-9	Ackley, E. F.	Lippincott	1929
"Mythology"	7-12	Hamilton, Edith	Little, Brown	1942
"Myths of Greece and Rome"	7 up	Guerber, H. A.	American	1921
"One God and How We Worship Him"	5-6	Fitch, Florence M.	Lathrop	1944
"100,000 Whys"	4-7	Ilin, M.	Lippincott	1935
"Our Holidays"	4-8	Curtis, Mary I.	Lyons	1950
"Our Negro Brother"	3-8	Mayer, Edith H.	Shady Hill	1945
"Pecos Bill"	6-9	Bowman, J. C.	Whitman	1937
"Plant Propagation"	9 up	Kains, M. G.	Orange-Judd	1952

Title	Reading Grade Diffi- culty	Author	Publisher	Date
"Reader's Encyclopedia"	9 up	Benét, W. R.	Crowell	1948
"Safety Can Be Fun"	3-4	Leaf, Munro	Lippincott	1938
"Sky is Blue"	5-7	Read, W. M.	Harcourt	1940
"Skyrocket"	3-5	Hader, Bertha and Elmer	Macmillan	1946
"Smokey, the Cowhorse"	6-9	James, Will	Scribner	1926
"Teen Days"	6-12	Strain, Frances	Appleton	1946
"32 Roads to the White House"	3-6	Graham, Alberta	Nelson	1945
"Understanding Science"	6-9	Crouse, W. H.	McGraw	1948
"We Are the Government"	7-10	Etting, Mary	Doubleday	1945
"Why We Celebrate Our Holidays"	3-5	Curtis, Mary I.	Lyons	1939
"Yankee Doodles Cousins"	4-8	Malcomson, Anne	Houghton	1941
"Yea, Wildcats"	7-9	Tunis, John	Harcourt	1944
"Webster New Inter- national Dictionary"		Webster	Merriam	1953
"Compton's Pictured Encyclopedia"	6-9	Compton		1952
"Encyclopedia Americana"	9 up			1939



## Periodicals

American BoyAmerican GirlCurrent HistoryFarm JournalMademoiselleNational GeographicNaturePractical EnglishPractical HomemakingReadReader's DigestSportsToday's HealthTown JournalTravel

## Newspapers

Houston Post (Daily)San Jacinto Times (Weekly)

## School Paper

Lincoln Wildcat Gazette

APPENDIX C

MANUALS

# Manual

## THORNDIKE-LORGE READING TEST FOR GRADES 7 TO 9

By E. L. Thorndike and Irving Lorge

READING varies widely. Its goal may be information, action, inspiration, or entertainment. Its operations range from mere perception of words and skimming of a page, to appreciation of subtle aesthetic effects and search for answers to difficult questions. There could be a dozen valid tests of reading, each different from the others.

The Thorndike-Lorge Reading Test is a general test, planned to include all the important factors in silent reading and to give reasonable weight to each of them. These factors are:

1. Knowledge of the meanings of words and phrases in context.
2. Knowledge of constructions, including idioms.
3. Ability to infer the meanings of words from their component parts, from their resemblances to known words and their contexts.
4. Ability to keep in mind the parts of a sentence or paragraph and use them to comprehend the whole.
5. Ability to organize and use the meanings of sentences and paragraphs so as to fulfill the informational and aesthetic purposes of reading.
6. Ability to read fast enough to facilitate factors 4 and 5, and to prevent undue expenditure of time in reading. The credits for speed are so arranged that the relative weights of quality and speed are approximately as 12 to 1. No credit attaches to speedy *misreading*.

The test measures the attainment by the pupil of the usual reading aims to get meaning from the printed page, to use the understandings to answer questions, and to organize and use information for the solution of problems. As a forty-minute test it gives due regard to the six important components of reading (listed above) needed in the junior high school grades. The test differs from many other reading tests in two important respects:

1. No separate test of vocabulary is included. It is believed that the understanding of vocabulary in context is a better indication of reading ability than scores on separate vocabulary tests. Since adequate vocabulary tests are available, a definitive check on vocabulary knowledge could be obtained by the use of such tests which would give an indication not only of relative standing but of the approximate volume of words understood.

2. The test measures the understanding and appreciation of figurative expressions, and of literary as well as informational reading matter. A large part of the teaching of reading is intended to give children the ability to

get the literary values of apt epithet, imagery, and the like, as well as the ability to get the factual values of history, science, or technology.

Ability to read with understanding and appreciation depends largely upon intelligence; and any adequate measure of ability to read will be more or less a measure of intelligence as it operates with language. It will be noted, however, that the test avoids sentences or paragraphs designed to be intellectual puzzles, tasks which require the pupil to use intellect in opposition to habits ordinarily successful in reading, highly abstract reading matter, scientific formulas, and the like.

### Validity

The validity of the Thorndike-Lorge Reading Test has been estimated by correlating the score derived from it with the scores of four reputable reading tests for the grade range 7-9. The correlations based on approximately 8,000 cases in grades 7, 8, and 9 average approximately .80. In view of the fact that reading as *reading* is measured and that no separate test of vocabulary is included it is evident that the Thorndike-Lorge Test is a valid measurement of reading ability in grades 7 through 9. Against a more reliable criterion of reading ability based on four or more reading tests, the correlation will be about .96. These correlations are for individual pupils; the validities for average scores for classes, or other groups of thirty or more, would be much higher.

### Reliability

The correlation of the score from forty minutes spent on one form of the Thorndike-Lorge Reading Test with the score for another form is, on the average, .90. The reliability of the average score derived from two such tests will be about .94. These estimates are based on four samples of about 200 children in grades 7, 8, and 9 who took two forms of the test. In four such samples, the range of estimated reliability coefficients is .86 to .92. These correlations are for individual pupils; the reliabilities for average scores for classes, or other groups of thirty or more, would be nearly perfect if conditions of testing were the same.

### Administration

No special training is required to administer the forms of the test, or to score them. The time allowed, forty minutes, will give each pupil ample time to demonstrate his reading ability.

Before passing out the test booklets to the pupils the examiner says:

### Examiner's Directions

"This is a reading test for which you will be allowed 40 minutes. The directions are printed in the test. Read them carefully and when I say 'Go' answer the questions. Some of the things you are asked to do are easy; some are more difficult. Do as well as you can. The purpose of this test is to find out how well you understand words and sentences, and how well you can read for information. Do not spend too much time on any one item. Answer the easier questions first, and then go back to the more difficult items. Wait until I say 'Go'."

After passing out the papers, the examiner says: "Ready, Go. Do as well as you possibly can. Keep right on until I ask you to stop." At the end of forty minutes, say: "Stop. Make sure your name is on the paper. Pass your papers."

### Scoring and Interpretation

The score on the Thorndike-Lorge Reading Test is the number of right responses. For each score a simple table (see page 3) gives the following facts:

1. The grade equivalent, i.e., the grade of pupils in American schools in 1946 for which that score is "normal." In each instance, the grade equivalents are based on samples of approximately 2,000 pupils, and have been checked against the grade equivalents of reputable reading tests.

2. The reading age equivalent, i.e., the age of pupils in American schools in 1946 for which that score is "normal." In each instance, the reading age equivalents are based on samples of approximately 2,000 pupils, and have been checked against the reading age equivalents of reputable reading tests.

3. From the reading age equivalents, the reading quotient of any pupil can be found by the formula:

$$\text{Reading Quotient} = \frac{\text{Reading Age in mos.}}{\text{Chronological Age in mos.}} \times 100.$$

### Interpretation of Test Scores

The norms of the Thorndike-Lorge Reading Test are based on a representative sampling of pupils in grades 7, 8, and 9, and with selected samples of students in senior high school. The grade norms represent the grade equivalent of the average pupil in a specified grade. The grade norm of 7.4, for instance, represents the score the average pupil would obtain in the fourth month of the seventh grade; or again, the grade norm of 9.9 represents the score of the average pupil in the ninth month of the ninth grade.

The age norms represent the average reading age of pupils making specified scores. A pupil who made a score of 28 on Form B would have a grade score of 10.0 and a reading age of 15 years 2 months. It is important to recognize that the curve of the development of reading flattens out very rapidly after the fifteenth or sixteenth year. In this respect, the curve of reading growth parallels the curve of mental growth. It is advisable, therefore, in estimating reading quotients to assume that the curve

of development in reading is nearly a straight line after age fifteen. In computing reading quotients, the divisor for chronological age should be the actual chronological age up to age fifteen. After chronological age fifteen years, it is recommended that the divisor be fifteen years or 180 months.

It should be pointed out that the norm is representative of the performance of the average child in a specified grade, or of a specified chronological age. In no sense should the norm be considered a standard for all children or all school systems. The teacher should recognize that individual differences in mental ability, in school experiences, and in school organization must be considered in evaluating the performance of the individual pupil.

It is difficult to establish that any particular test item as such is primarily measuring any particular factor such as "knowledge of the meanings of words or phrases in context" or "ability to organize and use the meanings of sentences and paragraphs so as to fulfill the informational and aesthetic purposes of reading." In the design of each of the forms, the questions were devised to elicit performances representative of these factors in reading. The design for each of the forms was as follows:

#### Questions Primarily Designed to Measure Certain Factors in

	Form A	Form B
Factor 1*	1-7, 8-11	1-7, 8-11
Factor 2	12-27	12-27
Factor 4	40-55	46-53
Factor 5	28-39	28-45

\* See page 1 for the factors measured.

Questions involving factor 3 are associated with each of the other four factors throughout the test.

The pupil who scores relatively low on the questions involving factors 1, 2, and 3 should be given special instruction and guidance in the use and control of idiomatic vocabulary and figurative transfer. It would be advisable to develop in, and for, the child an understanding of how the poet translates ideas into novel forms and how these novel terms apply to concrete situations.

The pupil who scores relatively low on the questions involving factors 4 and 5 should be given special instruction in how to read to answer specific questions. The teacher should guide the pupil gradually to more and more difficult questions in which the first group should involve specific information quickly gathered from the passage, followed by questions that involve a certain amount of inference by the pupil, and finally questions asking him to evaluate and extend the information of the paragraph so as to be able to answer higher order questions.

If the pupil fails to complete the entire test within the time limit, it is apparent that he is reading too slowly. Under these circumstances, the teacher would be well advised to give him pacing exercises which involve certain standards, so that gradually, day by day, he will be required to read faster, and at the same time maintain complete understanding.

## Form A

Thorndike-Lorge Score = No. R	Grade Equivalent	Age Equivalent
1	2.6	
2	2.9	
3	3.2	
4	3.5	
5	3.7	
6	4.0	
7	4.3	
8	4.6	9-7
9	4.9	9-11
10	5.2	10-2
11	5.5	10-6
12	5.7	10-9
13	5.9	10-11
14	6.2	11-3
15	6.5	11-6
16	6.8	11-10
17	7.1	12-1
18	7.4	12-5
19	7.7	12-9
20	8.0	13-0
21	8.2	13-2
22	8.5	13-6
23	8.7	13-10
24	8.9	14-1
25	9.2	14-4
26	9.3	14-5
27	9.5	14-7
28	9.7	14-10
29	9.9	15-0
30	10.1	15-3
31	10.4	15-7
32	10.6	15-9
33	10.8	16-0
34	11.1	16-5
35	11.3	16-8
36	11.5	16-11
37	11.8	17-2
38	12.0	17-5
39	12.3	17-9
40	12.5	18-0
41	12.7	18-3
42	13.0	18-6
43	13.2	
44	13.4	
45	13.7	
46	14.0	
47	14.3	
48	14.6	
49	14.9	
50	15.2	
51	15.5	
52	15.8	
53	16.1	
54	16.4	
55	16.7	

## Form B

Thorndike-Lorge Score = No. R	Grade Equivalent	Age Equivalent
1	2.1	
2	2.5	
3	2.9	
4	3.1	
5	3.4	
6	3.7	
7	4.0	
8	4.3	
9	4.5	9-6
10	4.8	9-9
11	5.2	10-2
12	5.5	10-6
13	5.8	10-10
14	6.0	11-0
15	6.4	11-5
16	6.7	11-10
17	7.1	12-1
18	7.4	12-5
19	7.8	12-11
20	8.1	13-1
21	8.4	13-5
22	8.7	13-10
23	8.9	14-1
24	9.2	14-4
25	9.4	14-6
26	9.6	14-8
27	9.8	14-11
28	10.0	15-2
29	10.3	15-5
30	10.5	15-8
31	10.7	15-11
32	11.0	16-3
33	11.2	16-7
34	11.4	16-9
35	11.7	17-1
36	11.9	17-4
37	12.2	17-8
38	12.5	18-0
39	12.7	18-3
40	13.0	18-6
41	13.3	
42	13.6	
43	13.9	
44	14.2	
45	14.5	
46	14.7	
47	15.0	
48	15.3	
49	15.6	
50	15.8	
51	16.0	
52	16.3	
53	16.6	

## Form A

Item	Key	Item	Key
Page 2		Page 6	
1	7	28	3
2	6	29	5
3	4	30	6
4	19	31	9
5	12	32	12
6	13	33	13
7	20	34	16
		35	17
		36	22
		37	28
		38	30
Page 3		Page 7	
8	6	39	34
9	5	40	2
10	2	41	7
11	7	42	11
12	2	43	13
13	4	44	16
14	6	45	18
15	7	46	21
		47	25
Page 4		Page 8	
16	7	48	27
17	5	49	30
18	8	50	31
19	1	51	17
Page 5		Page 8	
20	2	52	8
21	8	53	10
22	6	54	19
23	1	55	1
24	6		
25	3		
26	7		
27	5		

## Form B

Item	Key	Item	Key
Page 2		Page 6	
1	7	28	3
2	2	29	7
3	5	30	10
4	9	31	11
5	11	32	18
6	14	33	23
7	8	34	28
		35	30
		36	32
Page 3		Page 7	
8	7	37	2
9	3	38	5
10	4	39	7
11	2	40	8
12	2	41	14
13	7	42	17
14	3	43	No
15	6	44	No
		45	No
Page 4		Page 8	
16	8	46	1
17	1	47	6
18	7	48	12
19	4	49	17
Page 5		Page 8	
20	8	50	19
21	6	51	22
22	2	52	27
23	4	53	32
24	8		
25	6		
26	2		
27	1		

MANUAL OF DIRECTIONS AND INTERPRETATIONS  
For Forms Q, R, S, and T: Intermediate and Advanced

The Gray-Votaw-Rogers

# General Achievement Tests



**The Steck Company**  
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## MANUAL OF DIRECTIONS AND INTERPRETATIONS

For Forms Q, R, S, and T: Intermediate and Advanced

**The Gray-Votaw-Rogers General Achievement Tests**

By

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Southwest Texas State  
Teachers CollegeJ. LLOYD ROGERS  
Southwest Texas State  
Teachers College**Directions for Administering****INTERMEDIATE TEST: (Grades 4-6)****ADVANCED TEST: (Grades 7-9)**

(The same directions apply to both Intermediate and Advanced tests)

Study carefully these directions before attempting the administration of these tests. The same directions apply to all forms.

1. Pupils may be tested in ordinary classroom groups or in larger groups of a hundred or more.

2. While taking the test, each pupil should keep his test booklet folded back so that only the page on which he is working is visible.

3. A stop watch is most convenient, but an ordinary watch may be used satisfactorily for timing. The ordinary watch should be used in this way: On each of the tests except number 4 (Spelling), when the signal "Go" is given, the positions of the minute and second hands should be written down. To this the number of minutes for the period should be added, which will give the time when the pupils should be required to stop.

4. To prevent tiring the children, each form should be given in two to four sittings, separated by at least fifteen-minute recesses.

5. Throughout the administration of these tests it is hardly possible to give too much explanation to the children. Essential explanations of what the children are to do are given in this manual. It is frequently necessary, however, for the administrator of the tests to add to the printed directions by further explanations and illustrations. On the other hand, *after* a test is begun, in no case should the examiner give any assistance, such as helping a child with difficult words.

6. In all of the seven recognition tests (the two arithmetic tests and the spelling test are the only ones not of the recognition type), the directions instruct the pupils not to skip items. It is very important that the pupils comply. They should be told that if they are not sure which answer is right to select the one they think is most probably right and x the square for that answer.

The examiner or his assistant should move about the room to make sure that directions are being followed.

If a child wishes to change an answer he has made, he must erase carefully his first x and make another to indicate his final choice.

To prevent tiring the children, each form should be given in four sittings. It is suggested that the four sittings be as follows:

1. Soon after the beginning of the school day
2. After the morning recess
3. After the noon hour
4. After the afternoon recess

The advanced tests may be given to seventh, eighth, and ninth grade pupils in two sittings—one in the morning and one in the afternoon.

**Order of Tests and Time to be Allowed****FIRST SITTING**

	MINUTES
<i>Distributing booklets, supervising filling in of blanks on cover page, etc.</i> .....	5 (about)
Test 1. Elementary Science .....	10
Test 2. Language .....	10
Test 3. Literature .....	12
Total.....	37

**SECOND SITTING**

Test 4. Spelling .....	15 (about)
Test 5. Reading: Vocabulary .....	8
Test 6. Reading: Comprehension .....	10
Total.....	33

**THIRD SITTING**

Test 7. Social Studies .....	12
Test 8. Health and Safety .....	10
Test 9. Arithmetic Reasoning .....	20
Total.....	42

**FOURTH SITTING**

Test 10. Arithmetic Computation.....	28
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## FIRST SITTING

After pupils are seated, see that each has a pencil and provide each with a test booklet. (Have on hand a few extra pencils to provide in case of shortage or mishap.)

Say, "Do not open the test booklet or write on it until I tell you to." (In an informal manner now have all of the information blanks on the first cover page filled in.)

Say, "Do not begin until I say 'Go,' and the instant I say 'Stop,' you are to stop and hold your pencils up. After we begin a test, you must not ask questions. If you break your pencil point, hold up your hand and I will give you another pencil. Do your best at your own regular speed of work, and pay no attention to what others are doing. (Pause) Now turn over the page to Test 1. You will see Test 1 printed at the top of the page."

## Test 1. ELEMENTARY SCIENCE

Say, "Read the directions at the top of the page." (Allow time for the children to read the directions down to the sample sentence.) Then say, "The sample says: A turkey is a 1 fish 2 fowl 3 plant. Fowl, the second word, is the right answer; so an x has been placed in the second square.

"When you begin, go as far as you can; but do not skip any. Ready—Go."

Allow 10 minutes; then say, "Stop. Now turn to Test 2."

## Test 2. LANGUAGE

Say, "Read the directions at the top of the page." (Allow time for the children to read directions down to the sample sentence.) Then say, "The first sample says: The boys (is are) playing ball. Are, the lower word, is the right one; so an x has been placed in the second square. In the second sample, May should be spelled with a capital letter; so an x has been placed in the first square. The sentence in the third sample is a question; so the ending with the question mark is the right one.

"Go as far as you can, but do not skip any. Ready—Go."

Allow 10 minutes; then say, "Stop. Now turn to Test 3."

## Test 3. LITERATURE

Say, "Read the directions and the sample at the top of the first page. (Pause) The sample says: Captain Kidd was a famous 1 soldier 2 king 3 pirate 4 writer. Pirate, the third word, is the right answer; so an x has been placed in the third square. Do not skip any sentences. Ready—Go."

Allow 12 minutes; then say, "Stop. Close your booklets." (First sitting ends here. Collect the booklets and have them redistributed at the second sitting. If the room is to be emptied of children and is to remain locked or guarded during the recess, each child may leave his booklet on his desk.)

## SECOND SITTING

(Be sure that each child has his own booklet.)

## Test 4. SPELLING

See that booklets are open at the proper place.

Say, "Now I am going to pronounce some words for you to write. Write each letter in each word carefully so that your writing can be read easily. The words are numbered. I shall give you the number of the word first. Be sure to write the number first and then write the word on the same line." (Be sure to start with the correct number on the list for the grade being tested.)

Read the number, pronounce the word, read the definition, and then pronounce the word a second time. The word may be repeated still further if requested. (The examiner should look over the list of words before administering the test and should refer to a dictionary for the pronunciation of any of the words about which he is doubtful.)

When some of the children begin to slow up because of the harder words say, "Do your best. If you cannot write all the words, write those you can."

(A card on which is listed the words for the spelling test will be found in each bundle of tests purchased.)

When you have pronounced the last word for the grade being tested and the pupils have written it, say, "Stop. Turn to Test 5."

## TEST 5. READING: VOCABULARY

Say, "Read the directions at the top of the page. (Pause) The sample says: A lad is a 1 girl 2 pony 3 boy 4 kitten. Boy, the third word, is the answer; so an x has been placed in the third square.

"Do not skip any. Ready—Go."

Allow 8 minutes; then say, "Stop. Turn to Test 6."

## Test 6. READING: COMPREHENSION

Say, "Read the directions at the top of the first page. (Pause) The sample story says: Bob has a kitten, a puppy, and a rabbit. He feeds his kitten milk, his puppy meat scraps, and his rabbit carrots.

"That is the story about Bob and his pets. The first sample says: Bob has 1 one pet 2 two pets 3 three pets. Three pets, the third answer, is the right one; so an x has been placed in the third square. The second sample question says: He feeds meat scraps to his 1 kitten 2 puppy 3 rabbit. Puppy, the second answer, is the right one; so an x has been placed in the second square. Do not skip any of the questions. Ready—Go." (See that pupils keep trying until time is called.)

Allow 10 minutes; then say, "Stop. Close your books." (Second sitting ends here. Collect the booklets and have them redistributed at the third sitting.)

## THIRD SITTING

## Test 7. SOCIAL STUDIES

After each child has received his booklet, say, "Turn to Test 7. (Pause) Read the directions at the top of the first page. (Pause) The sample says: The capital of the United States is 1 Denver 2 Washington 3 Chicago 4 Atlanta. Washington, the second word, is the answer; so an x has been placed in the second square.

**"Do not skip any. Ready—Go."**

Allow 12 minutes; then say, "Stop. Turn to Test 8."

**Test 8. HEALTH AND SAFETY**

Say, "Read the directions at the top of the first page. (Pause) The sample says: A drink that builds body tissue is 1 coffee 2 tea 3 milk 3 ginger ale. Milk, the third answer, is the right one; so an x has been placed in the third square.

**"Do not skip any. Ready—Go."**

Allow 10 minutes; then say, "Stop. Turn to Test 9."

**Test 9. ARITHMETIC REASONING**

Say, "Read the directions at the top of the page. Work as rapidly as you can, but be accurate. Write your answers in the blank provided. Do not spend too much time on a problem. If you cannot solve it, go on to the next and come back to it later if you have time. You may figure on the pages of your booklet. Ready—Go."

Allow 20 minutes; then say, "Stop. Close your books." (Third sitting ends here. Collect the booklets.)

**FOURTH SITTING**

**Test 10. ARITHMETIC COMPUTATION**

Say, "Turn to Test 10. (Pause) Read the directions at the top of the page. Solve the problems as quickly as you can. You may use the pages of your booklet to figure on, but be sure to put each answer on the blank provided. Keep working until you come to the printed words, 'End of test.' Ready—Go."

Allow 28 minutes; then say, "Stop. Close your books." (End of test.)

(In administering all of the ten tests, keep watch to see that pupils do not stop at the bottom of a page, thinking they have completed the test.)

Occasionally a child may start marking the answer squares at random without reading the items. If this occurs, stop him and explain to him that he must read each item carefully and mark the answer square that he believes is correct.

**COMPARABLE SCORES**

Two parallel rows of figures will be found at the end of each test. A child's score is the figure in the bottom row which corresponds to the number of correct answers made by him on the test. This is the score which is to be recorded and is the only record of his performance which need be kept. The scores were determined by a transmutation formula, so that the scores of the several tests would be comparable. For example, a child whose score for each of the tests is 46 has uniform achievement in all the divisions.

It is this score, not the number right, which is significant. A teacher may consider a test "too difficult" in terms of the number answered, and consider the achievement of her class as "low" by the same criterion, yet the average score of her class may be average or above in terms of comparison with other schools. Any attempt to use the number

right as an index of achievement fails to utilize the chief advantage of standardized tests, that of making meaningful comparisons.

As a specific example, consider the Science and the Literature tests. On the Literature test 21 right out of 50 items represents the same level of accomplishment as 31 right out of 44 on the Science test, each having a score value of 70, representing typical beginning 7th grade achievement.

The authors of these tests have no desire to dictate curricula, but this example illustrates another point which is sometimes neglected; namely, *average performance is not necessarily satisfactory performance*. Although the books used in constructing items for the Literature test were selected from standard lists of books and authoritative recommendations for the respective grade levels, it would appear that the gross level of achievement on this test is lower than in other tests of this battery. To the authors, this indicates the strong possibility that many of these books which authorities say should be read by pupils are not available to them, and that they have had no opportunity to become acquainted with these books, rather than to suggest that the sampling in the test is "too difficult." Hence, a test performance which is "average" may not represent adequate acquaintance with literature.

**NORMS**

The Individual Educational Chart on each test booklet shows the norms. The scales for each of the ten tests, as well as the scale for the total average, are directly comparable with the grade and age norms.

On the educational grade scale of this chart horizontal lines are used to indicate spans of accomplishment from the end of one school grade to the end of the next higher school grade. Also, at each score-point on the scale the grade equivalent is given to the nearest one-tenth of a grade, and the age equivalent is given to the nearest year and month.

The age-scale increases exactly one year for each grade. The reason for this is that each grade norm was determined from the scores of only those pupils who were in the grade and normal age for the grade. The scores of under-age and over-age pupils were not included. Normal ages for the grades were defined as follows:

Grade	Age as of Sept. 1
1	5 yrs. 9 mo. to 7 yrs. 2 mo. 29 days
2	6 yrs. 9 mo. to 8 yrs. 2 mo. 29 days
3	7 yrs. 9 mo. to 9 yrs. 2 mo. 29 days
etc.	

This plan of defining normal ages allows a span of eighteen months for each grade, with an overlap of six months per grade. It is more flexible than the rigid plan of allowing only one year of age to each grade, and therefore is more consistent with practical and reasonable promotional practices.

In addition to the regular grade norms determined from the scores of the normal-age pupils as defined above (see Table 1), two additional sets of norms (Tables 2 and 3) are provided. One of these sets was determined from scores of the high-ability

normal-age pupils and the other from the scores of the low-ability normal-age pupils.

The authors are indebted to Mrs. Kate Malloch Appling and Mr. Aaron Posey, who made empirical determinations of these off-center norms for a check against the theoretical determinations made by the authors.

The use of these high and low norms should help impress the user of these tests with the fact of natural, wide differences in educational performances of pupils and thus lessen the temptation to "double" promote or to "fail" normal-age pupils whose scores differ widely from the regular grade norm.

### PRACTICE EFFECT

There are numerous advantages of having available several equated forms of a test. One of these advantages is the provision of a two- or three-year cycle for repeating in rotation the various forms. Another advantage is the provision for close seating of children, when necessary, by using two forms in the same testing program.

Four equated forms (Q, R, S, and T) of the Gray-Votaw-Rogers General Achievement Tests are available. These take care of any possible need for variety of forms. No hesitancy should be felt about using a form in a school in which the identical form was used previously, provided two years have elapsed. The influence of having taken the test previously will have disappeared completely in that time. As a matter of fact, the authors have found that the average practice effect amounts to less than .1 of a point between two different forms given to the same children on two consecutive days. The gain from practice amounts to only slightly more when the same form is administered to the same children two weeks after the first administration.

### "Do Not Skip"

A study made by one of the authors of these tests revealed that when children are permitted to "pass" (make no answer) items about which they feel doubtful when dealing with the recognition type of tests, the resulting scores are influenced by a personality trait known as Ascendancy-Submission. Moreover, this liberty affects the scores of superior students and inferior students differently. Therefore, in order to confine the test as nearly as possible to a measure of educational attainment, the directions in all recognition divisions are, "Do not skip any items."

Notwithstanding this administrative effort to encourage all pupils to attempt all recognition items, a skipped item is NOT to be marked as wrong.

### Coaching Pupils

The Gray-Votaw-Rogers General Achievement Tests have been normed carefully by being administered to children who have had no previous direct "coaching" for the test. The authors have provided a highly useful educational measuring instrument when used according to directions. A doctor who gives a prescription must depend upon the intelligence of the nurse or patient to follow his directions and thus receive benefits. The nurse or patient is seldom able to deceive the doctor. Likewise, while

the authors of this educational measure have no means of preventing its misuse, school administrators can detect readily cases in which it has been misused. Only ignorance of the functions of testing or dishonesty could motivate a person to coach children from a copy of a test they are to take.

### USES OF TEST RESULTS

These tests may be given for diagnostic and supervisory purposes at any time during the school year. Diagnosis may be made of individual pupils and also of classes. The authors recommend that at least four weeks of school work elapse in the fall before the tests are administered. That much time is ordinarily required for "recovery" and adjustment of pupils. Remedial work may then be applied where it is needed, and another form may be used near the end of the school year to measure progress.

The results of the tests should be of much value to the principal or counselor in his guidance program. Sectionizing of pupils may be made safely on the basis of the tests.

In this connection, teachers should be warned that copies of the test are not to be used as a drill device to make up deficiencies, even after the test has been given. In constructing a standardized test, it is necessary, in order to test all pupils from the poorest to the best, to include many items which do not represent minimum essentials or common learnings for all children in a given grade. To drill all pupils in a grade over all items would therefore not only indicate a complete lack of understanding of the tests, but it would also have the serious effect of forcing many pupils, perhaps a whole grade, to work on items far beyond their capacity or ability to understand.

For instance, if individual or group scores on Test 5, *Vocabulary*, are low, an attempt should be made to improve vocabulary in general, not to drill on these particular words. It is to be remembered that these are sampled from the hundreds of words which a pupil should learn, and are intended in no way to represent a "course of study" in vocabulary for any grade. This same principle holds true for most of the other tests, with the possible exception of Test 2, *Language*, and Tests 9 and 10, *Arithmetic*. These three may be used to a limited degree for diagnosis, since an analysis of errors will indicate to some extent the areas needing attention, if these errors are checked against the learnings expected for a given grade.

In order to secure a clear picture of a child's educational status, mark points on each of the subject-scales at the positions of the child's respective subject-scores and another point on the Total (average) scale at the position of his Total (average) score. Connect these points with a line. Between the educational age scale and the educational grade scale, draw a continuous horizontal line at the level of the child's Total (average) score. Then connect the left end of this line with the point on the chronological age scale which indicates the child's actual age, and connect the right end of the line with the point on the school grade scale which indicates his actual grade location.

Then repeat the procedure described above by connecting the class-average scores for each of the subjects and by drawing a horizontal line at the level of the Total (average) score for the class. (This second set of lines should be drawn with colored pencil.) Thus a child's achievement in the various divisions of the test may be compared with his own average, with the average of his class, or with the test norms. It is not unusual for a pupil's subject scores to deviate as much as 3 to 5 points (up or down) from his total average.

A completed Individual Educational Chart for a fifth-grade child is illustrated below. The chart is based on the scores made by the child plus the following data:

Date of test: December 1  
 Chronological age of child on date of test: 10-3  
 School grade on date of test: 5.3

(On December 1, about .3 of the school year has elapsed.)

From the chart it may be seen that this child's educational level is higher than would be expected of him from either a consideration of his actual age or a consideration of his school grade. The educational performance represented by a total average score of 59 is that of a child at the age 10-9, whereas this child is only 10-3. Similarly, his educational performance is .3 of a grade above his grade placement.

Test	Score
1. Elemen. Science	60
2. Language	56
3. Literature	54
4. Spelling	59
5. Reading: Vocab.	63
6. Reading: Comp.	66
7. Social Studies	63
8. Health & Safety	57
9. Arith. Reas.	58
10. Arith. Compu.	54

10) 590

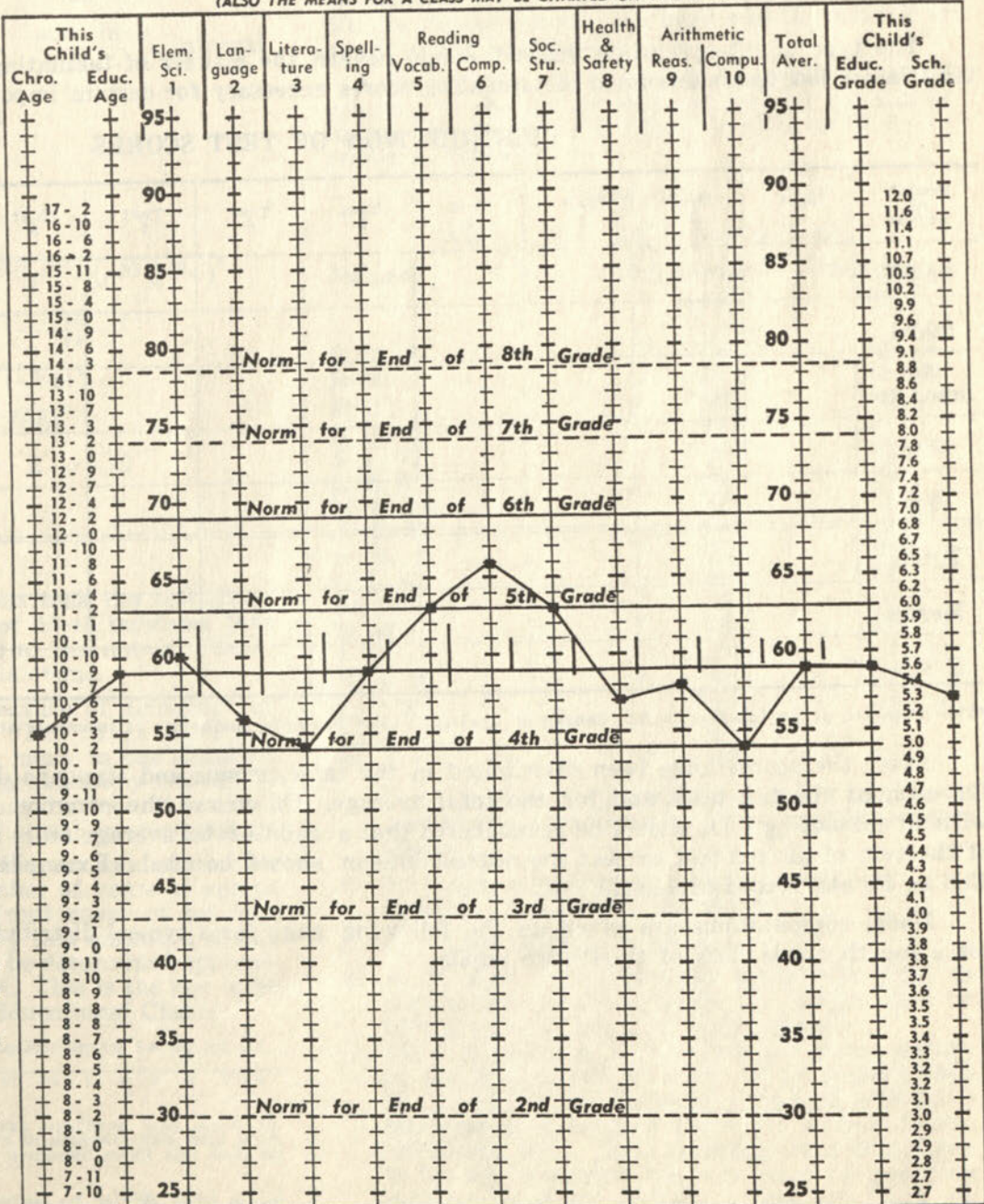
Total Average 59

Educational Grade 5.6

Educational Age 10-9

### INDIVIDUAL EDUCATIONAL CHART

(ALSO THE MEANS FOR A CLASS MAY BE CHARTED ON THIS PAGE)



- The educational grade and age scales on this Profile Chart indicate the norms for this test.
- Ages above 14-2 and below 8-2 are extrapolated.
- The short vertical lines are probable errors of the estimated true scores.
- The scale of scores for all of the tests has been equated. Thus uniform achievement will be indicated for a child if the line connecting his ten score-points is approximately horizontal.

DIRECTIONS printed in manual must be followed in administering this test if the results are to be compared with norms.

## ANALYZING YOUR SCHOOL'S RESULTS

Although comparison of the norms of your class or your school with those of corresponding units of other schools is important, comparison of individuals or classes within your own school unit is of even greater importance.

Scores should be tabulated in intervals of five (or three for Primary) for the various grades and buildings. These should be combined for the school as a whole. Means and standard deviations of each table should then be computed, and a picture of your school situation will emerge that will be highly revealing. Regardless of norms, no school can afford to refuse promotion to too large a proportion of its pupils.

In comparing one section with another or one school with another, it should be borne in mind that a mere difference between the means of the sections does not alone establish superiority of the one or the other. The probable error for each mean should be computed—

$$P E_m = \frac{.6745 \times S D}{\sqrt{N}}$$

Then the probable error of the difference between the two means should be computed—

$$P E_{dif} = \sqrt{P E_{m1}^2 + P E_{m2}^2}$$

The difference between the two means should be at least three times this probable error of the difference to justify the conclusion that it is significant (not due to chance).

The type of interpretation desired should govern the manner of tabulating or classifying scores. The table below illustrates one form of tabulating scores necessary for certain important interpretations.

## DISTRIBUTION OF TEST SCORES

Scale* of Scores	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 10	Total Ave.
95-99											
90-94											
etc. down to											
5-9											
0-4											
Totals											
Means											
S D's											

\*The midpoint of an interval is its "center of gravity." (For example, midpoints of intervals above are 97, 92, 87, 82, and so on.)

After the scores have been distributed in the table, means and standard deviations may be computed for each of the ten tests and for the total average. Of course the common average may be computed without tabulating. (It should be remembered that a child's total average score is found by taking one-tenth of the sum of his ten test scores; the nearest integer should be used. Examples: record 43.4 as 43, record 43.6 as 44, and record 43.5 as 44.)

Model computations are given on the following page for a typical distribution of total average scores for a fourth grade class of thirty-two pupils.

Scale of Scores	f	d	fd	fd <sup>2</sup>
65-69	1	4	4	16
60-64	2	3	6	18
55-59	3	2	6	12
50-54	4	1	4	4
45-49	8	0		
40-44	5	-1	-5	5
35-39	4	-2	-8	16
30-34	3	-3	-9	27
25-29	2	-4	-8	32
	<u>32</u>		<u>-10</u>	<u>130</u>

$$\frac{-10}{32} = -.31$$

$$\text{Mean} = \text{Assumed Mean} + \frac{\text{sum fd}}{N} \times \text{interval}$$

$$= 47 + \frac{-10}{32} \times 5$$

$$= 47 - 1.55$$

or Mean = 45.45

$$S D = \text{interval} \times \sqrt{\frac{\text{sum fd}^2}{N} - \left(\frac{\text{sum fd}}{N}\right)^2}$$

$$= 5 \times \sqrt{\frac{130}{32} - \left(\frac{-10}{32}\right)^2}$$

$$= 5 \sqrt{4.0623 - (-.31)^2}$$

$$= 5 \sqrt{4.0623 - .0961}$$

$$= 5 \sqrt{3.9662} \text{ or } 5 \sqrt{3.97}$$

$$= 5 \times 1.99$$

$$S D = 9.95$$

As these fourth grade pupils took the test about January 1 their mean score of 45.45 indicates that they are approximately equal to the normal attainment of fourth graders at that time.

Standard deviation is a measure of dispersion of individuals from the mean. The range from one standard deviation below the mean to one standard deviation above it includes approximately two-thirds of all the scores. Thus it may be seen that these children are approximately normal in variability.

A device for determining the number of months to be added to the whole number of years of age as given by the child on the front cover of his test booklet is suggested below. By this method a child's age in years and months may be determined approximately for the day of the test. This is the age to be indicated on the Individual Educational Chart.

Month of birth	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	
No. months to be added	3	2	1	0	12	11	10	9	8	7	6	5	4

The date for which this scale was prepared was April 15. Therefore the critical line is drawn to separate this date from April 16. A similar scale may be prepared to fit any date on which a test may be given.

For quickly converting dates of birth into ages as of September 1, 1948, use the following table

(after it has been extended, of course, to include required range of ages):

Year of Birth	MONTH OF BIRTH				
	Jan., April.	Feb., May	Mar., Aug., Nov.	June, July, Sept., Oct.	Dec.
1943		5½		5	4½
1942		6½		6	5½
1941		7½		7	6½
1940	and so on to include all possible ages of pupils in your grade or school.				

This converting table should be used during the entire school year of 1948-49 regardless of the time of year tests are given. By adding one year to each figure in the "Year of Birth" column the table will be modified for use during the school year of 1949-50. In similar manner the table may be modified to apply to any school year.

A clearer view of the positions of individuals in relation to the group may be secured by simply listing the pupils of a grade or class in order of scores as follows:

**Fifth Grade**

(Tested near end of school year)

Names	Achievement Scores	Chronological Age
	(Tot. Ave.)	
R. J. A.	84	11 ×
B. M. L.	76	10
M. J.	73	9½-
S. H. M.	71	10
J. L. S.	70	12 +
L. E. R.	68	10½
M. R.	66	11½+
A. F. V.	64	10
B. H.	62	10½
C. L. K.	60	11 ×
W. C.	56	10½
B. W.	55	10
J. H.	53	11 ×
M. J. B.	50	10½
L. T. E.	47	12 +
R. M. S.	44	10
W. J. C.	40	12 +

1. The two short horizontal lines in the column of achievement scores mark high- and low-ability norms.
2. A + sign placed after a chronological age signifies over-age for the grade.
3. A - sign signifies under-age.
4. A × sign indicates that while the child is normal-age for this grade he would also be normal-age for the next higher grade. (R. J. A. and J. L. S. should be advanced perhaps to the sixth grade at once. It is possible that M. R. should be reclassified though additional information about him should be secured before advancing him. This information is invaluable to the administrator, the director of the guidance program, and the classroom teacher. Any attempt to individualize the instructional program

of a school must be based upon test results and other objective evidence concerning the individual child.)

### DEVELOPMENT OF TESTS

The development of these tests has been dependent upon the co-operation of many individuals and the use of many sources. The authors acknowledge indebtedness to the Texas State Department of Education; to many faithful teachers who contributed items; to superintendents, principals, and teachers who administered the tests for experimental purposes; and to Dr. David F. Votaw, Jr., who did much of the statistical computation. Particularly were the public schools of San Marcos, Texas, and of Austin, Texas, obliging in permitting the experimental administration of the original list of items for validating data.

The tests were originally published in 1935 under the title of The New-South Achievement Tests. Each form contained nine divisions which had been validated and normed for grades 4-7 only.

In 1936 a primary division was added for use in grades 1-3.

In 1938 the New-South Achievement Test was revised and extended to include the eighth grade. Also at that time a tenth section, Elementary Science, was added. With the 1938 revision the name of the tests was changed to The Gray-Votaw General Achievement Tests.

A second revision (1942) included some very important changes. On the basis of information obtained from many sections of the United States, many items of the 1938 revision were discarded. To replace these, items of proved validity were used. The edition was divided into three sections: Primary for 1-3; Intermediate for grades 4-6; and Advanced for grades 7-9.

The present edition (1948) retains the previous divisions, Primary, Intermediate, and Advanced, but involves such extensive developments during the past two years that it may be regarded as a new test. Dr. J. Lloyd Rogers, a specialist in elementary education, has joined the staff of authors. All items used have been tested for validity as in the construction of an entirely new test. *Safety* has been incorporated into a division called *Health and Safety*.

Equivalent forms of the present edition will be called Q, R, S, and T. To maintain continuity of school records for schools that have been using previous forms, the new test provides a score scale that is identical to previous score scales; i.e., a child will make the same score on any one of the following forms: E, F, G, H, Q, R, S, T.

### PROCEDURE

- I. Selection of original items (about 4,000, or double the number finally used for the four forms).
  1. Analysis of courses of study and textbooks.
  2. Analysis of teacher's outlines and test questions.
  3. Judgment of expert supervisors.

4. Analysis of scales (such as Thorndike's Teacher's Word Book, the Ayres-Buckingham Spelling Scale, Horn's Spelling Scale, and so on.)
5. Arrangement in tentative order of difficulty.

### II. Experimental try-out of items.

1. Determining percentage of pupils for each grade knowing each answer.
2. Graphing of above data.
3. Rejecting items not showing proper "climb" through the successive grades. (A general achievement test should measure not the ephemeral knowledge of a grade but the surviving knowledge from school experiences.)
4. Rearranging surviving items in order of difficulty and renumbering them.

### III. Separation into four forms.

1. Selecting items for the four forms to ensure equal mean difficulty and the same variability in difficulty.

### IV. Publication.

#### V. Derivation of norms.\*

1. Administration to 2,160 pupils carefully selected to sample the school population. (Two trial time limits).
2. Computation of means and standard deviations for grade and age groups.
3. Transmutation to comparable scores.

### VI. Determination of reliability measures.

1. Correlation between forms.
2. Probable error of estimated true scores.

\*NOTE: All scores used for determining norms and other statistical results were secured by the authors either by directly administering the tests or by immediately supervising their administration by trained assistants. In no case was the administration of the tests left to the local teacher or principal. The users of these tests may be confident, therefore, that the norms were obtained under the conditions described and directions given in this manual. If the user follows these directions, his results are comparable with the norms.

### EASY SCORING

The new forms Q, R, S, and T are especially designed for ease and speed of scoring. They are completely objective. In all of the divisions only right answers are marked and counted. The usual, complicated procedure of discounting for guessing multiple-choice answers, which necessitates marking and counting wrong as well as right answers, has been eliminated completely. With this simplified plan of marking only right answers scoring can be done about three times as fast and with little or no loss of validity. Validity is preserved by the requirement that the pupil attempt each multiple-choice item, by the provision of ample time, and by the use of selected distractors.

In addition to the detailed directions for scoring which are given on the key, the following general rules should be observed:

1. In the recognition tests, any mark placed in or on the correct square should be accepted as correct.
2. Scoring can be done with greater speed and

fewer errors if Test 1 of all the booklets is scored first, then Test 2 of all the booklets, etc.

The consistency of the two sets of scores (one determined by number of right answers only and the other by the discount-for-guessing formula) is revealed in the following correlation coefficients of the score yield of 114 intermediate pupils:

TEST	NO. RESPONSES	CORREL.
Elem. Science	3	.94
Language	2	.93
Literature	4	.90
Read. Vocab.	4	.98
Soc. Studies	4	.97
Health and Safety	4	.96

### STATISTICAL RESULTS

Although no special statistical training is required to give and interpret these tests, the norms on the profile chart being self-explanatory, for those who desire to make a technical study of results the following statistical findings are offered:

TABLE 1.

### NORMAL-AGE GRADE NORMS FOR END OF SCHOOL YEAR

TEST	INTERMEDIATE			ADVANCED		
	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
Total Average	54.0	63.0	69.0	74.0	78.5	82.5
1. Elementary Science	54.2	63.0	68.5	73.9	77.1	83.8
2. Language	54.0	64.5	68.8	73.9	78.8	81.3
3. Literature	53.6	61.5	67.4	73.3	78.4	81.1
4. Spelling	54.0	62.5	69.8	73.4	79.7	83.2
5. Reading: Vocabulary	53.9	61.3	68.3	74.0	80.6	81.6
6. Reading: Comprehension	55.0	63.3	69.2	73.6	77.9	81.9
7. Social Studies	53.9	63.0	69.8	74.0	79.2	80.8
8. Health and Safety	53.5	62.3	68.8	73.7	78.0	82.3
9. Arithmetic: Reasoning	53.8	64.9	69.5	72.6	77.9	84.7
0. Arithmetic: Computation	53.9	63.5	69.9	74.8	78.4	84.1



TABLE 2.

**HIGH ABILITY NORMS**  
(MEANS FOR HIGH ABILITY THIRD OF THE NORMAL-AGE PUPILS)

TEST	INTERMEDIATE			ADVANCED		
	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
Total Average	63.7	74.4	78.0	82.0	85.0	90.0
1. Elementary Science	63.5	74.0	79.0	81.0	84.0	92.0
2. Language	62.8	75.0	81.0	84.0	87.0	81.0
3. Literature	65.0	70.0	74.0	78.2	83.3	89.0
4. Spelling	64.7	77.7	83.6	78.0	89.2	93.0
5. Reading: Vocabulary	65.7	73.0	79.0	82.0	87.3	89.6
6. Reading: Comprehension	67.0	76.0	81.0	84.0	87.5	90.0
7. Social Studies	60.1	72.0	79.0	83.4	86.0	88.6
8. Health and Safety	63.3	71.7	78.0	80.0	84.5	89.4
9. Arithmetic: Reasoning	62.8	71.0	75.0	78.0	82.0	88.0
10. Arithmetic: Computation	62.0	68.7	75.0	80.0	83.0	89.0

TABLE 3.

**LOW ABILITY NORMS**  
(MEANS FOR LOW ABILITY THIRD OF THE NORMAL-AGE PUPILS)

TEST	INTERMEDIATE			ADVANCED		
	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
Total Average	40.1	48.7	56.4	64.2	68.6	71.7
1. Elementary Science	41.3	49.3	57.0	64.4	66.8	68.2
2. Language	42.7	48.1	56.2	65.0	66.3	67.8
3. Literature	41.7	43.1	53.2	60.4	65.2	68.0
4. Spelling	41.3	45.9	57.1	63.0	69.8	73.2
5. Reading: Vocabulary	37.2	42.1	53.0	64.1	68.7	70.1
6. Reading: Comprehension	37.7	43.4	56.6	62.6	66.3	69.8
7. Social Studies	38.6	49.2	55.6	60.8	67.5	68.4
8. Health and Safety	38.0	49.6	57.5	60.8	66.7	73.8
9. Arithmetic: Reasoning	39.3	54.5	61.0	63.3	71.5	73.6
10. Arithmetic: Computation	47.9	57.2	64.2	67.8	72.1	76.1

TABLE 4.  
VARIABILITY OF SCORES

TEST	STANDARD DEVIATIONS*	
	Intermediate Gr. 4-6	Advanced Gr. 7-9
Total Average	13.0	9.9
1. Elem. Sci.	15.0	12.3
2. Language	16.9	9.6
3. Literature	13.5	9.5
4. Spelling	13.4	13.2
5. Read.: Vocab.	16.3	9.4
6. Read.: Compre.	16.1	10.3
7. Social Studies	12.6	10.2
8. Health and Safety	12.4	9.6
9. Arith. Reas.	11.7	8.6
10. Arith. Compu.	9.8	9.0

\*NOTE: These standard deviations are for a range of three grades. They are somewhat less for a single grade. For example, the standard deviation for the total average scores for grade 5 is 11.4 and for grade 8 it is 7.5.

TABLE 5.  
RELIABILITY

TEST	INTERMEDIATE (N = 245) (Grades 4-6)		ADVANCED (N = 192) (Grades 7-9)	
	Coef. of Reliability	P.E. of Est. True Score	Coef. of Reliability*	P.E. of Est. True Score
Total Average	.99	1.24	.97	1.08
1. Elementary Science	.92	4.63	.80	3.42
2. Language	.93	4.56	.84	3.04
3. Literature	.87	3.75	.77	2.29
4. Spelling	.92	2.02	.97	2.82
5. Reading: Vocabulary	.91	4.53	.89	1.96
6. Reading: Comprehension	.82	2.66	.85	2.20
7. Social Studies	.87	2.55	.92	1.95
8. Health and Safety	.85	2.51	.90	2.09
9. Arithmetic: Reasoning	.89	2.37	.85	1.61
10. Arithmetic: Computation	.93	1.34	.91	1.82

\*These coefficients were obtained by correlating scores on odd items with scores on even items and then by applying the Spearman-Brown formula. They are slightly reduced when determined for the narrower range of a single grade. For example, the coefficient of reliability of the total average scores for grade 8 is .953.

The short vertical lines on the profile chart indicate the probable errors of estimated true scores.

These are to be referred to only when considering the reliability of the scores of one pupil. The probable error of estimate of the mean true score for a class may be found by dividing the probable error of the estimated true score by the square root of the number of pupils in the class.

### RECORDING SCORES ON PERMANENT RECORD CARD

An important value of these tests will be lost unless a record of each child's performance is entered upon his permanent cumulative record card. For guidance purposes later, interpretation of a child's record will be greatly simplified if the record indicates merely the grade in which the test was taken and the percentile rank. Table 6 supplies the necessary information for recording these important data.

**TABLE 6.**  
**PERCENTILE SCORES EQUIVALENT TO TOTAL AVERAGE SCORES**  
**(END OF SCHOOL YEAR)**

Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Percentile Rank Equivalent
72	79	83	86	89	97	95
67	76	81	83	87	92	90
64	74	78	81	85	89	85
62	72	76	79	83	87	80
60	70	75	78	82	86	75
58	68	74	77	81	85	70
57	67	73		80	84	65
56	66	72	76			60
55	65	71	75	79	83	55
54	63	70	74		82	50
53	61	68	73	78	81	45
51	60	67	72	77	80	40
49	58	65	71	76	79	35
47	56	63	70	75	78	30
45	54	61	68	73	76	25
43	52	59	66	71	74	20
41	49	56	64	68	72	15
38	46	52	60	64	69	10
34	41	47	55	60	64	5

Note: The percentile rank equivalent indicates the percentage of pupils who made lower scores. For example, if a fourth grade pupil's total average score is 58, a percentile rank of 70 will be recorded on his permanent record card; if a sixth grade pupil's total average score is 77, a percentile rank of about 83 will be recorded; etc.



# How Well Do You Read? <sup>92</sup>

## DIAGNOSTIC READING TEST - Form B

Name \_\_\_\_\_ Raw Score \_\_\_\_\_ Grade Score \_\_\_\_\_

### DIRECTIONS FOR GIVING THE TEST

Boldface directions are to be read by the teacher to the students. Here are some articles and exercises to see how well you can read. Look at the sample story while I read it. (Teacher reads sample story.)

**1. SPECIFIC DETAILS.** (The first exercise under each paragraph is designed to test a student's ability to find a specific fact as stated in the test paragraph.)

Now look at the first exercise under the story. The first line says, "The canals around the rapids are \_\_\_\_\_." Which of the four words under this line finishes the sentence correctly? Yes, *shallow*, so draw a ring around the word *shallow*.

**2. INFERRED DETAILS.** (The second exercise under each paragraph is designed to reveal a student's ability to interpret the facts given in the story by seeing the relation between cause and effect or by drawing inferences and conclusions. The answer is implied in the content but is not definitely stated.)

Look at the second exercise under the story. The first line of this exercise says, "At the rapids, one would expect to find a \_\_\_\_\_." Which of the four words under this line finishes the sentence correctly? Yes, *city*, so draw a ring around the word *city*.

**3. WORD MEANINGS.** (The third exercise under each story measures ability to find a word in context when meaning is given.)

Look at exercise 3 under the story. Look at the story again. Which word means *changed from one place to another*? Yes, *transferred*, so draw a ring around the word *transferred* in the story.

**4. SELECTING TITLES.** (The fourth exercise under each story is designed to measure the ability to get the main idea of the test paragraph.)

Look at exercise 4 under the story. The first line says, "The best title for this story is:" (Teacher reads titles.) Which of the three titles is the best title for this story? Yes, *What Happens at the Rapids*, so draw a ring around the words *What Happens at the Rapids*.

There are 15 stories in this test like the sample. Read the first story *silently*. Then do the four exercises under this story just as we did in the sample. As soon as you finish one story, go right on to the next story. Do as many exercises as you can before I tell you to stop. Do not ask questions after you begin work. You may begin. (Allow 30 minutes; then collect papers.)

### SAMPLE TEST

**B**ETWEEN Lake Ontario and Montreal runs a 48-mile stretch of tumbled, broken water called the International Rapids. Cargo ships dare not enter this rough water. Ocean steamers coming up the St. Lawrence stop here. Passengers and cargoes are transferred to lake steamers which go around the rapids by way of shallow canals.

1. The canals around the rapids are  
huge shallow useless rough
2. At the rapids, one would expect to find a  
stretch sign city problem
3. Draw a ring around a word in the story that means *changed from one place to another*.
4. The best title for this story is:  
What Happens at the Rapids  
The Use of Small Lake Steamers  
Commerce on Lake Ontario  
(continued on next page)

## TEST QUESTIONS

(Time: 30 Minutes)

■ About 279 wildlife sanctuaries are maintained in our country. A single refuge may consist of 28,000 acres of natural wilderness. The welfare of the birds and animals living in a sanctuary is not left to chance. Naturalists are on the job, for the balance of nature does not take care of itself.

1. A refuge has many acres of natural  
fields                      wilderness                      beaches                      crops
2. The story shows how our country protects  
the young                      travelers                      the outdoors                      wildlife
3. Draw a ring around a word in the story that means *persons who study animals and plants*.
4. The best title for this story is:  
A Natural Area    Understanding Nature  
Our Country's Sanctuaries

■ One large drug-producing firm has a farm which is devoted to drug plants. Not only are the scarce plants cultivated, but there are experiments to increase the drug strength of abundant plants. This will make it possible to obtain more medicine from each pound of plant material. Many imported plants are very weak in useful drug substance.

1. This farm raises plants to obtain  
seeds                      bulbs                      fruits                      drugs
2. These experiments reduce our dependence on  
factories                      imports                      medicines                      substances
3. Draw a ring around a word in the story that means *tests to find out something*.
4. The best title for this story is:  
Raising Plants for Medicines    An American Firm  
Use of Abundant Plants

■■■ Refrigerator cars, refrigerated trucks, and airplanes handle quantities of fruits and crisp vegetables. In winter, produce from gardens on the West Coast and in the South appears on our markets. All year around, we can have a diet which is high in health-giving fruits and vegetables.

1. Two sections supply fresh produce during the  
winter                      season                      celebration                      summer
2. The story shows how transportation promotes  
health                      travel                      safety                      speed
3. Draw a ring around a word in the story that means *firm and fresh*.
4. The best title for this story is:  
Studying Our Diet    Our Supply of Fruits and Vegetables  
Means of Transportation

**IV** The well-dressed woman a few years from now may be handsomely clad in "coal, air, and water." Her hat may look like straw or velvet or anything in between. Her dress may look like silk or tweed. Her shoes may look like leather, but they will not scuff. Every item may be made of nylon.

1. The shoes told about will not wear dry scuff fit
2. Nylon can be made to resemble other ideas ages materials minerals
3. Draw a ring around a word in the story that means *separate thing or article*.
4. The best title for this story is:  
New Materials for Hats Things To Be Made from Nylon  
How Nylon Is Made

**V** Scientists are using a special kind of camera to study the ocean bottom. This camera can be lowered three miles. At that depth, there is utter darkness. To take pictures, the camera carries a light. The camera has a special trigger underneath. When the trigger touches the ocean bottom, it sets off a flash bulb and snaps the camera shutter.

1. Underneath the camera is a special bulb trigger shutter window
2. This camera will help to reveal the ocean's waves temperature secrets currents
3. Draw a ring around a word in the story that means *complete*.
4. The best title for this story is:  
How the Special Camera Operates The Depth of the Ocean  
Why the Flash Bulb Is Needed

**VI** In catalogues and shopwindows, you can admire the latest sandals for beach wear. You may think, "What modern footwear!" In reality, sandals date back to the Egyptians of 2000 B.C. They made sandals of papyrus which were not so different from the plaited straw sandals of today.

1. The Egyptians made sandals of leather plastic string papyrus
2. Sandals have always had great significance appeal secrets heels
3. Draw a ring around a word in the story that means *braided*.
4. The best title for this story is:  
In the Days of the Egyptians Keeping Up to Date  
An Old Yet Modern Shoe (continued on next page)

## 95 VII

Membership in the Live Oak Society is open to live oaks in Mississippi, Louisiana, and Texas, that have reached the century mark. A human sponsor enrolls the tree and pays its dues of 25 acorns a year. The acorns are planted in a nursery which distributes seedlings for planting.

1. The dues in this society are paid in  
secret                      service                      acorns                      favors
2. This unusual society works for  
health                      safety                      sports                      conservation
3. Draw a ring around a word in the story that means *makes a member*.
4. The best title for this story is:  
Reaching the Century Mark                      The Live Oak Society  
A Southern Nursery

**VIII** Whenever a wheel turns on an axle, one or two bearings support it. For large wheels, these bearings are of special "bearing metals," softer than the axles themselves. The bearings—not the axles—become worn and are replaced. For tiny wheels, the bearings are jewels, usually sapphires, harder than the axles.

1. The part replaced in the big wheels is the  
metal                      bearing                      surface                      wheel
2. Sapphires make good bearings because of their  
hardness                      brilliance                      shape                      training
3. Draw a ring around a word in the story that means *the shaft on which a wheel turns*.
4. The best title for this story is:  
Replacing Bearings                      Special Metals                      Bearings for Wheels

**IX** Facsimile is the invention which is capable of delivering the morning newspaper to your front room by radio. Any black and white reproduction can be sent through the ether by means of facsimile. Diagrams, charts, and handwritten notes can be sent to businessmen. Ranchers won't have to wait a week for their dailies.

1. A facsimile message can be  
lost                      stored                      handwritten                      delayed
2. This invention means new competition for  
business                      newspapers                      ranchers                      producers
3. Draw a ring around a word in the story that means *the upper regions of space*.
4. The best title for this story is:  
A New Means of Communication                      Service for Distant Points  
A New Delivery System



**X** Good telephone service is partly up to you. Dialing the wrong number wastes time. Failure to have coins in your hand when using a public pay phone causes delays. Keeping the operator guessing what number you want is an unnecessary waste of time, for there are ways of speaking so you will be understood. Use your normal tone of voice. Then check to see if you speak directly into the transmitter. Customers frequently transpose digits when they ask an operator for a number, so be sure to give the number correctly. Omit the "please" at the end, for it may sound like a digit. Saying the number as though it were a question helps you to emphasize the last digit rather than mumble or swallow it. Exercise care in saying 5 and 9 or 2 and 3, for they often sound alike.

1. The "please" at the end may sound like a  
digit                      show                      pretense                      challenge
2. For efficient service, the operator needs your  
corrections                      coopération                      scale                      programs
3. Draw a ring around a word in the story that means *change the position, or order, of*.
4. The best title for this story is:  
Avoiding Confusion                      Importance of Pronunciation  
Pointers on Telephone Etiquette

**XI** Josiah Wedgwood is regarded as England's most noted potter. Before Wedgwood's time, all but the wealthy ate from wooden platters or dishes of poor and ugly earthenware. But Josiah Wedgwood decided that beautiful dishes could be made and sold cheaply enough for the average family to enjoy them. He was a man of great energy as well as good taste. He searched everywhere for new designs for his pottery. The ware developed by this master craftsman had a texture so fine that it has been compared to a baby's skin. The microscopic delicacy of the dishes and vases designed and produced by Wedgwood is astonishing. He established such standards of excellence that Wedgwood ware is world famous.

1. Wedgwood designs have unusual  
colors                      delicacy                      themes                      simplicity
2. For Josiah Wedgwood, pottery was  
an art                      a pastime                      a hobby                      a bore
3. Draw a ring around a word in the story that means *unusual merit or quality*.
4. The best title for this story is:  
A Famous Potter and His Ware                      A Craftsman's Problems  
Reducing the Cost of Dishes                      (continued on next page)

## XII

For years, unavoidably steep grades have cost the railroads time and money. Now the new diesel and steam locomotives, with their speed and power, are flattening these grades without anyone's scooping a shovelful of dirt to level them.

Passengers like the smooth start of these engines—without head-snapping jerks. They like the speed which gets them to their destination on time. And there's no smoke—no cinders.

Many engineers who have been hanging out of locomotive cabs for years in all kinds of weather now ride in comfort. The soundproof cab of a diesel is warm and dry. The engineer and fireman sit in comfortable leather chairs.

1. The cab of a diesel locomotive is  
open                      smooth                      leather-lined                      soundproof
2. Many railroad problems are solved by new  
schedules                      designs                      tracks                      locomotives
3. Draw a ring around a word in the story that means *the place to which a person is going*.
4. The best title for this story is:  
Saving Time and Money                      Comfort for Travelers  
Advantages of Modern Locomotives

## XIII

There is a strange inconsistency in Brazil. Brazil's poverty is due in part to the easy riches she produced. One after another, Brazil turned to sugar, cotton, cacao, rubber, and coffee. Each of these created wealth—for a few rich proprietors. Each, in turn, being dependent on foreign demand, went through a slump. The sugar trade shifted to the West Indies. The cotton market was captured by the United States. The cacao market was lost to Ecuador, Venezuela, and Colombia. Rubber was king until 1910, when Malaya took the lead. Finally, Brazil became the world's great coffee country. But competition from several countries produced a glut.

These one-crop policies produced slump after slump. Today, Brazil seeks to diversify her agriculture to make herself economically secure.

1. In recent years, Brazil has raised much  
rice                      tea                      coffee                      sugar
2. Brazil's agriculture could not meet foreign  
competition                      demands                      policy                      attractions
3. Draw a ring around a word in the story that means *contradiction*.
4. The best title for this story is:  
Sources of Wealth in Brazil                      Foreign and Domestic Markets  
Why Brazil Seeks Diversified Agriculture

# XIV

The Smithsonian Institution in Washington, D. C., is the first of Uncle Sam's laboratories. It was founded in 1846 through the generosity of James Smithson, an Englishman, who left \$542,000 in his will to our Government "for the increase and diffusion of knowledge among men."

Not one of the seven seas or the seven continents has failed to be the location of a group of scientific men sponsored by the Institution. The men investigate and collect the curious things made by nature or fashioned by man. The findings are sent to the Institution's laboratories, where the specimens are prepared. Here, too, instruments are devised and constructed for the explorers' use.

1. The Institution constructs the explorers' objectives instruments theories homes
2. Mr. Smithson's gift is being well hidden preserved sponsored administered
3. Draw a ring around a word in the story that means *spreading, extension.*
4. The best title for this story is:  
 Activities of Our Scientific Age      Equipment in a Modern Laboratory  
 Founding and Work of the Smithsonian

# XV

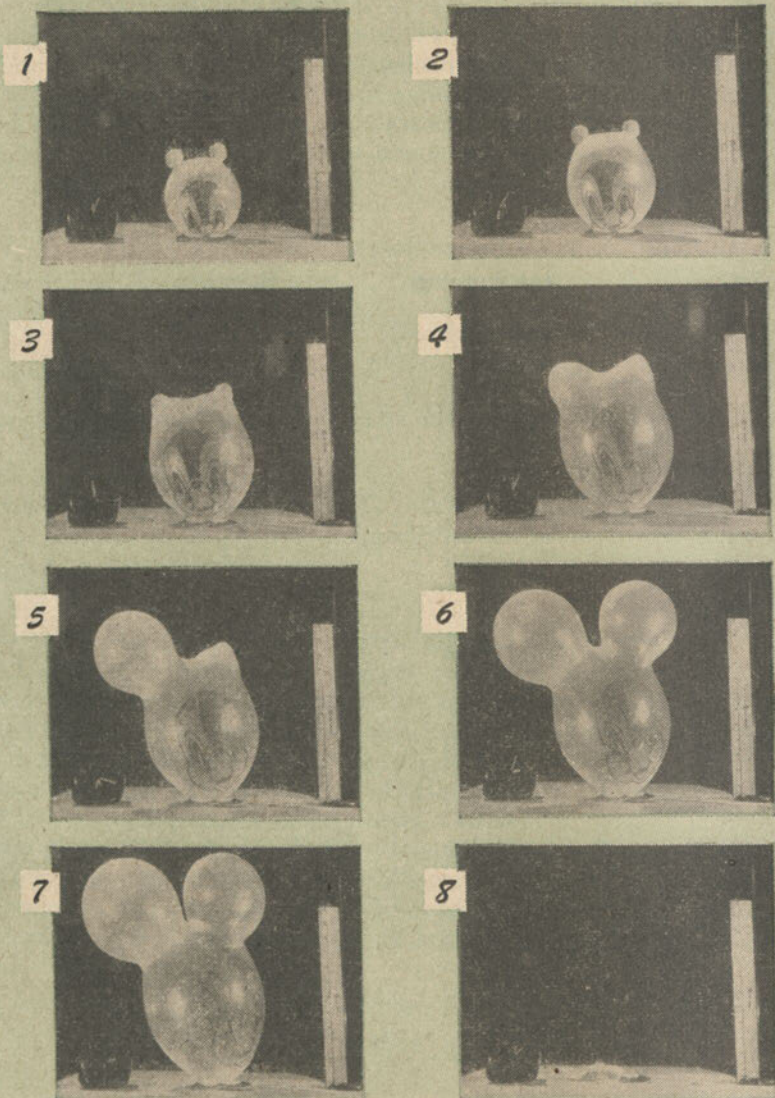
The Everglades at the southern tip of Florida are a real story-book jungle. Here, numberless waterways wind and glint in saw grass and forest. Some of the waterways are tunnels walled by the tangled roots of mangrove trees which rise out of the water. Here and there are islands of varying size, called "hammocks." These are mounds of tropical vegetation, supported on heaps of soil and shell. The strange-looking trees have names such as poisonwood, gumbo limbo, manchineel, and mahogany.

On the trees creep brilliantly banded snails. Scorpions and deadly cotton-mouth snakes slink beneath the logs. The air is thick with biting, buzzing insects. Amid the whole expanse of the Everglades live the glamorous birds of the tropics: the egret, the ibis, and the heron.

1. This jungle is inhabited by birds, snakes, and scorpions horses wolves bears
2. This area has great appeal for mountaineers hikers naturalists gypsies
3. Draw a ring around a word in the story that means *to creep, glide.*
4. The best title for this story is:  
 Tropical Birds and Plants      A Description of the Everglades  
 Waterways in the Everglades

(end of test)

# Bolo Tests the Stratosphere



**BOLO**, a toy balloon, was placed in the high altitude testing chamber of the Northrop Aircraft, Inc. In this chamber, density of air and temperatures can be gradually changed so that they are like changes in the atmosphere up to an altitude of 130,000 feet. Stages in Bolo's ascent are shown above. 1—sea level; 2—15,000 ft.; 3—30,000 ft.; 4—40,000 ft.; 5—45,300 ft.; 6—52,000 ft.; 7—70,000 ft.; 8—80,000 ft., a burst balloon.

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