
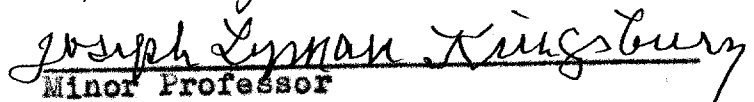


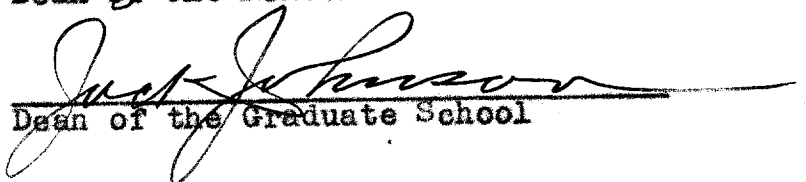
THE RELATIONSHIP BETWEEN CERTAIN MENTAL CHARACTERISTICS
AND ACHIEVEMENT OF STUDENTS IN THE SEVENTH AND
EIGHTH GRADES OF THE CLEBURNE
JUNIOR HIGH SCHOOL

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THESIS

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By

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CHAPTER I

INTRODUCTION

The Problem

Statement of the problem.--The purpose of this study is to determine the extent of pupil failure in the seventh and eighth grades of the Cleburne Junior High School, to determine to what extent certain mental characteristics contribute to pupil failure and success, and to submit some suggestions as to how pupil failure may be reduced to a minimum in the seventh and eighth grades of the Cleburne Junior High School, Cleburne, Texas.

Importance of the problem.--America's biggest business is that of going to school. When a business man wishes to cut down expenses, he examines the efficiency of his plant and seeks to find waste that may be eliminated. Likewise, in educational matters, the first thing looked for is waste where there is an investigation of efficiency of teachers. The investigation discovers waste in the form of failures among pupils.¹

Society suffers a loss of pupils' enthusiasm and ambition when pupils fail to make proper progress in school.

¹H. A. Smith, "A Study of High School Failures and Their Causes," Educational Administration and Supervision, VIII (December, 1928), pp. 557-572.

There is also the loss sustained by the pupils themselves: that of time, self-assurance, and confidence, a loss which seriously affects their lives in many cases.

Definitions.--For purposes of this study a failure is considered a student who does not do the level of school work which will justify the teacher to assign him a grade of seventy per cent or better. A failing student is one who is required to repeat work in a given subject and make a mark of seventy per cent or better in order to receive credit.

The term "excelled" means that a student made a better score on one part of the sub-tests than on another.

The term "best grades" means that a student has been assigned the best marks attainable in language arts, mathematics or social studies.

The term "I.Q." means intelligence quotient.

The term "CTMM" means California Test of Mental Maturity, elementary series.

The term "mean I.Q." means the average intelligence quotient of a group of students.

The term "percentile rank" means the arrangement of scores of one student in relation to the scores of the other students.

The term "success" means passing.

The term "language arts" means a combination of English, reading and spelling.

The term "mathematics" means a course in the solving of numerical problems.

The term "social studies" means a combination of history, geography and government.

A grade of 90 per cent to 100 per cent means superior; a grade of 80 per cent to 90 per cent means high average; a grade of 70 per cent to 80 per cent means a low average; and a grade below 70 per cent means failing.

An average grade of 70 per cent is required to pass; daily grades count two-thirds and examination grades count one-third of the final mark.

Data.--The data used in this study have come from the CTMM and from the marks assigned pupils by the teachers. Marks of the teachers were the only bases upon which a comparison could be made since no achievement tests were given.

Language arts, mathematics and social studies will be considered.

There are 302 students in the seventh and eighth grades of the Cleburne Junior High School. One hundred and seventy-four students are boys and 128 students are girls.

Sixteen students are in the low seventh grade, 165 students are in the high seventh grade, forty students are in the low eighth grade, and eighty-one students are in the high eighth grade.

There are ten boys and six girls in the low seventh grade; there are eighty-eight boys and seventy-seven girls in the high seventh grade; there are twenty-four boys and sixteen girls in the low eighth grade; there are fifty-two boys and twenty-nine girls in the high eighth grade.

In classifying the I.Q.'s of students' CTMM results, 320 students are used. However, eighteen of the 320 students received no grades at the end of the semester, as they dropped out of school before the end of the semester.

Treatment of data.--The writer proposes to study separately low seventh, high seventh, low eighth, and high eighth grades and then to study these four sections collectively to determine conclusions. Percentages are used for purposes of comparison.

In some instances the different teachers assigned the same marks to more than one subject of a particular student. Care has been exercised in this matter. When a student had a mark of eighty on two or more subjects, the first time the grade occurred a tally was made for language arts; the second time, a tally was made for mathematics; the third time, a tally was made for social studies.

Related Studies

The writer was unable to find studies that have been made which deal with any test in a like manner, but certain related studies were helpful in the study which follows.

As early as 1909, L. P. Ayres² found the ordinary offerings of our schools were insufficient. He expressed a concern because the school was not organized to fit the needs of all the children--bright, average and dull.

The Smith³ study of failures in the Chattanooga Junior High Schools was undertaken to determine some of the causes of the high per cent of pupil failure as indicated by the grades assigned them by the teachers. He found that the school failed to provide courses adapted to the needs of pupils with low mentality. He also found that teachers failed to agree concerning requirements for promotion.

Traxler⁴ found that total mental factors, language factors, and vocabulary factors of the CTMM are very reliable and that non-language factors are fairly reliable. He found also that memory and reasoning were not very highly reliable.

Miller⁵ found the activity method excellent for the instruction of mentally retarded children. She took a group of dull-normal children in the seventh and eighth grades of

²L. P. Ayres, Laggards in School, p. 236.

³Ellison M. Smith, "A Study of Failures in the Chattanooga Junior High School" (Unpublished Doctor's Dissertation, George Peabody College, 1934), p. 8.

⁴Arthur E. Traxler, "A Study of the California Test of Mental Maturity," Journal of Educational Research, XXXII (September, 1938-May, 1939), p. 603.

⁵Zola C. Miller, "Mathematics for the Mentally Retarded" (Unpublished Master's Thesis, North Texas State Teachers College, 1940), p. 46.

the Reagan Junior High School, Wichita Falls, Texas, and used the CTMM to arrive at I.Q.'s of the students.

Wolverton⁶ found that whites outrank negroes in I.Q. but that ability to achieve has no definite relation to intelligence.

Peters⁷ found those students who have the higher I.Q.'s make the higher grades in language arts, mathematics and social studies. Her study was made with sixth grade students of Amarillo, Texas.

The CTMM

The CTMM⁸ contains three pre-tests: one dealing with visual acuity, one dealing with auditory acuity and one dealing with motor coordination. These pre-tests are used to help the test administrator to determine whether or not a student can see and hear well enough, and whether or not he has motor coordination sufficient, to allow him to take the rest of the test without being placed at a disadvantage.

The CTMM is divided into sub-tests dealing with memory, spatial relationships, logical reasoning, numerical reasoning and vocabulary.

⁶Ethel G. Wolverton, "Intelligence Quotients and Achievement" (Unpublished Masters Thesis, North Texas State Teachers College, 1936), p.

⁷Ruby Gray Peters, "Intelligence Quotients and Achievement Scores" (Unpublished Master's Thesis, North Texas State Teachers College, 1946), p.

⁸Elizabeth T. Sullivan, Willis W. Clark and Ernest W. Teigs, Manual of Directions, California Test of Mental Maturity, elementary series, pp. 1-6.

Further explanation of the phases of the CTMM will be made as introductory statements to each of the sub-tests which has been selected as a basis for this study.

Limitations of the Study

In making a study of the relationship between certain mental characteristics and the achievement of students in the seventh and eighth grades of the Cleburne Junior High School many phases will not be considered. The influence of the economic status of the family on failure and success is not considered. Neither are the facts of the pupils moving from town to town, entering school late or attending irregularly, etc. considered.

Results do not take into consideration that teachers have different standards of grading, even though an attempt has been made to establish policies concerning a uniform system of grading.

This study will not take into consideration defective hearing and poor vision.

Only results from the I.Q., the memory sub-test, the numerical reasoning sub-test, and the vocabulary sub-test of the California Test of Mental Maturity are considered in this study.

CHAPTER II

MENTAL FACTORS AS SHOWN BY THE CALIFORNIA TEST OF MENTAL MATURITY, IN RELATION TO ACHIEVEMENT IN LANGUAGE ARTS, MATHEMATICS AND SOCIAL STUDIES

The Relation of Intelligence Quotient and Achievement of Students

The I.Q. is the ratio of mental age to chronological age. The I.Q. indicates the extent to which an individual has mental ability above or below the average for his age. The average I.Q. is indicated by 100.

The purpose of this study of I.Q.'s, is to determine to what extent failing grades and successful grades can be attributed to the I.Q.'s of the students.

Table I gives a comparison of I.Q.'s with grades made by 302 seventh and eighth grade students of the Cleburne Junior High School in language arts, mathematics and social studies. Grade marks below seventy represent failing grades; grade marks of seventy to eighty represent low average grades; grade marks of eighty to ninety represent high average grades; grade marks of ninety and above represent superior grades.

In the low seventh grade those students who had I.Q. classifications of very inferior made failing grades in mathematics. Eighty per cent of the students within this classification failed mathematics.

TABLE 1

COMPARISON OF I.Q.'S WITH GRADES MADE BY 302 SEVENTH AND EIGHTH GRADE STUDENTS IN LANGUAGE ARTS, MATHEMATICS AND SOCIAL STUDIES

Subjects	Marks	Low Seventh Grade I.Q.					High Seventh Grade I.Q.					
		Below 70	70-84	85-99	100-114	115-129	130 and above	Below 70	70-84	85-99	100-114	115-129
Language Arts	90			1					1	7	12	1
	80		1	2				2	15	29	14	
	70	4	5	3			1	5	27	20	1	
	60						3	5	12	3		
	50							3	4			
	Total	4	6	6			4	15	59	59	27	1
Mathematics	90			1					3	4	7	1
	80		1	3				4	13	25	18	
	70		1	1			2	6	33	28	2	
	60		1	1			2	3	7	1		
	50	4	3	1				2	3	1		
	Total	4	6	6			4	15	59	59	27	1
Social Studies	90											
	80	2	1	3			1	7	3	7	13	1
	70	2	5	3			3	7	20	35	11	
	60							7	33	16	3	
	50							1	3	1		
	Total	4	6	6			4	15	59	59	27	1

TABLE 1--Continued

Subjects	Marks	Low Eighth Grade I.C.					High Eighth Grade I.C.					Total both grades	
		Below 70	70-84	85-99	100-114	115-129	130 and above	Below 70	70-84	85-99	100-114		115-129
Language Arts	90		3	3	3			1	2	7	3	1	36
	80				2			5	14	4			95
	70	2	11	9	2		1	14	14	8			127
	60	2	2	2			1	2	3				32
	50	1						1					12
	Total	5	16	14	5		2	23	33	19	3	1	302
Mathematics	90		1	1	1			1	2	4	1	1	24
	80		12	11	4			5	4	5	1	1	83
	70	3	1	2			1	15	17	8	1		144
	60	2	1	2			1	2	5	2			25
	50	2	2					1	5				26
	Total	5	16	14	5		2	23	33	19	3	2	302
Social Studies	90		1	3				3	1	2	2		29
	80	1	13	5	5			18	7	8	1	1	104
	70	3	1	2			1	22	22	9	1		149
	60	1	1	4			1	2	2				13
	50	1	1	4				1	1				7
	Total	5	16	14	5		2	23	33	19	3	1	302

In the high seventh grade those students who are not above the low average classification in I.Q. made a majority of the failing grades. In language arts 89 per cent failed; in mathematics 88 per cent failed; in social studies 80 per cent failed.

In the low eighth grade those students who are not above the low average classification in I.Q. made a majority of the failing grades. In language arts 100 per cent failed; in mathematics 100 per cent failed; in social studies 100 per cent failed.

In the high eighth grade those students who are in the low average I.Q. classification made a majority of the failing grades. In language arts 100 per cent failed; in mathematics 87 per cent failed; in social studies 100 per cent failed.

A study of Table 1 reveals the fact that 178 students had an I.Q. below 99; of those who did fail 93 per cent made failing grades in language arts, 92 per cent made failing grades in mathematics and 95 per cent made failing grades in social studies.

Table 2 gives the classification of I.Q.'s of ten boys and six girls in the low seventh grade of the Cleburne Junior High School. Since this group is a retarded group, it would be expected that none would rank as high as very superior, superior, or high average. In the low normal or low average I.Q. group classification there were three boys and

TABLE 2

CLASSIFICATION OF SIXTEEN STUDENTS' INTELLIGENCE QUOTIENTS
IN THE LOW SEVENTH GRADE OF THE CLEBURNE JUNIOR HIGH
SCHOOL, SPRING SEMESTER, 1948

Classification	Intelligence Quotient	Boys	Girls	Total
Very superior	130 and above			
Superior	115 to 129			
High average	100 to 114			
Low average	85 to 99	3	3	6
Inferior	70 to 84	4	2	6
Very inferior	Below 70	3	1	4
Total		10	6	16

three girls; in the inferior I.Q. group classification there were four boys and two girls; in the very inferior I.Q. classification there were three boys and one girl.

The mean I.Q. for the boys in the low seventh grade is 75.2 and for the girls it is 80. The mean I.Q. for the low seventh grade is 77.3. This I.Q. grade of 77.3 ranks, according to the CTMM, as inferior.

Table 3 shows the number of boys and girls in the low seventh grade who failed and who made best grades in comparison to I.Q.'s. By best grades in a subject, it is meant that the student made a higher mark on one subject than on another subject. Best grades are passing grades.

TABLE 3

FAILURES AND BEST GRADES MADE IN LANGUAGE ARTS, MATHEMATICS AND SOCIAL STUDIES BY SIXTEEN STUDENTS IN THE LOW SEVENTH GRADE OF THE CLEBURNE JUNIOR HIGH SCHOOL IN RELATION TO INTELLIGENCE QUOTIENT

Subject	Sex	Below 70	I.Q. 70-84	I.Q. 85-99	I.Q. 100-114	I.Q. 115-192	I.Q. 130 and above	Total
Failures								
Language Arts	Boys							
	Girls							
	Total							
Mathematics	Boys	3	3					6
	Girls	1	1	1				3
	Total	4	4	1				9
Social Studies	Boys							
	Girls							
	Total							
Best Grades								
Language Arts	Boys		1	1				2
	Girls	1	1	2				4
	Total	1	2	3				6
Mathematics	Boys							
	Girls			1				1
	Total			1				1
Social Studies	Boys	3	3					6
	Girls		1	2				3
	Total	3	4	2				9

Of those students in the very inferior class all boys and all girls failed mathematics; of those in the inferior group 75 per cent of the boys and 50 per cent of the girls

failed mathematics; one girl in the low average group failed mathematics.

Table 3 shows also the best grades which were made under each I.Q. classification. A higher per cent of best grades was made in language arts by the girls but a higher per cent of best grades was made in social studies by the boys. One girl who has the highest I.Q. in the low seventh grade made her best grade in mathematics.

A study of Table 3 reveals the fact that of nine of those sixteen students in the low seventh grade who had an I.Q. rank below 99, 100 per cent of the boys and 100 per cent of the girls made failing grades in mathematics; no other failing grades were made in the low seventh grade. Of the sixteen students in the low seventh grade with an I.Q. below 99, 100 per cent of the boys and 100 per cent of the girls made best grades in language arts, zero per cent of the boys and 100 per cent of the girls made best grades in mathematics and 100 per cent of the boys and 100 per cent of the girls made best grades in social studies.

Table 4 gives the classification of I.Q.'s of eighty-eight boys and seventy-seven girls in the high seventh grade. In the very superior group there is one girl; in the superior classification there are sixteen boys and twelve girls; in the high average classification there are twenty-seven boys and thirty-one girls; in the low average classification there are thirty-three boys and twenty-five girls; in the inferior

TABLE 4

CLASSIFICATION OF INTELLIGENCE QUOTIENTS OF 165 STUDENTS
IN THE HIGH SEVENTH GRADE OF THE CLEBURNE JUNIOR
HIGH SCHOOL, SPRING SEMESTER, 1948

Classification	Intelligence Quotient	Boys	Girls	Total
Very superior	130 and above		1	1
Superior	115 to 129	16	12	28
High average	100 to 114	27	31	58
Low average	85 to 99	33	25	58
Inferior	70 to 84	9	7	16
Very inferior	Below 70	3	1	4
Total		88	77	165

classification there are nine boys and seven girls; in the very inferior classification there are three boys and one girl.

The mean I.Q. for the boys in the high seventh grade is 98.2, and for the girls it is 101.5. The I.Q. grade mean is 99.85. The class mean is in the high average rank, according to the CTMM.

Table 5 shows the number of boys and girls in the high seventh grade who made failing marks and best grades in comparison to their I.Q.'s. Of the twenty-nine students who had very superior or superior I.Q.'s, none made failing marks; of the boys with high average I.Q.'s 11 per cent made failing marks in language arts; of the boys with low average

TABLE 5

FAILURES AND BEST GRADES MADE IN LANGUAGE ARTS, MATHEMATICS
AND SOCIAL STUDIES BY 165 STUDENTS IN THE HIGH SEVENTH
GRADE OF THE CLEBURNE JUNIOR HIGH SCHOOL IN
RELATION TO INTELLIGENCE QUOTIENT

Subject	Sex	Below 70	I.Q. 70-84	I.Q. 85-99	I.Q. 100-114	I.Q. 115-129	I.Q. 130 and above	total
Language Arts	Boys	3	5	11	3			22
	Girls	1	2	5				8
	Total	4	7	16	3			30
Mathe- matics	Boys	1	3	6	1			11
	Girls	2	2	3	1			8
	Total	3	5	9	2			19
Social Studies	Boys		1	2	1			4
	Girls			1				1
	Total		1	3	1			5
Best Grades								
Language Arts	Boys		1	2	4	3		10
	Girls		1	5	13	2	1	22
	Total		2	7	17	5	1	32
Mathe- matics	Boys	1	2	14	5	7		29
	Girls		1	9	6	3		19
	Total	1	3	23	11	10		48
Social Studies	Boys	2	6	17	18	6		49
	Girls	1	5	11	12	7		36
	Total	3	11	28	30	13		85

I.Q.'s 33 per cent made failing marks in language arts; of the boys with inferior I.Q.'s 55 per cent made failing marks in language arts; of the boys with very inferior I.Q.'s, 67

per cent made failing marks in language arts. The first failures among the girls in language arts appeared in the low average group. Of the girls with low average I.Q.'s 20 per cent made failing marks in language arts; of the girls of inferior I.Q. 28 per cent made failing marks in language arts; of the girls with very inferior I.Q.'s 100 per cent made failing marks in language arts.

Failing marks were made by some of the boys who have an I.Q. in the high average rank. Of the boys with high average I.Q. 3.7 per cent made failing marks in mathematics; of the boys with inferior I.Q.'s 33 per cent made failing marks in mathematics; of the boys with very inferior I.Q.'s 33 per cent made failing grades in mathematics. Failing marks were made by some of the girls in the high average I.Q. rank. Of the girls with high average I.Q.'s 3.2 per cent made failing grades in mathematics; of the girls with low average I.Q.'s 12 per cent made failing grades in mathematics; of the girls with inferior I.Q.'s 28 per cent made failing marks in mathematics; of the girls with very inferior I.Q.'s 100 per cent made failing grades in mathematics.

Of the boys with high average I.Q.'s 3.7 per cent made failing marks in social studies; of the boys with low average I.Q.'s 6 per cent made failing marks in social studies; of the boys with inferior I.Q.'s 2 per cent made failing marks in social studies. Of the low average I.Q. girls, 4 per cent made failing marks in social studies.

Table 5 shows that 11 per cent of the boys made best grades in language arts; 28 per cent of the girls made best grades in language arts. The highest per cent of best grades in language arts was made by girls with high average I.Q.'s.

Thirty-three per cent of the boys made best grades in mathematics; 24 per cent of the girls made best grades in mathematics.

Fifty-five per cent of the boys made best grades in social studies; 46 per cent of the girls made best grades in social studies. The highest per cent of best grades made in social studies by boys was found among the high average I.Q. group; the highest per cent of best grades made in social studies by girls was found among the superior I.Q. group.

A study of Tables 4 and 5 reveals the fact that seventy-eight students in the high seventh grade have I.Q.'s below 99; of those who made failing grades, 86 per cent of the boys and 100 per cent of the girls made failing grades in language arts, 90 per cent of the boys and 87 per cent of the girls made failing grades in mathematics and 75 per cent of the boys and 100 per cent of the girls made failing grades in social studies. Of the seventy-eight students in the high seventh grade with I.Q.'s below 99, 30 per cent of the boys and 27 per cent of the girls made best grades in language arts, 58 per cent of the boys and 52 per cent of the girls made best grades in mathematics, and 59 per cent of the boys and 47 per cent of the girls made best grades in social studies.

Table 6 gives the I.Q. classification of the twenty-four boys and sixteen girls in the low eighth grade. There were none who ranked above 114 in this group, but 2.5 per cent of the boys and 10 per cent of the girls showed that they were in the very inferior classification.

TABLE 6

CLASSIFICATION OF INTELLIGENCE QUOTIENTS OF FORTY STUDENTS
IN THE LOW EIGHTH GRADE OF THE CLEBURNE JUNIOR HIGH
SCHOOL, SPRING SEMESTER, 1948

Classification	Intelligence Quotient	Boys	Girls	Total
Very superior	130 and above			
Superior	115 to 129			
High average	100 to 114	3	2	5
Low average	85 to 99	9	4	13
Inferior	70 to 84	11	6	17
Very inferior	Below 70	1	4	5
Total		24	16	40

The mean I.Q. for the boys in the low eighth grade is 88.7 and that for the girls is 82.7; the grade mean is 85.7. The mean I.Q. for the class is in the low average rank, according to CTMM.

Table 7 shows the number of boys and girls in the low eighth grade who made failing marks and best grades in relation to I.Q. classification in language arts, mathematics and social studies. No student made a failing grade who had

TABLE 7

FAILURES AND BEST GRADES MADE IN LANGUAGE ARTS, MATHEMATICS
AND SOCIAL STUDIES BY FORTY STUDENTS IN THE LOW EIGHTH
GRADE OF THE CLEBURNE JUNIOR HIGH SCHOOL IN
RELATION TO INTELLIGENCE QUOTIENT

Subject	Sex	Below 70	I.Q. 70-84	I.Q. 85-99	I.Q. 100-114	I.Q. 115-192	I.Q. 130 and above	Total
Failures								
Language Arts	Boys		2	2				4
	Girls	3						3
	Total	3	2	2				7
Mathe- matics	Boys	1	2	1				4
	Girls	2	1					3
	Total	3	3	1				7
Social Studies	Boys		2	4				6
	Girls	1	1	1				3
	Total	1	3	5				9
Best Grades								
Language Arts	Boys		2	1	1			4
	Girls	2	4	2	2			10
	Total	2	6	3	3			14
Mathe- matics	Boys		4	5	2			11
	Girls	1	2					3
	Total	1	6	5	2			14
Social Studies	Boys	1	4	3	1			9
	Girls	1	1	1				3
	Total	2	5	4	1			12

an I.Q. rank of as much as high average. Only five students fell in this category. Of the low average I. Q. boys 22 per cent made failing marks in language arts; of the inferior I.Q. boys, 18 per cent made failing marks in language arts;

of the boys with very inferior I.Q.'s none made failing marks in language arts. The only failures among the girls are those with very inferior I.Q.'s; 75 per cent made failing marks in language arts.

In mathematics failures among the boys began to appear in the inferior I.Q. group with 18 per cent; the very inferior I.Q. group showed a failure of 100 per cent. Among the girls mathematics failures began to appear in the low average I.Q. group with 50 per cent; the inferior I.Q. girls showed 16 per cent failures in mathematics; and the girls with very inferior I.Q.'s showed 50 per cent failures in mathematics.

In social studies failures among the boys with low average I.Q.'s showed 44 per cent; with inferior I.Q.'s 18 per cent; with very inferior I.Q.'s no per cent. In social studies the girls with low average I.Q.'s showed 25 per cent failures; with inferior I.Q.'s 16 per cent failures; with very inferior I.Q.'s 25 per cent failures.

Sixteen per cent of the boys made best grades in language arts. Sixty-two per cent of the girls made best grades in language arts. Forty-one per cent of the boys made best grades in mathematics, while only 18 per cent of the girls made best grades in mathematics. Thirty-seven per cent of the boys in the low eighth grade made best grades in social studies, and 25 per cent of the girls made best grades in social studies.

Thirty-three per cent of the boys in the high average I.Q. rank made best grades in language arts and 100 per cent of the girls in the high average I.Q. rank made best grades in language arts. A higher per cent of best grades in mathematics was made by 55 per cent of the boys with a low average I.Q. rank and by 33 per cent of the girls with an inferior I.Q. rank. Thirty-six per cent of the boys in the inferior I.Q. group made best grades in social studies, while 50 per cent of the girls in the low average I.Q. group made best grades in social studies.

In the low eighth grade 17 per cent of the boys and 19 per cent of the girls made failing grades in language arts; 12 per cent of the boys and 31 per cent of the girls made failing grades in mathematics; 25 per cent of the boys and 19 per cent of the girls made failing grades in social studies.

A study of Tables 6 and 7 reveals that of thirty-five of those forty students who made failing grades in the low eighth grade with an I.Q. below 99, 100 per cent of the boys and 100 per cent of the girls made failing grades in language arts, 100 per cent of the boys and 100 per cent of the girls made failing grades in mathematics and 100 per cent of the boys and 100 per cent of the girls made failing grades in social studies. Of the thirty-five students in the low eighth grade with I.Q.'s below 99, 75 per cent of the boys and 80 per cent of the girls made best grades in language arts, 81 per cent of the boys and 100 per cent of the girls made best grades

in mathematics and 88 per cent of the boys and 100 per cent of the girls made best grades in social studies.

Table 8 gives the I.Q. classification of the fifty-two boys and twenty-nine girls in the high eighth grade.

TABLE 8

CLASSIFICATION OF INTELLIGENCE QUOTIENTS OF EIGHTY-ONE STUDENTS IN THE HIGH EIGHTH GRADE OF THE CLEBURNE JUNIOR HIGH SCHOOL, SPRING SEMESTER, 1948

Classification	Intelligence Quotient	Boys	Girls	Total
Very superior	130 and above	2	1	1
Superior	115 to 129	2	1	3
High average	100 to 114	13	6	19
Low average	85 to 99	22	10	32
Inferior	70 to 84	13	11	24
Very inferior	Below 70	2		2
Total		52	29	81

The mean I.Q. for the boys is 92.9; the mean I.Q. for the girls is 91.0. The grade mean I.Q. is 91.95. According to the classification given by the CTMM, the high eighth grade of the Cleburne Junior High School is in the low average rank.

Table 9 shows the number of boys and girls in the high eighth grade who made failing marks and best grades in language arts, mathematics and social studies in relation to I.Q. Only two students who had a high average I.Q. made

failing grades. Twenty-three students fell into this classification.

TABLE 9

FAILURES AND BEST GRADES MADE BY EIGHTY-ONE STUDENTS IN THE HIGH EIGHTH GRADE OF THE CLEBURNE JUNIOR HIGH SCHOOL IN LANGUAGE ARTS, MATHEMATICS AND SOCIAL STUDIES IN RELATION TO INTELLIGENCE QUOTIENT

Subject	Sex	Below	I.Q.	I.Q.	I.Q.	I.Q.	I.Q.	Total
		70	70-84	85-99	100-114	115-192	130 and above	
Failures								
Language Arts	Boys	1	3	2				6
	Girls			1				1
	Total	1	3	3				7
Mathematics	Boys	1	2	6	2			11
	Girls	1	1	3				5
	Total	2	3	9	2			16
Social Studies	Boys	1	1	2				4
	Girls		1	1				2
	Total	1	2	3				6
Best Grades								
Language Arts	Boys		5	9	2	1		17
	Girls		8	9	4	1		22
	Total		13	18	6	2		39
Mathematics	Boys	2	5	7	7	1		22
	Girls		2		1		1	4
	Total	2	7	7	8	1	1	26
Social Studies	Boys		3	6	4			13
	Girls		1	1	1			3
	Total		4	7	5			16

Of the boys with high average I.Q.'s 9 per cent made failing marks in language arts; of the boys with inferior

I.Q.'s 23 per cent failed; of the boys with very inferior I.Q.'s 50 per cent failed. Of the girls with low average I.Q.'s 10 per cent failed. The others were successful.

In mathematics failures began to appear among the boys with high average I.Q.'s and they increased to 50 per cent in the very inferior I.Q. group. No failures appeared among the girls until the low average I.Q. rank was considered; 30 per cent of the girls in this rank failed.

Social studies failures among the boys began among the low average I.Q. group with 9 per cent; the inferior I.Q. group showed 7 per cent; the very inferior I.Q. group showed 50 per cent. Among the girls the low average I.Q. group showed 20 per cent, the inferior I.Q. group showed 9 per cent and the very inferior I.Q. group showed no per cent.

Thirty-two per cent of the boys and 75 per cent of the girls made best grades in language arts; 42 per cent of the boys and 14 per cent of the girls made best grades in mathematics; 25 per cent of the boys and 10 per cent of the girls made best grades in social studies.

A study of Tables 8 and 9 reveals that fifty-eight of those eighty-one students in the high eighth grade with I.Q.'s below 99 who made failing grades, 100 per cent of the boys and 100 per cent of the girls made failing grades in language arts, 81 per cent of the boys and 100 per cent of the girls made failing grades in mathematics, and 100 per cent of the boys and 100 per cent of the girls made failing grades in

social studies. Of the fifty-eight students in the high eighth grade with I.Q.'s below 99, 82 per cent of the boys and 76 per cent of the girls made best grades in language arts, 63 per cent of the boys and 50 per cent of the girls made best grades in mathematics, and 69 per cent of the boys and 68 per cent of the girls made best grades in social studies.

Table 10 gives a comprehensive comparison of I.Q.'s of students in the seventh and eighth grades of the Cleburne Junior High School with those which have been used by the CTMM. As can be seen, the average for very superior is below the test norm; the school average for superior is 10.9 per cent as compared with 12 per cent; the high average group with I.Q.'s of from 100 to 114 is 25.6 per cent as compared with 35 per cent; the low average I.Q. exceeds that of the test norms by 36.2 per cent to 35 per cent; the inferior I.Q. exceeds by far that of the CTMM by a 21.50 per cent to 12 per cent; the very inferior I.Q. of students of the local school exceeds that of the test norm by 5 per cent to 3 per cent.

The test norms exceed the Cleburne Junior High School norms in the very superior, superior, and high average I.Q. groups, while in the low average, the inferior, and the very inferior I.Q. groups the local school students are ahead. According to the standards as set by the CTMM, the seventh and eighth grades do not rank average in any category.

TABLE 10

A COMPARISON OF INTELLIGENCE QUOTIENTS OF 320 STUDENTS
IN THE SEVENTH AND EIGHTH GRADES OF THE CLEBURNE
JUNIOR HIGH SCHOOL WITH THAT OF TYPICAL
POPULATION AS SET FORTH BY CALIFORNIA
TEST OF MENTAL MATURITY

Descriptive Classification	I. Q.	Number of Students	Per cent Typical Population (CTMM)	Per cent Cleburne Junior High School Population
Very superior	130 and above	2	3	.06
Superior	115-129	35	12	10.94
High average	100-114	82	35	25.9
Low average	85- 99	116	35	36.6
Inferior	70- 84	69	12	21.5
Very inferior	Below 70	16	3	5.0
Total		320	100	100

The total number of students considered in Table 10 is 320 instead of 302 as appears in other tables. The I. Q. classification was made on the basis of all students who took the CTMM. Since this test was given early in the second semester, eighteen students have withdrawn from school.

A summary of the relationship of I. Q. and achievement of students in the Cleburne Junior High School follows:

1. The average I. Q. of the 174 boys in the seventh and eighth grades of the Cleburne Junior High School is 88.75; the average I. Q. of the 128 girls in the seventh and eighth

grades of the Cleburne Junior High School is 88,92. Boys and girls both fall into the low average classification according to the CTMM.

2. Ninety-three per cent of those forty-four students who failed language arts in the Cleburne Junior High School had I.Q.'s below 99; 92 per cent of those fifty-one students who failed mathematics in the Cleburne Junior High School had I.Q.'s below 99; 95 per cent of those twenty students who failed social studies had I.Q.'s below 99.

3. Of the seventy-eight boys who made failing grades in language arts, mathematics and social studies, 93 per cent had I.Q.'s below 99; of the thirty-seven girls who made failing grades in language arts, mathematics and social studies 99 per cent had I.Q.'s below 99.

4. Of the 302 students in the seventh and eighth grades of the Cleburne Junior High School 24 per cent of the boys and 49 per cent of the girls made best grades in language arts; 33 per cent of the boys and 16 per cent of the girls made best grades in mathematics; 43 per cent of the boys and 35 per cent of the girls made best grades in social studies.

5. Of the 183 students who had I.Q.'s below 99, 79 per cent passed language arts, 76 per cent passed mathematics and 93 per cent passed social studies. Of those 119 students who had I.Q.'s above 99 failures were negligible.

The Relation of Memory and Achievement of Students

The first test as given in the California Test of Mental Maturity to determine the total mental factors of the student is that of memory. This part of the CTMM is divided into immediate recall and delayed recall.

The immediate recall is a test of auditory verbal memory. Pairs of words are read to those tested. After the first word of each pair is repeated the students remember the word which goes with it. As the series increases in number and difficulty, the length of immediate memory span is revealed. No part of the immediate recall test depends upon the ability of the students to read, as response is indicated by the proper selection of pictures.

The delayed recall test is one of intentional learning type. The students listen to a story which is read to them with the explanation that they will be asked to remember it later. After thirty minutes they are given an opportunity to respond to multiple choice questions. Ability to remember does not mean that the students do have the ability to reach valid conclusions.⁹

Table 11 gives a classification of failures in language arts, mathematics and social studies in relation to the total percentile rank determined by the memory sub-test. Each subject is divided into numerical marks to represent grades made

⁹Sullivan, Clark and Teigs, op. cit., p. 4.

TABLE II

COMPARISON OF MEMORY PERCENTILE RANK WITH GRADIS MADE BY 302 SEVENTH AND EIGHTH GRADE STUDENTS OF THE CLEBURNE JUNIOR HIGH SCHOOL IN LANGUAGE ARTS, MATHEMATICS AND SOCIAL STUDIES

Subject	Low Seventh						High Seventh						Low Eighth						High Eighth										
	10	30	50	70	90	Total	10	30	50	70	90	Total	10	30	50	70	90	Total	10	30	50	70	90	Total					
Language Arts	Marks	90	80	70	60	50	Total	12	3	1			35	38	36	35	21	23	8	6	3			27	27	14	7	6	302
		1	3	2	1			11	12	15	8	1	7	10	17	10	4	2	2	4	1	1	1	8	10	4	2	40	
								9	15	15	1	3	12	17	15	8	1	5	5	4	1	1	14	12	7	1	2	98	
								9	8	1	3		1	1	1	3		1	1	1	1	1	3	3				120	
								6	2	1			4	4	1	1		1	1				1	1				33	
								2	1	1			1	1				1	1				1	1				11	
Mathematics	Marks	90	80	70	60	50	Total	1	1	1	1	1	6	4	12	16	12	6	2	4	2		7	6	1	4	2	26	
		1	1	1	1			7	13	18	14	3	1	17	17	1	1	7	7	4	2		13	12	8	1	3	85	
								21	18	2	4	2	12	13	14	13	3	2	1	1	1		5	5	1			140	
								2	2	4	2		4	1	4	2		1	1	1	1		2	2	1			25	
								5	4				4	4				4	4				3	3				26	
								35	38	36	35	21	23	8	6	3			27	27	14	7	6	302					
Social Studies	Marks	90	80	70	60	50	Total	4	8	1	2	1	4	8	11	9	1	3	5	1	1	1	6	3	22	4	1	33	
		1	2	1				2	14	17	10	8	1	15	1	2	5	3	5	1	1	1	1	17	22	4	1	111	
								17	17	2	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	138	
								2	2	1			2	2				1	1				1	1				14	
								35	38	36	35	21	23	8	6	3			27	27	14	7	6	302					
								12	3	1			35	38	36	35	21	23	8	6	3			27	27	14	7	6	302

in each subject by students falling in the various classifications. Fifty to 69 represents failing; 70 to 90 represents low and high averages; 90 and above represents superior. Percentile ranks in memory have been grouped as follows: 10 to 29 represents the very inferior; 30 to 49 represents the inferior; 50 to 69 represents the low average or normal; 70 to 89 represents the high average or above normal, and 90 to 100 represents the superior.

In the low seventh grade nine students failed mathematics. Only three of the sixteen students had a total percentile rank of 50 or more on the memory test. Since there were no failures in language arts and social studies, it becomes evident that the work was adapted to the ability of the students. All nine failures in mathematics were registered by those students who had a percentile rank of less than 50 on the memory test.

In the high seventh grade thirty students failed language arts, eighteen students failed mathematics and seven students failed social studies. Among those who failed language arts 83 per cent were below the fiftieth percentile rank in memory; among those who failed mathematics 64 per cent were below the fiftieth percentile rank in memory; among those who failed social studies 86 per cent fell below the fiftieth percentile rank in memory.

The low eighth grade had seven failures in language arts, seven failures in mathematics and nine failures in

social studies. Among those students who made failing grades in language arts, 86 per cent were below the fiftieth percentile rank in memory; among those students who made failing grades in mathematics 86 per cent were below the fiftieth percentile rank in memory; among those students who made failing grades in social studies 78 per cent were below the fiftieth percentile rank in memory.

In the high eighth grade seven students failed language arts, fourteen students failed mathematics and seven students failed social studies. Among those who showed failing grades in language arts, 100 per cent were below the fiftieth percentile rank in memory; among those students who showed failing grades in mathematics 81 per cent were below the fiftieth percentile rank in memory; among those students who showed failing grades in social studies 71 per cent were below the fiftieth percentile rank in memory.

Considering collectively, the low seventh grade, the high seventh grade, the low eighth grade and the high eighth grade, 83 per cent of the students who failed language arts fell below the fiftieth percentile rank in memory; 84 per cent of the students who failed mathematics fell below the fiftieth percentile in memory; 80 per cent of the students who failed social studies fell below the fiftieth percentile in memory.

Table 12 shows the number of pupils who failed and who made best grades when they excelled or made better scores in

TABLE 12

STUDENTS WHO FAILED AND WHO ALSO MADE BEST GRADES WHEN
THEY EXCELLED IN IMMEDIATE RECALL

Subject	Low Seventh	High Seventh	Low Eighth	High Eighth	Total
Failures					
Language Arts		12	1	2	15
Mathematics	4	4		6	14
Social Studies		2	1	2	5
Best Grades					
Language Arts	5	26	8	22	61
Mathematics	2	24	2	11	39
Social Studies	3	17	1	9	30

immediate recall--a part of the total memory test. Four of the failures in mathematics in the low seventh grade appeared in this group. In the high seventh grade twelve failed language arts, four failed mathematics and two failed social studies. In the low eighth grade only one failed language arts and one failed social studies. In the high eighth grade two failed language arts, six failed mathematics and two failed social studies.

Of the 130 pupils who excelled in immediate recall, 11 per cent failed language arts, 10 per cent failed mathematics and 3.8 per cent failed social studies.

Of those pupils who excelled or made better scores in immediate recall, best grades in the low seventh grade were made in language arts by five pupils, two pupils in mathematics and three pupils in social studies. Best grades in the high seventh were made in language arts by twenty-six pupils, twenty-four pupils in mathematics and seventeen in social studies. Best grades in the low eighth grade were made in language arts by eight pupils, two pupils in mathematics and one pupil in social studies. Best grades in the high eighth grade were made in language arts by twenty-two pupils, eleven pupils in mathematics and nine pupils in social studies.

Of the total number of pupils who excelled in immediate recall and who also made best grades on the subjects under consideration, 46 per cent made best grades on language arts, 30 per cent made best grades in mathematics and 23 per cent made best grades in social studies.

Table 13 shows the number of pupils who failed and who made best grades when they excelled in delayed recall. This is a language type test.

In the low seventh grade five pupils who excelled in delayed recall failed mathematics. In the high seventh grade eighteen pupils who excelled in delayed recall failed language arts, fifteen pupils failed mathematics and three pupils failed social studies. In the low eighth grade six pupils who excelled in delayed recall failed language arts,

seven pupils failed mathematics and eight pupils failed social studies. In the high eighth grade five pupils failed language arts, ten pupils failed mathematics and four pupils failed social studies.

TABLE 13

STUDENTS WHO FAILED AND WHO ALSO MADE BEST GRADES
WHEN THEY EXCELLED IN DELAYED RECALL

Subject	Low Seventh	High Seventh	Low Eighth	High Eighth	Total
	Failures				
Language Arts		18	6	5	29
Mathematics	5	15	7	10	37
Social Studies		3	8	4	15
	Best Grades				
Language Arts		12	12	15	39
Mathematics		14	7	9	30
Social Studies	6	72	10	15	103

Among the 172 pupils who excelled or made better scores in delayed recall, 16 per cent failed in language arts, 21 per cent failed in mathematics and 8 per cent failed in social studies.

Among those pupils who excelled in delayed recall, best marks in the low seventh grade were made in social studies by six pupils. Best marks in the high seventh grade were made in language arts by twelve pupils, in mathematics by

fourteen pupils and in social studies by seventy-two pupils. Best marks in the low eighth grade were made in language arts by twelve pupils, in mathematics by seven pupils and in social studies by ten pupils. Best marks in the high eighth grade were made in language arts by fifteen pupils, in mathematics by nine pupils and in social studies by fifteen pupils.

Among the 172 pupils who excelled in delayed recall and who also made best grades in the subjects under consideration, 22 per cent made best grades in language arts, 18 per cent made best grades in mathematics and 59 per cent made best grades in social studies.

Table 14 gives a grade analysis of boy-girl failures and best grades made in relation to the CTMM percentile rank in memory.

In the low seventh grade six boys and three girls failed mathematics; both groups had memory percentile ranks of less than 50.

In the high seventh grade seventeen boys and eight girls failed language arts when the memory percentile rank was less than 50. When the memory percentile rank was above 50, five boys and no girls failed. Among the boys who failed language arts, 77.2 per cent had memory percentile ranks of less than 50 and 22.8 per cent had memory percentile ranks of more than 50. Among the girls who failed language arts 100 per cent had memory percentile ranks of less than 50. Among the twelve high seventh grade boys who failed

TABLE 14

BOY-GIRL FAILURES AND BEST GRADES IN RELATION TO PERCENTILE RANK IN MEMORY

Subject	Sex	Low Seventh					High Seventh					Low Eighth					High Eighth					Total			
		10	30	50	70	90	10	30	50	70	90	10	30	50	70	90	10	30	50	70	90				
Language Arts	Boys						12	5	2	3	2	1				1					3	3			32
	Girls						3	5			3										1				12
	Total						15	10	2	3	5	1				1					4	3			44
Mathematics	Boys	5	1				4	4	3	1	2										3	6	1	2	32
	Girls	2	1				2	2	2	1	3	1				1					2	2			19
	Total	7	2				6	6	5	2	5	1				1					5	8	1	2	51
Social Studies	Boys						1	2	1		4	1									3			1	14
	Girls						1				3										1	1			6
	Total						2	2	1		7	1									4	1		1	20
Language Arts	Boys	2					2	2	4	3	1	2	1	3	1					7	8	6	3	45	
	Girls	4	1				5	2	8	9	5	6	2		1					6	9	2	1	63	
	Total	4	3				7	4	12	12	6	8	3	3	1					13	17	8	4	108	
Mathematics	Boys	1					6	8	4	4	3	9			2	1				6	5	3	1	53	
	Girls	1					1	5	1	3	3	2								2	2	1	1	20	
	Total	2					7	13	5	7	6	11			2	1				8	5	3	2	73	
Social Studies	Boys						15	10	12	9	5	2	2	1						4	4	2	1	76	
	Girls						6	10	8	8	3	2	3		1					2	1	1		45	
	Total	5	1	1			21	20	20	17	8	4	5	1	1					6	5	3	1	121	

failures

Best Grades

mathematics 67 per cent showed memory percentile ranks of less than 50. Among the seven girls who failed mathematics 57.1 per cent had memory percentile ranks of less than 50. Among the four boys who failed social studies 75 per cent fell below the memory percentile rank of 50; the one girl in the high seventh grade who failed social studies had a memory percentile rank below 50.

Failures in both the low and the high eighth grades follow the same trend in each subject as above with the exception of mathematics in the low eighth grade. More girls than boys failed this subject.

Table 14 indicates also that 24 per cent of the boys and 49 per cent of the girls made best grades in language arts, 33 per cent of the boys and 16 per cent of the girls made best grades in mathematics, and 43 per cent of the boys and 35 per cent of the girls made best grades in social studies.

A study of Table 14 reveals the fact that of those 139 boys and 90 girls who failed and who ranked below the fiftieth percentile in memory, 81 per cent of the boys and 83 per cent of the girls made failing grades in language arts, 81 per cent of the boys and 79 per cent of the girls made failing grades in mathematics and 57 per cent of the boys and 100 per cent of the girls made failing grades in social studies. Of the 139 boys who ranked below the fiftieth percentile in memory, best grades were made in social studies; of the 90 girls who ranked below the fiftieth percentile in memory best grades were made

in language arts. Of the thirty-five boys who ranked above the fiftieth percentile in memory best grades were made in social studies; of the thirty-eight girls who ranked above the fiftieth percentile in memory, best grades were made in language arts.

Table 15 shows that a higher per cent of boys made failing grades than girls made in every percentile rank. The highest number of failures appears among those pupils who made low percentile ranks on total memory.

Boys and girls were put into five percentile rank divisions of 10, 30, 50, 70 and 90.

In language arts among the boys of each rank 29 per cent, 20 per cent, 5 per cent, 18 per cent, and no per cent respectively, made failing grades. In language arts among the girls of each rank 17 per cent, 16 per cent, no per cent, no per cent and no per cent respectively made failing grades.

In mathematics among the boys of each of the five percentile ranks, 25 per cent, 25 per cent, 11 per cent, 13 per cent and no per cent respectively made failing grades. Among the girls of each percentile rank 23 per cent, 20 per cent, 9 per cent, 8 per cent and no per cent respectively made failing grades in mathematics.

In social studies among the boys of each percentile rank 13 per cent, 6 per cent, 5 per cent, 4 per cent and no per cent made failing grades. Among the girls of each percentile

TABLE 15

PER CENT OF BOY-GIRL FAILURES IN RELATION TO PERCENTAGE RANK IN MEMORY

Subjects	Percentile rank	Number		Number Failed		Per cent Failed	
		Boys	Girls	Boys	Girls	Boys	Girls
Language Arts	90	12	14				
	70	23	24	4		18	
	50	36	21	2		5	
	30	45	30	9	5	20	16
	10	58	39	17	7	29	17
	Total		174	128	32	12	
Mathematics	90	12	14				
	70	23	24	3	2	13	8
	50	36	21	4	2	11	9
	30	45	30	11	6	25	20
	10	58	39	14	9	25	23
	Total		174	128	32	19	
Social Studies	90	12	14				
	70	23	24	1		4	
	50	36	21	2		5	
	30	45	30	3	1	6	3
	10	58	39	8	5	13	12
	Total		174	128	14	6	

rank, 12 per cent, 13 per cent, no per cent, no per cent and no per cent made failing grades in social studies.

Recall or memory is an important step in creative expression. Skinner has the following to say about recall.

Recall, like reflective thinking, is a familiar phenomenon to education, and like reflective thinking, it has played a role in education out of proportion to its relative importance. Education should aim primarily at growth. So long as it remains content to test the results of instruction by percentage of factual knowledge recalled by the student, it will continue to fall short of its most important objectives. Even if learning and education were one and the same thing,

recall would be an inadequate test. But if we cannot even measure satisfactorily the mental engorgement of facts and figures, it can scarcely be counted an adequate measure of education in terms of growth. In spite of our knowledge for over half a century we as yet have worked out no satisfactory criterion of growth, so that it is still the factual recall of the contents of the curriculum which decides the fates of our pupils in school.¹⁰

Crow gives this definition of memory: "Memory is the power to relive past experiences, with the knowledge that they are past experiences."¹¹

Tiegs has the following to say about language arts, mathematics and social studies:

Whether justified or not, language has come to constitute evidence of the degree of culture and refinement of its possessor. It embraces not only the correctness or incorrectness of language form, but other additional aspects as well, such as enunciation, pronunciation, tone quality, and emotional response.

A number of research studies have indicated that life needs for mathematics are not very extensive; only a few of the simplest operations are required, and no great skill is necessary.

The objectives in social studies are the development of the ability to think in this field; the ability to draw useful and helpful lessons for the present and future from the past; the ability to recognize and understand the origin and functions of present institutions, movements, and trends; and the ability to predict the future from the present and past.¹²

¹⁰Charles S. Skinner, Educational Psychology, pp. 244-248.

¹¹Alice and Lester D. Crow, Learning to Live with Others, p. 176.

¹²Ernest W. Tiegs, Tests and Measurements for Teachers, p. 231.

A summary of the relationship of memory and achievement of students in the seventh and eighth grades of the Cleburne Junior High School follows:

1. Eighty-three per cent of those forty-four students who made failing grades in language arts ranked below the fiftieth percentile in memory; 84 per cent of those fifty-one students who made failing grades in mathematics ranked below the fiftieth percentile in memory; 80 per cent of those twenty students who made failing grades in social studies ranked below the fiftieth percentile in memory.

2. There were 130 pupils in the seventh and eighth grades who excelled in immediate recall. Eleven per cent of this group made failing grades in language arts; 10 per cent made failing grades in mathematics; 4 per cent made failing grades in social studies. Of the 130 pupils who excelled in immediate recall 46 per cent made best grades in language arts, 30 per cent made best grades in mathematics, and 23 per cent made best grades in social studies.

3. There were 172 pupils in the seventh and eighth grades who excelled in delayed recall. Sixteen per cent of this group made failing grades in language arts; 21 per cent made failing grades in mathematics and 8 per cent made failing grades in social studies. Of the 172 pupils who excelled in delayed recall, 22 per cent made best grades in language arts, 18 per cent made best grades in mathematics and 59 per cent made best grades in social studies.

4. There are 174 boys and 128 girls in the seventh and eighth grades. Of the boys who made failing grades in language arts, mathematics and social studies 78 per cent ranked below the fiftieth percentile in memory; of the girls who made failing grades in language arts, mathematics and social studies, 89 per cent ranked below the fiftieth percentile in memory.

5. There were no boys who ranked above the ninetieth percentile in memory who failed either language arts, mathematics or social studies; there were no girls who ranked above the fiftieth percentile in memory who failed either language arts or social studies; there were no girls who ranked above the ninetieth percentile in memory who failed mathematics.

6. All students who ranked below the fiftieth percentile in memory did not fail. Chance of failure, however, is greater among the low percentile rank group. Failing grades decrease as percentile rank in memory increases.

The Relation of Numerical Reasoning and Achievement

A time limit is placed on each of the three parts of the test on numerical reasoning, a sub-test of the CTMM. The first part is one of number series. This test involves the matching of like numbers and the elimination of unlike numbers. It is non-language in nature; therefore, the ability to read well would have no bearing on this test.

The second part of the numerical reasoning test involves making change and is not dependent upon ability to read.

The third part of the test on numerical reasoning is in numerical quantity; this test involves the ability to read a problem. If the student were a poor reader he could not be tested in numerical reasoning were it not for the two non-language tests.

Table 16 gives a classification of failures in language arts, mathematics and social studies in relation to the total percentile rank in numerical reasoning. Marks of 50 to 69 represent unsuccessful attainment; marks of 70 to 89 represent low and high averages respectively; marks of 90 to 100 represent superior attainment.

In the low seventh grade the nine students who failed mathematics were in the tenth percentile rank in numerical reasoning. Since all of these students were repeating mathematics, it is evident that students with a percentile rank of 10 in numerical reasoning will have great difficulty in mastering mathematics even though they have repeated the same operations the preceding semester.

In the high seventh grade 67 per cent of the failures in language arts was made by those students who had percentile ranks below 50 in numerical reasoning. Eighty per cent of the failures in mathematics was made by those students who had percentile ranks below 50 in numerical reasoning. Sixty per cent of the failures in social studies was made by those

TABLE 16

COMPARISON OF NUMERICAL REASONING PERCENTILE RANK WITH GRADES MADE BY 302 SEVENTH AND EIGHTH GRADE STUDENTS OF THE CLEBURNE JUNIOR HIGH SCHOOL IN LANGUAGE ARTS, MATHEMATICS AND SOCIAL STUDIES

Subject	Marks	Low Seventh					High Seventh					Low Eighth					High Eighth					Total
		10	30	50	70	90	10	30	50	70	90	10	30	50	70	90	10	30	50	70	90	
Language Arts	90			1			3	9	10			1	3	1	5		1	7	6	4	4	37
	80	2	1	1			6	10	16	3		6	12	6	5		7	8	5	5	91	
	70	8	2				17	13	6	12		1	1	5	8		12	8	9	8	130	
	60						8	1	1	3		2	3	1	1		2	2	1		32	
	50						3	3	2			3					1	1	1		12	
	Total	10	3	2	1		15	34	30	53	33	18	10	7	4		1	23	16	21	17	4
Mathematics	90			1					4	13												27
	80		2	1			1	14	28	14		1	8	1	6		5	4	2	5	89	
	70	1	1	1			11	18	11	5	12	2	1	2	8	4		13	7	12	8	135
	60		1				2	4	3	1	1		1	1	2	4		4	2	3	2	25
	50	8					4	3	1		4		4			1		1	3	1		26
	Total	10	3	2	1		15	34	30	53	33	18	10	7	4		1	23	16	21	17	4
Social Studies	90								2	13	12											32
	80	3	2	1	1		3	10	18	25	17	2	2	2	2		4	2	5	8	106	
	70	7	1	1			9	21	9	15	3	13	6	6	3		1	14	14	7	141	
	60						3	3	1		1	1	1	1	1		5		1		17	
	50											2	1	1	2		1				6	
	Total	10	3	2	1		15	34	30	53	33	18	10	7	4		1	23	16	21	17	4

students who had a percentile rank below 50 in numerical reasoning.

In the low eighth grade 85 per cent of the failures in language arts were made by those students who had a percentile rank below 50 in numerical reasoning. One hundred per cent of failures in mathematics were made by those students who had a percentile rank below 50 in numerical reasoning. Fifty-five per cent of failures in social studies were made by those students who had a percentile rank below 50 in numerical reasoning.

In the high eighth grade 71 per cent of failures in language arts were made by those students who had a percentile rank below 50 in numerical reasoning. Sixty-two per cent of failures in mathematics were made by those students who had a percentile rank below 50 in numerical reasoning. Seventy-one per cent of failures in social studies were made by those students who had a percentile rank below 50 in numerical reasoning.

A study of Table 16 reveals the fact that 129 students ranked below the fiftieth percentile in numerical reasoning. Of those who made failing grades in this rank 66 per cent failed language arts, 76 per cent failed mathematics and 69 per cent failed social studies.

Table 17 shows the number of students who failed and who made best grades on either language arts, mathematics or social studies when they excelled in number series, a part

TABLE 17

STUDENTS WHO FAILED AND WHO ALSO MADE BEST GRADES IN
RELATION TO THAT PART OF THE CTMM ON NUMERICAL
REASONING KNOWN AS NUMBER SERIES
AND NUMERICAL QUANTITY

	Low Seventh	High Seventh	Low Eighth	High Eighth	Total
Excelled in Number Series (Non-language)					
Failures					
Language Arts		1			1
Mathematics	1		1		2
Social Studies			2		2
Best Grades					
Language Arts	1	1		1	3
Mathematics		1	2		3
Social Studies		4	1		5
Excelled in Numerical Quantity (Non-language)					
Failures					
Language Arts		14	2	3	19
Mathematics	2	12	1	8	23
Social Studies		3	2	2	7
Best Grades					
Language Arts	2	14	4	16	36
Mathematics	3	22	6	7	38
Social Studies	3	42	3	11	59
Excelled in Numerical Quantity (Language)					
Failures					
Language Arts		15	5	4	24
Mathematics	6	7	5	8	26
Social Studies		2	5	4	11
Best Grades					
Language Arts	2	19	10	26	57
Mathematics		21	7	12	40
Social Studies	5	41	7	8	61

of the total numerical reasoning test. In the low seventh grade one failure appeared in mathematics. In the high seventh grade one failure appeared in language arts. In the low eighth grade one failure appeared in mathematics and two failures appeared in social studies. In the high eighth grade there were no failures in any of the three subjects.

There were eleven students who excelled in number series. Nine per cent failed language arts; 18 per cent failed mathematics, and 18 per cent failed social studies.

Table 17 shows also that of those students who excelled in number series one low seventh student made best grades in language arts; one high seventh student made best grades in language arts, one high seventh student made best grades in mathematics and four high seventh students made best grades in social studies. Two low eighth grade students made best grades in mathematics and one low eighth grade student made best grades in social studies; one high eighth grade student made best grades in language arts.

Among the eleven students who excelled in number series and who also made best grades in the three subjects under consideration 27 per cent made best grades in language arts, 27 per cent made best grades in mathematics, and 46 per cent made best grades in social studies.

Of the pupils who excelled in numerical quantity (non-language), there were two students in the low seventh grade who failed mathematics. There were fourteen students in the

high seventh grade who failed language arts. Twelve students in the high seventh grade failed mathematics, and three students in the high seventh grade failed social studies. There were two students in the low eighth grade who failed language arts, one student in the low eighth grade failed mathematics, and two students in the low eighth grade failed social studies. There were three students in the high eighth grade who failed language arts. Eight students in the high eighth grade failed mathematics, and two students in the high eighth grade failed social studies.

Among the 133 students who excelled in numerical quantity of the non-language type 14 per cent failed language arts, 17 per cent failed mathematics and 5 per cent failed social studies.

Among the students who excelled in the non-language test of numerical reasoning and who made best grades in the three subjects, 27 per cent made best grades in language arts, 28 per cent made best grades in mathematics and 44 per cent made best grades in social studies.

The third part of the numerical reasoning test is of the numerical quantity type which requires reading ability. In the low seventh grade six students in this group failed mathematics. In the high seventh grade fifteen students in this group failed language arts, seven students failed mathematics and two students failed social studies. In the low eighth grade five students in this group failed language arts,

five students in this group failed mathematics and five students failed social studies. In the high eighth grade four students in this group failed language arts, eight students failed mathematics and four students failed social studies.

Among the 158 students who excelled in the language type of numerical quantity, 15 per cent failed language arts, 16 per cent failed mathematics and 7 per cent failed social studies.

Among the 158 students who excelled in the language type test in numerical reasoning 31 per cent made best grades in language arts, 26 per cent made best grades in mathematics, and 41 per cent made best grades in social studies.

Table 18 shows boy-girl failures and best grades made in language arts, mathematics and social studies in relation to percentile ranks in numerical reasoning. Percentile ranks of 10, 30, 50, 70 and 90 are used.

In the low seventh grade six boys and three girls failed mathematics. All had numerical reasoning percentile ranks of less than 30.

In the high seventh grade sixteen boys and six girls failed language arts when the percentile rank in numerical reasoning was less than 50. When the percentile rank was more than 50, six boys and two girls failed language arts. Among those boys who failed language arts 72 per cent had percentile rank in numerical reasoning of less than 50 and 28 per cent had percentile rank of more than 50. Among the

TABLE 18

BOY-GIRL FAILURES AND BEST GRADES IN RELATION TO
PERCENTILE RANK IN NUMERICAL REASONING

Subject	Sex	Low Seventh					High Seventh					Low Eighth					High Eighth									
		10	30	50	70	90	10	30	50	70	90	10	30	50	70	90	10	30	50	70	90					
Language Arts	Boys						5	11	2	3	1						3	1				3	1	2		
	Girls						3	3	1	1																
	Total						8	14	3	4	1	3	3	1			3	2				3	2	2		
Mathematics	Boys	6					2	9		1												4	3	3	2	
	Girls	3					2	2	3								1	2	1			1	2	1		
	Total	9					4	11	3	1		5	2				5	5	4	2		5	5	4	2	
Social Studies	Boys						3					1	1	2	3							2		1	1	
	Girls							1				2					3					3				
	Total						3	1				3	2	3			5					5		1	1	
		Best Grades																								
Language Arts	Boys	1																								
	Girls	3					2	3	8	8	4	2	1	1	1	1	1	1	8	2	5	2	5	2	4	2
	Total	4					2	6	10	13	10	6	3	1	4	1	1	1	16	7	14	6	7	4	6	2
Mathematics	Boys																									
	Girls						6	7	6	6	3	1	4	3			1	2	3	3	5	2	3	2	5	2
	Total						6	10	12	9	5	4	4				1	2	4	5	7	3	5	2	7	2
Social Studies	Boys	5	1				6	16	5	15	9	3	2									3	4	1	4	1
	Girls						6	4	8	12	5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Total	5	1				12	20	13	27	14	5	3	1	1	1	1	1	4	5	2	5	5	2	5	2
		Total																								

girls who failed language arts 75 per cent had percentile rank in numerical reasoning of less than 50 and 25 per cent had percentile rank of more than 50. Among those boys who failed mathematics 91 per cent had percentile rank of less than 50 and 9 per cent had rank of more than 50. Among the girls who failed mathematics 57 per cent had percentile rank of less than 50 and 43 per cent had percentile rank of more than 50. Among the boys who failed social studies, 100 per cent had percentile rank in numerical reasoning of less than 50. There were no girls who failed social studies who had percentile rank of less than 50, but one girl with a percentile rank of more than 50 failed social studies.

A study of Table 18 reveals the fact that 174 boys and 128 girls attended the Cleburne Junior High School. Of those who ranked below the fiftieth percentile in numerical reasoning and who also failed, 71 per cent of the boys and 83 per cent of the girls made failing grades in language arts, 81 per cent of the boys and 84 per cent of the girls made failing grades in mathematics and 57 per cent of the boys and 100 per cent of the girls made failing grades in social studies. Of the boys who ranked below the fiftieth percentile in numerical reasoning best grades were made in social studies; of the girls who ranked below the fiftieth percentile in numerical reasoning best grades were made in language arts. Of the boys who ranked above the fiftieth percentile in numerical reasoning, best grades were made in social studies;

of the girls who ranked above the fiftieth percentile in numerical reasoning best grades were made in language arts.

Table 19 requires some explanation. In order to determine the per cent of boys and girls who failed certain subjects in relation to percentile rank in numerical reasoning, it was necessary to divide the percentile ranks into five classifications and to tally the number of boys and girls in each rank. In the tenth percentile rank there were thirty-four boys and thirty-three girls; in the thirtieth percentile rank there were forty-three boys and nineteen girls; in the fiftieth percentile rank there were thirty-three boys and twenty-eight girls; in the seventieth percentile rank there were forty-two boys and thirty-one girls; in the ninetieth percentile rank there were twenty-two boys and seventeen girls.

In language arts among the boys of each of the tenth, thirtieth, fiftieth, seventieth and ninetieth percentile ranks, 23 per cent, 34 per cent, 15 per cent, 7 per cent, and 4 per cent respectively made failing marks. In language arts among the girls of each of the above ranks 18 per cent, 21 per cent, 3 per cent, 3 per cent and no per cent, respectively made failing marks.

In mathematics among the boys of each of the above ranks, 41 per cent, 27 per cent, 9 per cent, 7 per cent and no per cent, respectively, made failing marks. In mathematics among the girls of each of the above ranks, 27 per cent, 31 per cent,

14 per cent, no per cent, and no per cent, respectively, made failing marks.

TABLE 19
PER CENT OF BOY-GIRL FAILURES IN RELATION TO PERCENTILE RANK IN NUMERICAL REASONING

Subjects	Percentile Rank	Number		Number Failed		Per cent Failed	
		Boys	Girls	Boys	Girls	Boys	Girls
Language Arts	90	22	17	1		4	
	70	42	31	3	1	7	3
	50	33	28	5	1	15	3
	30	43	19	15	4	34	21
	10	34	33	8	6	23	18
	Total		174	128	32	12	
Mathematics	90	22	17				
	70	42	31	3		7	
	50	33	28	3	4	9	14
	30	43	19	12	6	27	31
	10	34	33	14	9	41	27
	Total		174	128	32	19	
Social Studies	90	22	17	1		2	
	70	42	31	1		2	
	50	33	28	4		12	
	30	43	19	2	1	4	5
	10	34	33	6	5	17	15
	Total		174	128	14	6	

In social studies among the boys of each of the tenth, thirtieth, fiftieth, seventieth and ninetieth percentile ranks, 17 per cent, 4 per cent, 12 per cent, 2 per cent and no per cent, respectively, made failing marks. In social studies among the girls of each of the above ranks, 15 per cent, 5 per cent, no per cent, no per cent and no per cent, respectively, made failing grades.

A summary of the relationship of numerical reasoning and achievement of students in the seventh and eighth grades of the Cleburne Junior High School follows:

1. Sixty-six per cent of those students who made failing grades in language arts ranked below the fiftieth percentile in numerical reasoning; 76 per cent of those students who made failing grades in mathematics ranked below the fiftieth percentile in numerical reasoning, and 69 per cent of those students who made failing grades in social studies ranked below the fiftieth percentile in numerical reasoning.

2. There were eleven in the seventh and eighth grades who excelled in number series. Nine per cent of this group made failing grades in language arts; 18 per cent made failing grades in mathematics, and 18 per cent made failing grades in social studies. Of the eleven pupils who excelled in number series, 27 per cent made best grades in language arts, 27 per cent made best grades in mathematics and 46 per cent made best grades in social studies.

3. There were 133 students in the seventh and eighth grades who excelled in numerical quantity (non-language). Fourteen per cent of this group made failing grades in language arts; 17 per cent made failing grades in mathematics, and 5 per cent made failing grades in social studies.

4. There were 158 students who excelled in numerical quantity (language). Fifteen per cent of this group made failing grades in language arts; 16 per cent made failing

grades in mathematics and 7 per cent of this group made failing grades in social studies.

5. There are 174 boys and 128 girls in the seventh and eighth grades. Of the boys who made failing grades 69 per cent ranked below the fiftieth percentile in numerical reasoning. Of the girls who made failing grades 89 per cent ranked below the fiftieth percentile in numerical reasoning.

6. There was one boy who ranked in the ninetieth percentile in numerical reasoning who made a failing grade in language arts. There were no boys in the ninetieth percentile rank in numerical reasoning who made failing grades in mathematics; There was one boy who ranked in the ninetieth percentile in numerical reasoning who made a failing grade in social studies. There were no girls in the ninetieth percentile rank who made failing grades in any subject under consideration.

7. In the tenth percentile rank in numerical reasoning a higher per cent of both boys and girls failed mathematics.

The Relation of Vocabulary and Achievement of Students

The vocabulary test of the CTMM is one in which like words are marked. The students are instructed to draw a line under the word which means the same thing as the first. Fifty words which increase in the degree of difficulty are given, and students are told to work at an average rate of speed. The time limit for this test is six minutes.

The Manual of Directions for the CTMM has the following paragraph of explanation concerning vocabulary:

Vocabulary signifies much more than mere connections between symbols and the realities for which they stand. Ideas and meanings begin as perceptions which enter consciousness through the senses; if they are remembered, they may function in many relationships. This verbal factor called vocabulary, is recognized as an important and relatively independent functional element of mental maturity. Individuals who score high in this test possess the capacity to understand and profit from their experiences. They should do well in reading, literature and drama which involve the understanding of meanings through spoken and written languages. Individuals who score low on this test will profit less by reading than from other non-verbal types of educational activities.¹³

Table 20 gives a classification of grades made in language arts, mathematics and social studies in relation to the total percentile rank in vocabulary. Each subject is divided into numerical marks to represent grades made on each by students falling in the various classifications. Grades of 50 to 69 represent failing. Grades of 70 to 89 represent low and high averages respectively. Grades of 90 to 100 represent superior. A vocabulary percentile rank of 10 to 29 represents very inferior; a vocabulary percentile rank of 30 to 49 represents inferior; a vocabulary percentile rank 50 to 69 represents low average or normal; a vocabulary percentile rank of 70 to 89 represents superior; a vocabulary percentile rank of 90 to 100 represents very superior.

In the low seventh grade nine students failed mathematics. Eighty-eight per cent of the failures in mathematics were

¹³Sullivan, Clark and Teigs, op. cit., p. 5.

TABLE 20

COMPARISON OF VOCABULARY PERCENTILE RANK WITH GRADES MADE BY 302 SEVENTH AND EIGHTH GRADE STUDENTS OF THE CLIBURNE JUNIOR HIGH SCHOOL IN LANGUAGE ARTS, MATHEMATICS AND SOCIAL STUDIES

Subject	Marks	Low Seventh					High Seventh					Low Eighth					High Eighth					
		10	30	50	70	90	10	30	50	70	90	10	30	50	70	90	10	30	50	70	90	Total
Language Arts	90	1					1	2	9	6	4	4	4	4	2		1	4	3	5	4	40
	80	2	1	1			6	14	18	16	4	4	4	6	2		10	7	6	5	2	102
	70	10			1		11	20	16	6	2	16	6	1	1		8	14	4	1		116
	60						15	5				6					3	3				32
	50						8	2				1					1					12
Total	13	1	1	1		41	43	43	28	10	27	10	3			23	28	13	11	6	302	
Mathematics	90	1					2	2	3	5	2	1	1	2				2	2	2	2	24
	80	3			1		7	10	21	15	6	1	1	2			9	5	2	3	3	88
	70	1	1				21	26	16	8	2	19	8	2	2		6	16	6	6	1	139
	60	1					5	3	2		2	2	2	1			6	3	3			26
	50	7			1		6	2	1			4					2	2				25
Total	13	1	1	1		41	43	43	28	10	27	10	3			23	28	13	11	6	302	
Social Studies	90						1	4	6	9	2	2	3	3	1			1	1	3	2	29
	80	5			1		12	17	27	14	7	7	3	3	1		1	5	5	3	2	106
	70	8	1	1			25	20	10	5	1	17	5	2	2		19	19	7	5	2	147
	60						3	2				3	4				3	3				14
	50											4	2									6
Total	13	1	1	1		41	43	43	28	10	27	10	3			23	28	13	11	6	302	

made by those students who had percentile ranks in vocabulary below 50.

In the high seventh grade thirty-two students failed language arts, seventeen failed mathematics and five failed social studies. Ninety-five per cent of the failures in language arts were made by those students who had percentile ranks in vocabulary below 50. Ninety-three per cent of the failures in mathematics were made by those students who had percentile ranks in vocabulary below 50. One hundred per cent of failures in social studies were made by those students who had percentile ranks in vocabulary below 50.

In the low eighth grade seven students failed language arts, seven students failed mathematics and ten students failed social studies. One hundred per cent of the failures in language arts were made by those students who had percentile ranks in vocabulary below 50. Eighty-five per cent of the failures in mathematics were made by those students who had percentile ranks in vocabulary below 50. One hundred per cent of the failures in social studies were made by those students who had percentile ranks in vocabulary below 50.

In the high eighth grade seven students failed language arts, fifteen failed mathematics and seven failed social studies. One hundred per cent of the failures in language arts were made by those students who had percentile ranks in vocabulary below 50. Eighty per cent of the failures in mathematics were made by those students who had percentile

ranks in vocabulary below 50. One hundred per cent of the failures in social studies were made by those students who had percentile ranks in vocabulary below 50.

A study of Table 20 reveals the fact that of those students who ranked below the fiftieth percentile in vocabulary and who failed, 100 per cent made failing grades in language arts, 84 per cent made failing grades in mathematics and 100 per cent made failing grades in social studies.

Table 21 shows that in the low seventh grade six boys and three girls failed mathematics. One hundred per cent of the boys who failed mathematics had percentile ranks in vocabulary below 50 and 66 per cent of the girls who failed mathematics had percentile ranks in vocabulary below 50.

In the high seventh grade twenty-two boys and eight girls failed language arts. Ninety-five per cent of the boys who failed language arts had percentile ranks in vocabulary below 50 and 100 per cent of the girls who failed language arts had percentile ranks in vocabulary below 50.

In the high seventh grade twelve boys and seven girls failed mathematics. Ninety per cent of the boys who failed mathematics had percentile ranks in vocabulary below 50 and 85 per cent of the girls who failed mathematics had percentile ranks in vocabulary below 50.

In the high seventh grade four boys and one girl failed social studies. One hundred per cent of the boys who failed social studies had percentile ranks in vocabulary below 50.

The one girl who failed social studies had a percentile rank in vocabulary above 50.

In the low eighth grade four boys and three girls failed language arts. One hundred per cent of the boys who failed language arts had percentile ranks in vocabulary below 50 and 100 per cent of the girls who failed language arts had percentile ranks in vocabulary below 50.

In the low eighth grade two boys and five girls failed mathematics. One hundred per cent of the boys who failed mathematics had percentile ranks in vocabulary below 50 and 80 per cent of the girls who failed mathematics had percentile ranks in vocabulary below 50.

In the low eighth grade six boys and three girls failed social studies. Eighty-three per cent of the boys who failed social studies had percentile ranks in vocabulary below 50 and 100 per cent of the girls who failed social studies had percentile ranks in vocabulary below 50.

In the high eighth grade six boys and one girl failed language arts. One hundred per cent of the boys who failed language arts had percentile ranks in vocabulary below 50 and 100 per cent of the girls who failed language arts had percentile ranks in vocabulary below 50.

In the high eighth grade twelve boys and four girls failed mathematics. Seventy-five per cent of the boys who failed mathematics had percentile ranks in vocabulary below

50 and 100 per cent of the girls who failed mathematics had percentile ranks in vocabulary below 50.

In the high eighth grade four boys and three girls failed social studies. One hundred per cent of the boys who failed social studies had percentile ranks in vocabulary below 50 and 100 per cent of the girls who failed social studies had percentile ranks in vocabulary below 50.

When the low seventh grade, the high seventh grade, the low eighth grade and the high eighth grade are combined to determine the greatest per cent of failures in each subject, 18 per cent of the boys and 9 per cent of the girls failed language arts; 18 per cent of the boys and 15 per cent of the girls failed mathematics, and 8 per cent of the boys and 5 per cent of the girls failed social studies.

When the four sections are combined to determine the subjects in which best grades were made, 24 per cent of the boys and 49 per cent of the girls made best grades in language arts. Thirty-three per cent of the boys and 16 per cent of the girls made best grades in mathematics. Forty-three per cent of the boys and 35 per cent of the girls made best grades in social studies.

A study of Table 21 reveals the fact that of those boys and girls who ranked below the fiftieth percentile in vocabulary and who also failed, 97 per cent of the boys and 100 per cent of the girls made failing grades in language arts, 87 per cent of the boys and 84 per cent of the girls made

failing grades in mathematics and 92 per cent of the boys and 86 per cent of the girls made failing grades in social studies. Of the boys who ranked below the fiftieth percentile in vocabulary best grades were made in social studies. Of the girls who ranked below the fiftieth percentile in vocabulary best grades were made in language arts. Of the boys who ranked above the fiftieth percentile in vocabulary best grades were made in social studies. Of the girls who ranked above the fiftieth percentile in vocabulary best grades were made in language arts.

Table 22 indicates per cent of boy-girl failures in relation to percentile rank in vocabulary. The higher the percentile rank in vocabulary, the lower the per cent of failure becomes. Low percentile rank in vocabulary indicates that a high per cent of failures in language arts exists.

Thirty-five per cent of the boys and 21 per cent of the girls in the tenth percentile rank bracket failed language arts. Nine per cent of the boys and 10 per cent of the girls in the thirtieth percentile rank bracket failed language arts. Three per cent of the boys and no per cent of the girls in the fiftieth percentile rank bracket failed language arts. There were no failures among the boys or girls in the seventieth and ninetieth percentile rank brackets.

A summary of the relationship of vocabulary and achievement of students in the seventh and eighth grades of the Cleburne Junior High School follows:

TABLE 22

PER CENT OF BOY-GIRL FAILURES IN RELATION TO PERCENTILE RANK IN VOCABULARY

Subjects	Percentile Rank	Number		Number Failed		Per cent Failed	
		Boys	Girls	Boys	Girls	Boys	Girls
Language Arts	90	7	6				
	70	17	15				
	50	31	29	1		3	
	30	43	40	4	4	9	10
	10	76	38	27	8	35	21
	Total		174	128	32	12	
Mathematics	90	7	6				
	70	17	15				
	50	31	29	4	3	13	10
	30	43	40	6	5	14	12
	10	76	38	22	11	29	28
	Total		174	128	32	19	
Social Studies	90	7	6				
	70	17	15				
	50	31	29		1		3
	30	43	40	4	3	9	6
	10	76	38	9	3	11	7
	Total		174	128	13	7	

1. One hundred per cent of those students who made failing grades in language arts ranked below the fiftieth percentile in vocabulary. Eighty-four per cent of those students who made failing grades in mathematics ranked below the fiftieth percentile in vocabulary. One hundred per cent of those students who made failing grades in social studies ranked below the fiftieth percentile in vocabulary.

2. There are 174 boys and 128 girls in the seventh and eighth grades of the Cleburne Junior High School. Of the

boys who made failing grades in language arts, mathematics and social studies, 92 per cent ranked below the fiftieth percentile in vocabulary. Of the girls who made failing grades in language arts, mathematics and social studies 90 per cent ranked below the fiftieth percentile in vocabulary.

3. A higher per cent of both boys and girls of the tenth percentile rank in vocabulary made failing grades in language arts.

4. Neither girls nor boys who were in the seventieth and ninetieth percentile ranks in vocabulary made failing grades.

CHAPTER III

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The following conclusions regarding the relationship of certain mental characteristics as measured by the California Test of Mental Maturity and achievement of students in the seventh and eighth grades of the Cleburne Junior High School have been reached by this study.

1. The I.Q.'s of students of the Cleburne Junior High School are lower than those I.Q.'s set forth by the norms of the CTMM.

2. It can be concluded from this study that the I.Q. and vocabulary tests are the best means of determining in advance the students who may be successful and unsuccessful in language arts, mathematics and social studies.

3. There is a marked difference in the mental ability of pupils in the seventh and eighth grades of the Cleburne Junior High School within each grade group.

4. The boys in the seventh and eighth grades of the Cleburne Junior High School make better grades in social studies; the girls make better grades in language arts.

5. Students in the seventh and eighth grades of the Cleburne Junior High School who excell in immediate recall

make better grades in language arts; students who excell in delayed recall make better grades in social studies. A higher per cent of failures in language arts, mathematics and social studies is made by those students who excell in delayed recall.

6. Students in the seventh and eighth grades of the Cleburne Junior High School make better scores on the language type tests of the CTMM than on the non-language type tests of the CTMM.

7. Eighteen per cent of the 174 boys and 9 per cent of the 128 girls made failing grades in language arts; 18 per cent of the boys and 15 per cent of the girls made failing grades in mathematics; 8 per cent of the boys and 5 per cent of the girls made failing grades in social studies.

8. The sub-tests of the CTMM seem to be more predictive at the upper and lower ends than in the middle percentile ranks.

9. One out of five students who had I.Q. ranks below 99 made failing grades in language arts. One out of twenty-nine students who had I.Q. ranks above 99 made failing grades in language arts; one out of four students who had I.Q. rank below 99 made failing grades in mathematics; one out of twenty-three students who had I. Q. ranks above 99 made failing grades in mathematics. One out of ten students who had I. Q. ranks below 99 made failing grades in social studies; one out of 130 students who had I.Q. ranks above

99 made failing grades in social studies. In other words, students who have I.Q. ranks below 99 have a better chance to make successful grades in social studies and language arts than in mathematics. Students who have I.Q. ranks above 99 have a better chance of making successful grades in social studies and language arts than in mathematics. Therefore, it can be concluded that the I.Q. ranks as shown by the CTMM are significant and for this reason can be used in the selection of students for enrolment in particular courses of the curriculum of the Cleburne Junior High School.

10. One out of five students who ranked below the fiftieth percentile in memory made failing grades in language arts; one out of twenty-two students who ranked above the fiftieth percentile in memory made failing grades in language arts. One out of four students who ranked below the fiftieth percentile in memory made failing grades in mathematics; one out of twelve students who ranked above the fiftieth percentile in memory made failing grades in mathematics. One out of ten students who ranked below the fiftieth percentile in memory made failing grades in social studies; one out of forty-three students who ranked above the fiftieth percentile in memory made failing grades in social studies. In applying these findings, it may be said that students of the Cleburne Junior High School who rank below the fiftieth percentile in memory will be more likely to make unsuccessful grades in mathematics and language arts;

students who rank above the fiftieth percentile in memory have a greater chance to make successful grades in language arts and social studies.

11. One out of four students who ranked below the fiftieth percentile in numerical reasoning made failing grades in language arts; one out of sixteen students who ranked above the fiftieth percentile in numerical reasoning made failing grades in language arts. One out of three students who ranked below the fiftieth percentile in numerical reasoning made failing grades in mathematics; one out of seventeen students who ranked above the fiftieth percentile in numerical reasoning made failing grades in mathematics. One out of nine students who ranked below the fiftieth percentile in numerical reasoning made failing grades in social studies; one out of twenty-nine students who ranked above the fiftieth percentile in numerical reasoning made failing grades in social studies. In other words, students who rank below the fiftieth percentile in numerical reasoning will be more likely to make unsuccessful marks in mathematics than in language arts or social studies. The scores made on the numerical reasoning test of the CTMM are significant and for this reason can be used in the selection of students for enrolment in particular courses of the curriculum of the Cleburne Junior High School.

12. One out of five students who ranked below the fiftieth percentile in vocabulary made failing grades in language arts; one out of 105 students who ranked above the fiftieth

percentile in vocabulary made failing grades in language arts. One out of five students who ranked below the fiftieth percentile in vocabulary made failing grades in mathematics; one out of fifteen students who ranked above the fiftieth percentile in vocabulary made failing grades in mathematics. One out of ten students who ranked below the fiftieth percentile in vocabulary made failing grades in social studies; one out of 105 students who ranked above the fiftieth percentile in vocabulary made failing grades in social studies. In other words, students who have a high percentile rank in vocabulary will have a better chance to be successful in language arts and social studies than in mathematics. It can be concluded that the scores made on the vocabulary test of the CTMM are significant and for this reason can be used in the selection of particular courses of the curriculum of the Cleburne Junior High School.

Recommendations

The following recommendations are made on the basis of conclusions reached as a result of a study of the relationship between certain mental characteristics determined by the CTMM, elementary series, and achievements as measured by grades given by teachers.

1. It is recommended that a policy of mental testing in the seventh and eighth grades of the Cleburne Junior High school be adopted.

2. The curriculum should be more diversified to provide greater opportunity of selection of subjects to be taken by the students.

3. All results of tests given should be studied carefully by the teachers and methods of teaching altered to provide for the individual differences in mental characteristics of the pupils as revealed by the tests.

4. A guidance program should be initiated so that individual differences in mental characteristics can be provided for in the students' courses of study.

5. Homogeneous grouping should be undertaken. However, I.Q.'s, achievement test scores and teacher's judgment should be combined in determining group rank of the students.

6. More emphasis should be placed on vocabulary study in the seventh and eighth grades of the Cleburne Junior High School.

APPENDIX

TEST COMMITTEE BULLETIN NO. I

SUGGESTED PROCEDURE FOR ADMINISTERING THE CALIFORNIA TEST
OF MENTAL MATURITY IN THE CLEBURNE PUBLIC SCHOOLS

I. GETTING THE CLASS READY FOR THE TEST

1. Arrange and announce a definite schedule of test.
2. Some points to mention to the students:
 - a. Students of the lower grades should hear the test mentioned as "Puzzle Games."
 - b. In telling the students about the test, care should be taken not to over-emphasize or magnify the project.
 - c. The whole procedure should be as nearly like another day in school as possible.
 - d. Each student should be told to provide himself with two or three soft lead pencils and a few sheets of paper for the test.
 - e. Describe the test to the older students as being one that all will like, with none failing; since it is a test in which all will score themselves in comparison with other boys and girls in the United States concerning their ability to do school work.
3. Preparing the data asked for on the front page.
 - a. The teacher should fill in this information in the 1-3rd. grade level.
 - b. Write the family name first, and give all the information asked for in each blank correctly.
 - c. The interpretation of test results depends wholly upon the reliability of this information.
 - d. Go over each blank with the students of the upper grade levels to see that they are filled accurately.
4. Get a sufficient number of tests for your group including a copy to be marked by the teacher for her use in giving directions. Have manual at hand well noted in such a way as to facilitate the administering of the test.
5. The size of the groups should be arranged as follows:
 - a. A teacher should not attempt to give the test to more than 20-25 students in grades 1-3. No more than 30 students should be in any group at any level.

- b. If groups have to be larger, it is suggested that two or more teachers may work together on the group. Teachers from other grade levels may be used.
- 6. Each examiner should provide himself with a watch that has a second hand.
- 7. Check over the manual and your test to be sure that you understand the procedure and are familiar with the content of each test, time limits, intermission period, etc.

II. THE TESTING PROCEDURE

- 1. The principal, a teacher, or some trusted student from another grade level, should watch the halls and test rooms to see that no group is disturbed during the progress of the test.
- 2. While giving the test, be yourself; act as you would any other school day; be patient and calm.
- 3. On the lower grade level, announce the test and ask the students if they are ready to play the "Puzzle Games." On the upper grade level, announce the test.
- 4. The test manual gives the necessary instructions for administering. Do not elaborate on the printed directions.
 - a. See that each student has a few sheets of paper, one to be used as a marker and the others to be used to perform some of the simple calculations.
 - b. The students are directed to listen to directions very carefully and to say nothing except during the explanatory period just before each test, and then to ask only for further explanation on what they are to do. When the teacher says "begin," everything must be quiet.
 - c. Students are not to talk to each other at any time during the test, and should work as fast as possible without hurrying or being careless.
 - d. If students come to a problem they can not master, they should know to go to the next problem.
 - e. On pages where the students all move together, they will be instructed to wait for the proper signal from the teacher before they move on.
 - f. Throughout the test they are not to go to the next page until told to do so; they are to fold the pages back so that only one may be seen at a time.

- g. Explain to the students that they are not expected to know the answers to all questions nor are they expected to complete all of the time tests.
 - h. A pupil may change his answer by erasing his mark or by drawing a circle around the incorrect answer, then mark another choice.
5. Move about the room freely, but do not come to stand so that any student might feel that you are gazing at his work.
 6. Speak in your natural tone of voice; speak distinctly, clearly, and slowly so there will be no doubt that the students will understand.
 7. Do not repeat a question or direction other than where the manual directs you to repeat.

III. SCORING THE TEST.

1. Learn the order of the test, noting that tests 5 and 14 are out of order. Familiarize yourself with the scoring key.
2. Note that most choices of answers are in horizontal columns.
3. The correct answers are to be checked with a "C" or the ordinary check mark; the incorrect answers are not to be checked at all.
4. It is suggested that two teachers work together on checking test, with one calling the correct answers and the other checking the correct answers on the test. If this can not be done, fold the key as directed in the manual. Be sure that the proper answer column matches the test.
5. As each test is completed, count the number of correct answers and place in the blank at the bottom of the page.
6. Check all tests and make all profile sheets with red pencil.
7. The Class Record Sheet will be made by each teacher.

IV. PREPARING THE PROFILE SHEET (THE FRONT SHEET OF THE TEST)

1. Place the score made on each test in the right space provided.
2. Put totals for each mental factor in the proper blank.
3. Make all totals on the sheet before you attempt any graph work.

4. Make the graph by placing points along each line at the number which corresponds to the score made on the test; then connect each of these points in order by straight lines.
5. Using the proper age level in the manual, translate the score for each mental factor into percentile rank scores; then record this in proper blank on the right hand side of profile sheet.
6. Obtain the mental age of each student by reading the number of months opposite the test score in the table on the back of the manual. Record this age, in months, on the "summary of data" chart.
7. Perform the indicated calculations for I.Q. score by dividing the student's mental age, in months, by his chronological age (actual age) in months.

V. MISCELLANEOUS DIRECTIONS AND CONCLUSIONS

1. As soon as the test is completed, each teacher will return the unused tests to his principal.
2. Score all tests, make the profile sheets, arrange them in alphabetical order, and fill in all data asked for on the class record sheet for your group.
3. Hand all this to the principal as soon as possible after the test is given. One week seems to be sufficient time.
4. The teacher should keep her manual as an aid in diagnosing and remedying undesirable findings.
5. The principal will file all profile sheets in the permanent record folders of each student.
6. Please do not put any I.Q. marks on the report cards or on permanent record cards. When it becomes necessary to use the I.Q. results, reference can be made to the profile sheets.
7. The recorded results of the tests should never leave the principal's office; no one should be permitted to see the results except those immediately concerned with the welfare of the student.
8. The principals will see that all used test booklets are destroyed as soon as the teachers have completed their profile sheets. If this is not followed, the plan to use the same test in the future will have been ruined.
9. The chairman or any member of the Testing Committee will be glad to render any assistance which it may in making the testing program a success.
10. Each must cooperate with the other and rely on our judgment and common sense.

SUGGESTED PROCEDURE FOR THE COMPLETION AND
USE OF RESULTS OBTAINED FROM THE CALI-
FORNIA TEST OF MENTAL MATURITY

We, the Testing Committee of Cleburne Public Schools, have been asked to restate part of Test Bulletin No. 1, "Suggested Procedure for Administering the California Mental Abilities Test," Part No. V, Sections 1-8, and to formulate a general policy for the use of the recorded results.

In setting forth the items of the bulletin to follow, we wish to state that each member of the committee has conferred with and solicited the advice of both teachers and principals. Again we say that all problems that arise will not be answered in the pages to follow; however, we sincerely present them with the feeling that this bulletin will be of great value to those who conscientiously and cooperatively work with us in the interpretation and use of the work done on the initial step of our program. We again ask your cooperation in putting this program into operation--where the entire staff has to act as a confidential family for the betterment of every boy and girl of our schools.

I. CONCERNING THE COMPLETION OF THE FILES, INTERVIEWS, ETC., WE SUGGEST AND RECOMMEND THAT:

1. The Profile Sheet (front page of the test) be completed in every detail, as previously directed.
2. The Profile Sheet be taken off the test booklet by the several teachers who have given the test, arranged alphabetically, and handed to the principal of each school unit. He will then file them in his office, and have the old used test booklet destroyed.
3. In the event the principals have folders containing the other records of pupils of his building, then this sheet should be added as a part of the pupil's accumulative record.
4. The teachers and principals, alike, should have access to the test results for use in any manner that will help them to better understand the individual child. We think it worth while to add that persons other than the superintendent, principals, teachers, and the juvenile officer should not have access to the test results.

5. The students and their parents, if they so desire, have a right to know, in a general way, the results. Such information should be received while in conference with the principal and the student's home-room teacher.
6. In both Junior and Senior High School, the principal and members of the Testing Committee should act as counselors for students wishing to know their test results. THIS DOES NOT MEAN THAT OTHER MEMBERS OF THE STAFF IN THESE SCHOOL UNITS MAY NOT USE THE TEST RESULTS FOR THEIR OWN PERSONAL CLASS STUDENTS, AND CONFERENCES WITH THEIR CLASS STUDENTS.
7. The results should be given in terms of a comparison with norms obtained by the wide use of the test. In other words, a student's Percentile Rank rather than the I.Q. or Mental Age score should be used as a basis for results. We feel that such a general comparison is as much as should ever be revealed to the student or parent, with no exceptions to this procedure.
8. The Profile Sheet should become a part of the student's permanent record and be transferred along with the rest of his records.
9. The class Record Sheets, as soon as a complete tabulation is made, should be kept by the principal of the respective buildings.

II. CONCERNING THE USE OF TEST RESULTS, WE SUGGEST AND RECOMMEND THAT:

1. The following are some of the aims and purposes of a Testing Program:
 - a. To discover a student's ability to achieve
 - b. To attempt to discover the actual achievement of the student
 - c. To discover more accurately student difficulties
 - d. To discover as early as possible the personality traits of the student.
 - e. To motivate interest thereby motivating learning
 - f. To reduce the number of failures
 - g. To become more conscious, as teachers, of the already accepted fact of individual differences
 - h. To develop in teachers a more sympathetic attitude toward students who appear to be failures

- i. To study the effectiveness of teacher methods and teaching materials.
 - j. To give more adequate educational guidance to students.
2. Each teacher should study the Manual of Instruction for her grade level thoroughly, that she might understand the meaning and significance of each test of the booklet. She should know the meaning of both high and low scores in certain areas, and how such score would be associated with her courses of instruction. She should prepare herself for constructive teaching in the retarded area indicated by the individual student, or by the class as a whole.
3. Our special attention should be given to individuals in the low score areas. If our remedial work is effective and successful, it will be indicated when the students are tested on the next grade level by the scores in all mental factors being nearer the median for their mental age. This does not mean that a student's intelligence quotient will be higher; but as the student develops his development in all mental factors will balance.
4. The committee plans to make tabulation of results through the entire system as soon as all Class Record Sheets are in to the committee. This tabulation should enable the superintendent, principals, and teachers to see exactly what grade or grade level is below, up to, or above normal in any particular area of learning. Then it will be the proper procedure to give special attention to those levels whose areas of learning is lowest.
5. So far we have considered only the areas of retarded learning and the retarded student. Now let us consider the student of gifted ability. The teacher should expect and accept only work of an extraordinary type in regular class procedure, from such students. Their surplus abilities above that needed in the regular class work should be utilized in various types of extra-class activities and extra-curricular activities of the kind best suited for the individual student.
6. In Junior and Senior High School, especially where the staff is adequate, section assignments of students should be based on mental maturity as indicated by test results. This is a matter that would have to be a confidential arrangement by the staff.

7. Any teacher that confers with a student in which the test results are used, should record information on a full size sheet of paper which should be attached to the Profile Sheet. (Forms may be available). The following information should appear on this sheet:
- a. Teacher's name
 - b. Date
 - c. Nature of the conference
 - d. High lights of the conference--any information that might be valuable or that might help some other teacher
 - e. Student-Teacher agreement or conclusion.
8. The committee invites constructive criticism and any helpful information that will be given us. We also wish to express our appreciation to Superintendent Fred R. Thompson for his confidence placed in us and for his consultation with us while working on this program. Furthermore, we wish to thank those who have helped us so faithfully and given us their time and full cooperation.

Sincerely,

THE COMMITTEE ON TEST

APPROVED:


Fred R. Thompson
Superintendent

FRT:blm

TEST 2.

24

Directions: In each row, make an X under the picture that is named.

A



1 _____



2 _____



3 X

1



1 _____



2 _____



3 _____

2



1 _____



2 _____



3 _____

3



1 _____



2 _____



3 _____

4



1 _____



2 _____



3 _____

5



1 _____



2 _____



3 _____

6



1 _____



2 _____



3 _____

7



1 _____



2 _____



3 _____

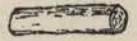
8



1 _____



2 _____



3 _____

9



1 _____



2 _____



3 _____

10



1 _____

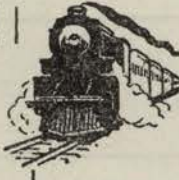


2 _____



3 _____

11



1 _____



2 _____



3 _____

12



1 _____



2 _____



3 _____

13



1 _____



2 _____



3 _____

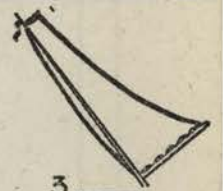
14



1 _____



2 _____



3 _____

15



1 _____



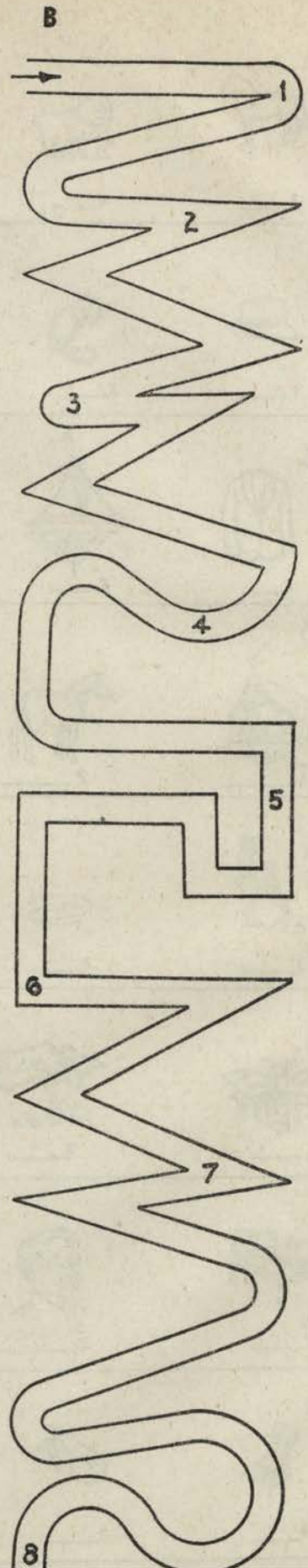
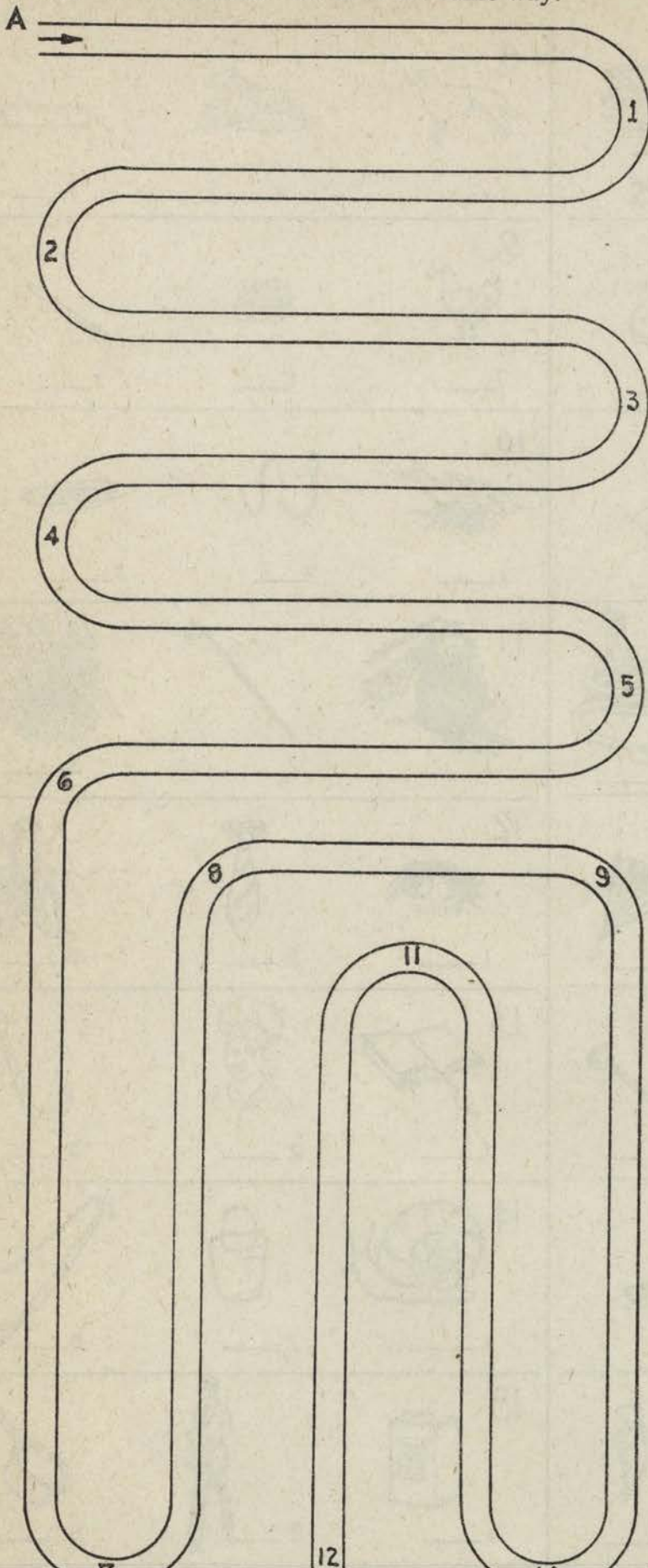
2 _____



3 _____

TEST 3.
85

Directions: Start at the first arrow and draw a line to each number when called. Try to keep within the black lines. Do B in the same way.



TEST 4.

86

Directions: Listen carefully to the pairs of words that will be read to you. The first word of each pair will be repeated and you are to remember what word went with it. Find a picture of this word. Put an X under it and write its number on the line to the right.

A

1 _____ 2 X _____ 3 _____ 4 _____ 2 A

B

1 _____ 2 _____ 3 X _____ 4 _____ 3 B

1

1 _____ 2 _____ 3 _____ 4 _____ 1

2

1 _____ 2 _____ 3 _____ 4 _____ 2

3

1 _____ 2 _____ 3 _____ 4 _____ 3

4

1 _____ 2 _____ 3 _____ 4 _____ 4

5

1 _____ 2 _____ 3 _____ 4 _____ 5

6

1 _____ 2 _____ 3 _____ 4 _____ 6

7

1 _____ 2 _____ 3 _____ 4 _____ 7

8

1 _____ 2 _____ 3 _____ 4 _____ 8

9

1 _____ 2 _____ 3 _____ 4 _____ 9

10

1 _____ 2 _____ 3 _____ 4 _____ 10

11

1 _____ 2 _____ 3 _____ 4 _____ 11

12

1 _____ 2 _____ 3 _____ 4 _____ 12

13

1 _____ 2 _____ 3 _____ 4 _____ 13

14

1 _____ 2 _____ 3 _____ 4 _____ 14

15

1 _____ 2 _____ 3 _____ 4 _____ 15

16

1 _____ 2 _____ 3 _____ 4 _____ 16

17

1 _____ 2 _____ 3 _____ 4 _____ 17

18

1 _____ 2 _____ 3 _____ 4 _____ 18

19

1 _____ 2 _____ 3 _____ 4 _____ 19

20

1 _____ 2 _____ 3 _____ 4 _____ 20

21

1 _____ 2 _____ 3 _____ 4 _____ 21

22

1 _____ 2 _____ 3 _____ 4 _____ 22

23

1 _____ 2 _____ 3 _____ 4 _____ 23

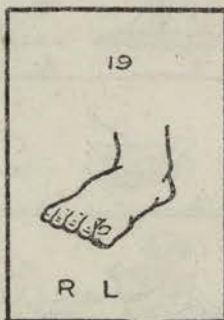
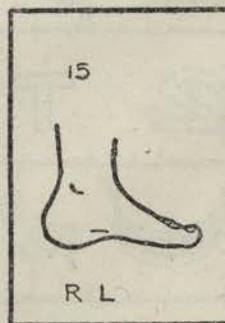
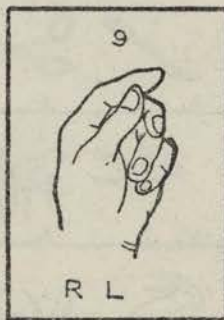
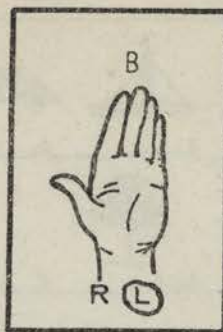
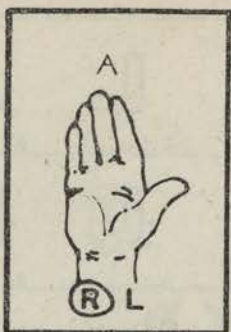
24

1 _____ 2 _____ 3 _____ 4 _____ 24

TEST 6.

87

Directions: Draw a ring around the letter R under all right hands and feet. Draw a ring around the letter L under all left hands and feet.



TEST 7.

89

Directions: In each row find a drawing which is the same as the first drawing. Put an X under it and write its number on the line to the right.

A

1 2 3 ~~X~~ 4 3

1

1 2 3 4 1

2

1 2 3 4 2

3

1 2 3 4 3

4

1 2 3 4 4

5

1 2 3 4 5

6

1 2 3 4 6

7

1 2 3 4 7

8

1 2 3 4 8

9

1 2 3 4 9

10

1 2 3 4 10

11

1 2 3 4 11

12

1 2 3 4 12

13

1 2 3 4 13

14

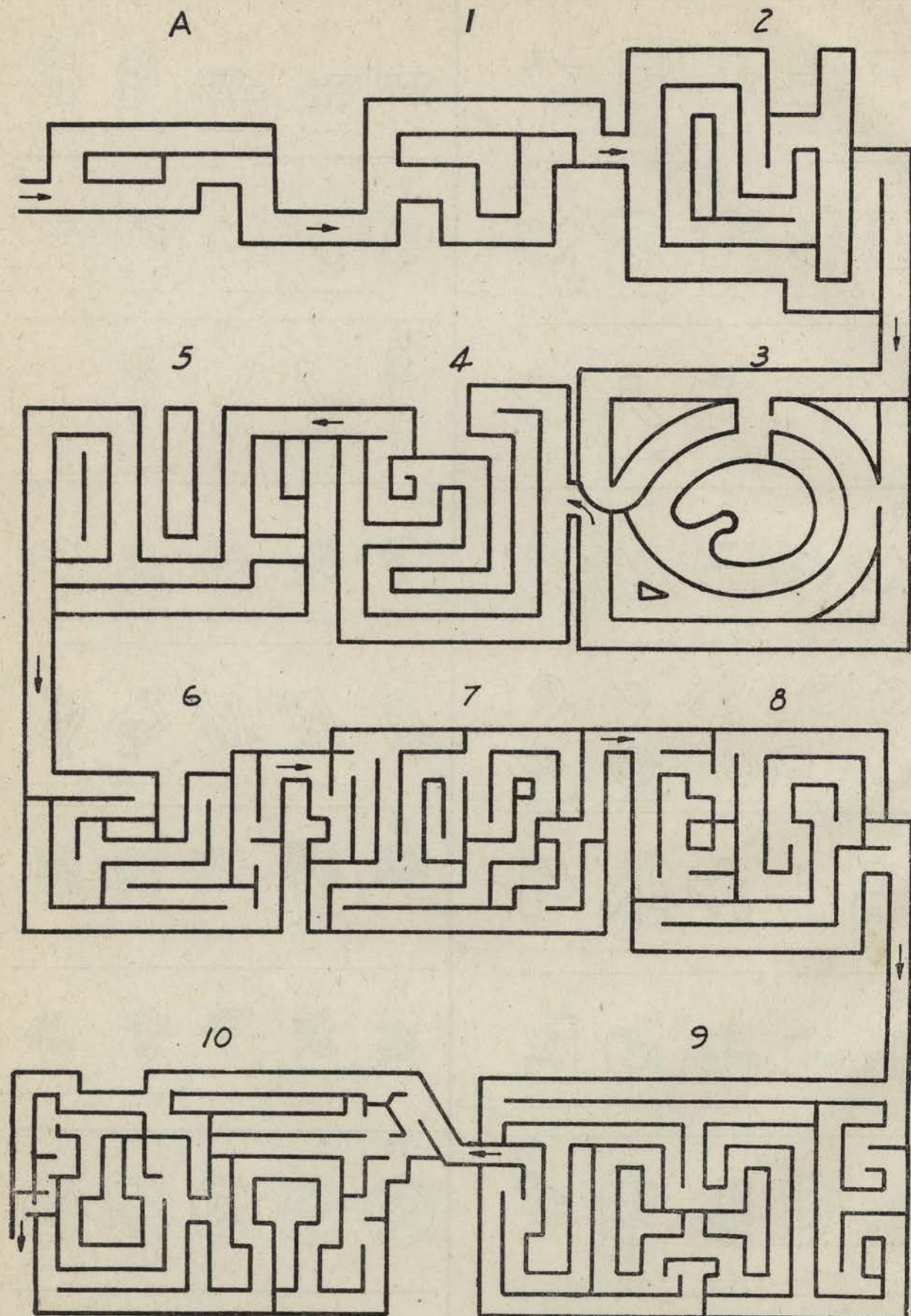
1 2 3 4 14

15

1 2 3 4 15

TEST 8.

Directions: Begin at the arrow in drawing A. Draw a line to show the path you would take through all the drawings so as to finish at the arrow in drawing 10.



TEST 9.

90

Directions: In each row there is one picture which is the opposite of the first picture. Find it, put an X under it, and write its number on the line to the right.

A

1 _____ 2 _____ 3 X 4 _____ 3

1

1 _____ 2 _____ 3 _____ 4 _____ 1

2

1 _____ 2 _____ 3 _____ 4 _____ 2

3

1 _____ 2 _____ 3 _____ 4 _____ 3

4

1 _____ 2 _____ 3 _____ 4 _____ 4

5

1 _____ 2 _____ 3 _____ 4 _____ 5

6

1 _____ 2 _____ 3 _____ 4 _____ 6

7

1 _____ 2 _____ 3 _____ 4 _____ 7

8

1 _____ 2 _____ 3 _____ 4 _____ 8

9

1 _____ 2 _____ 3 _____ 4 _____ 9

10

1 _____ 2 _____ 3 _____ 4 _____ 10

11

1 _____ 2 _____ 3 _____ 4 _____ 11

12

1 _____ 2 _____ 3 _____ 4 _____ 12

13

1 _____ 2 _____ 3 _____ 4 _____ 13

14

1 _____ 2 _____ 3 _____ 4 _____ 14

15

1 _____ 2 _____ 3 _____ 4 _____ 15

TEST 10.

97

Directions: The first three things in each row are alike in some way. Find another thing in the same row which belongs with them. Put an X under it, and write its number on the line to the right.

A

1 2 X 3 4 2

8

1 2 3 4 8

1

1 2 3 4

9

1 2 3 4 9

2

1 2 3 4

10

1 2 3 4 10

3

1 2 3 4

11

1 2 3 4 3

4

1 2 3 4

12

1 2 3 4 12

5

1 2 3 4

13

1 2 3 4 13

6

1 2 3 4

14

1 2 3 4 14

7

1 2 3 4

15

1 2 3 4 15

TEST 11.

Directions: In each row, the first picture is related to the second. Find a picture that goes with the third picture in the same way. Put an X under it and write its number on the line to the right.

A

1 2 3 4 X 4

1

1 2 3 4 1

2

1 2 3 4 2

3

1 2 3 4 3

4

1 2 3 4 4

5

1 2 3 4 5

6

1 2 3 4 6

7

1 2 3 4 7

8

1 2 3 4 8

9

1 2 3 4 9

10

1 2 3 4 10

11

1 2 3 4 11

12

1 2 3 4 12

13

1 2 3 4 13

14

1 2 3 4 14

15

1 2 3 4 15

TEST 12.

93

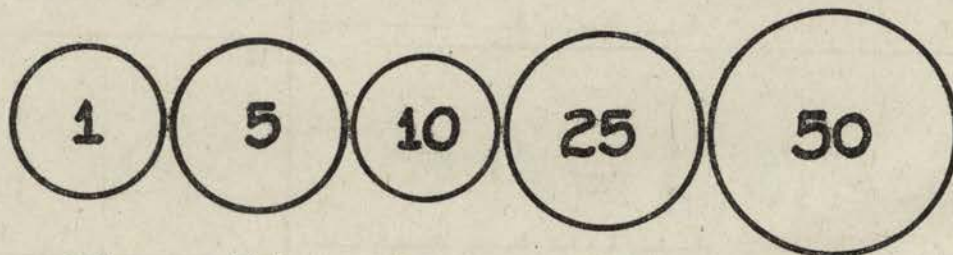
Directions: In each row of numbers below, there is one that is wrong. Find this wrong number and draw a line under it. Then write it on the line to the right.

Samples:	2	4	6	8	<u>9</u>	10				<u>9</u>		
	11	9	<u>8</u>	7	5	3	1			<u>8</u>		
A.	5	10	15	20	22	25	30			_____ A		
B.	18	15	13	12	9	6	3			_____ B		
C.	2	5	8	10	11	14	17			_____ C		
D.	1	2	4	8	14	16	32			_____ D		
E.	27	9	3	1	0	$\frac{1}{3}$				_____ E		
F.	3	4	7	8	11	12	14	15		_____ F		
G.	3	9	27	76	81	243				_____ G		
H.	25	24	22	19	18	16	13	12	9	10	7	_____ H
I.	1	2	4	7	11	15	16	22				_____ I
J.	12.5	11.4	10.3	9.8	9.2	8.1	7.0					_____ J

Test 12. Score (number right).....

TEST 13.

Directions: In each problem you are to find a certain number of coins to make a certain amount of money. Put the number of coins required under the drawing of the coin.



Samples:		cent	nickel	dime	quarter	half-dollar
2 coins	10 cents.....	_____	<u>2</u>	_____	_____	_____
3 coins	25 cents.....	_____	<u>1</u>	<u>2</u>	_____	_____
A.	6 coins 10 cents.....	_____	_____	_____	_____	_____
B.	7 coins 15 cents.....	_____	_____	_____	_____	_____
C.	4 coins 45 cents.....	_____	_____	_____	_____	_____
D.	3 coins 70 cents.....	_____	_____	_____	_____	_____
E.	3 coins 85 cents.....	_____	_____	_____	_____	_____
F.	6 coins 43 cents.....	_____	_____	_____	_____	_____
G.	6 coins 73 cents.....	_____	_____	_____	_____	_____
H.	5 coins 47 cents.....	_____	_____	_____	_____	_____
I.	7 coins 93 cents.....	_____	_____	_____	_____	_____
J.	7 coins 63 cents.....	_____	_____	_____	_____	_____

TEST 14.

94

Directions: Work these problems. Use the side of this page to figure on if you need to. See sample problem A. (Read the problem.) The correct answer is 8 so the letter *b* is written on the line to the right.

- A. There are 5 birds in the tree and 3 birds on the fence. How many birds are there?

Ans.: a 2 b 8 c 15 d 7 b A

1. Tom has 5 marbles. Bob has 4 marbles. Bill has 3 marbles. How many marbles do all three boys have

Ans.: a 1 b 2 c 12 d 60 _____ 1

2. Tickets to the kite show cost 10 cents. Jim's big brother bought 2 tickets. How much did he pay for them?

Ans.: a 20¢ b 2¢ c 12¢ d 8¢ _____ 2

3. Ben earns 4 dollars each month helping his father after school. He has earned 16 dollars. How many months has he been working?

Ans.: a 20 b 64 c \$4 d 4 _____ 3

4. Seventy girl scouts were divided into 5 groups of equal size. How many girls were there in each group?

Ans.: a 15 b 14 c 20 d 3 _____ 4

5. How many marbles can you buy for 25 cents at the rate of 3 for 5 cents?

Ans.: a 15 b 75 c 33 d 40 _____ 5

6. Two boys had a watermelon stand at the ball game. They had 50 cents in the cash box to start with. They sold 40 slices of melon at 5 cents a slice. How much should they have in the cash box at the end of the day?

Ans.: a \$2.00 b 80¢ c \$3.00 d \$2.50 _____ 6

7. Baseball mits which usually sold for 65 cents were sold for a short time for 25 cents less. Frank bought a mit at the lower price and gave the clerk 50 cents. How much change should he get back?

Ans.: a 25¢ b 20¢ c 10¢ d 5¢ _____ 7

8. At Camp No. 9 it took 10 boy scouts 3 days to set up camp. At Camp No. 12 the camp must be set up in one day. How many boys will be needed to do the work?

Ans.: a 3 b 30 c 27 d 13 _____ 8

9. George lives one-fourth of a mile from school. He goes home at noon for lunch. How far does he walk each day going to and from school?

Ans.: a 1/2 mi. b 1 mi. c 3/4 mi. d 1 1/2 mi. _____ 9

10. A newsboy delivered papers to 30 customers for a month. At the end of the month he collected \$15. How much did each customer pay?

Ans.: a 50¢ b \$2.00 c 5¢ d \$5.00 _____ 10

11. There are 20 girls in the Sunday school class. Each week each girl gives 5 cents to go toward a fund for needy families. How much will all the girls give in 5 weeks?

Ans.: a \$1.00 b 25¢ c \$5.00 d \$7.50 _____ 11

12. Richard saw a bicycle advertised for \$21 at one-third off for cash. How much money will he need to buy it?

Ans.: a \$14.00 b \$7.00 c \$18.00 d \$9.00 _____ 12

13. How much will your mother have to pay for the cleaning of a rug 9 ft. wide and 12 ft. long at the rate of 20 cents a square foot?

Ans.: a \$8.40 b \$1.08 c \$4.20 d \$21.60 _____ 13

14. In a field meet, 20 events were listed for the day. Pupils from your school won 60 per cent of the events. How many events did you lose?

Ans.: a 4 b 3 c 8 d 12 _____ 14

15. A swimming pool is 60 ft. long and 30 ft. wide. The water in the pool is 4 ft. deep on the average. How long will it take to fill the pool if the water runs in at the rate of 90 cubic feet a minute?

Ans.: a 90 min b 5 min c 26 min d 45 min _____ 15

TEST 15.

2 9 5

Directions: Read each group of statements and draw a line under the correct answer. Write the number of the answer on the line to the right. See sample 0.

0. If the sun shines it is day.
The sun shines. Therefore
¹ It will not rain ² It is day
³ The moon may shine tonight 2 0
1. All four-footed creatures are animals
All horses are four-footed. Therefore
¹ Creatures other than horses can walk
² All horses can walk
³ All horses are animals _____ 1
2. Either the sun moves around the earth or
the earth moves around the sun.
But the sun does not move around the earth.
Therefore
¹ The earth moves around the moon
² The earth moves around the sun
³ The sun is larger than the earth _____ 2
3. Manuel runs faster than Harry.
Burt runs faster than Harry.
Which is the slowest of the three?
¹ Burt ² Manuel ³ Harry _____ 3
4. Jane is taller than Helen. Helen is taller
than Barbara.
Which is the tallest: Jane, Helen, or Barbara?
¹ Helen ² Jane ³ Barbara _____ 4
5. All mammals are vertebrates
The cow is a mammal. Therefore
¹ Some vertebrates live on land
² Some mammals live in water
³ The cow is a vertebrate _____ 5
6. A is either B or C.
A is not C. Therefore
¹ A is not B ² A is B ³ C is B _____ 6
7. Either your cousin is older than you, or the
same age, or younger.
But your cousin is not older, nor is he younger.
Therefore
¹ Your cousin is younger than you
² Your cousin is older than you
³ Your cousin is the same age as you _____ 7
8. All circles are round figures.
The figure is not round. Therefore
¹ It is not a circle ² It is oval
³ It is either a square or a triangle _____ 8
9. All metals are solids.
Gold is a metal. Therefore
¹ Gold is valuable ² Gold is a solid
³ Metals are usually heavy _____ 9
10. Some fishes fly.
No birds are fishes. Therefore
¹ All creatures that fly are fishes or birds
² No fishes resemble birds
³ Creatures other than birds can fly _____ 10
11. Three boys are up on a ladder.
Tom is farther up the ladder than Paul.
Jim is farther up than Tom.
Which boy is in the middle position on the
ladder?
¹ Tom ² Paul ³ Jim _____ 11
12. George Washington was a skillful general.
George Washington was President of the
United States. Therefore
¹ Skilled generals make good presidents
² One President of the United States was
a skillful general
³ Good presidents make skillful generals _____ 12
13. A is situated to the east of B.
B is situated to the east of C. Therefore
¹ C is situated close to A
² A is situated to the east of C
³ C is nearer to A than to B _____ 13
14. He is either honest or dishonest.
But he is not dishonest. Therefore
¹ He is desirable for a position
² He comes of honest people
³ He is honest _____ 14
15. A is equal to B.
B is equal to C. Therefore
¹ B is larger than C ² A is equal to C
³ A is equal to B plus C _____ 15

TEST 16.

1196

Directions: Draw a line under the word which means the same or about the same as the first word. Write the number of this word on the line to the right, as:

- | | | | | | | |
|-------------------|----------------|--------------|--------------|---------------|---|----|
| 0. blossom | 1 tree | 2 vine | 3 flower | 4 garden | 3 | 0 |
| 1. journey | 1 state | 2 travel | 3 end | 4 fair | — | 1 |
| 2. law | 1 rules | 2 power | 3 able | 4 help | — | 2 |
| 3. always | 1 larger | 2 forever | 3 know | 4 apart | — | 3 |
| 4. almost | 1 rarely | 2 never | 3 now | 4 nearly | — | 4 |
| 5. alarm | 1 blame | 2 signal | 3 address | 4 comfort | — | 5 |
| 6. damage | 1 manage | 2 collect | 3 injure | 4 recover | — | 6 |
| 7. announce | 1 keep | 2 publish | 3 reform | 4 destroy | — | 7 |
| 8. improve | 1 make | 2 better | 3 satisfy | 4 admit | — | 8 |
| 9. difficult | 1 different | 2 pleasant | 3 hard | 4 task | — | 9 |
| 10. despair | 1 mind | 2 time | 3 past | 4 hopeless | — | 10 |
| 11. consent | 1 occur | 2 offer | 3 oppose | 4 agree | — | 11 |
| 12. portion | 1 collect | 2 part | 3 make | 4 refer | — | 12 |
| 13. amuse | 1 afford | 2 gift | 3 game | 4 please | — | 13 |
| 14. lack | 1 use | 2 want | 3 admit | 4 apart | — | 14 |
| 15. cease | 1 consent | 2 concert | 3 stop | 4 strain | — | 15 |
| 16. disguise | 1 reveal | 2 declare | 3 show | 4 mask | — | 16 |
| 17. distinct | 1 success | 2 clear | 3 interest | 4 noticed | — | 17 |
| 18. sincere | 1 satisfactory | 2 genuine | 3 hopeful | 4 noble | — | 18 |
| 19. lofty | 1 tone | 2 high | 3 example | 4 toil | — | 19 |
| 20. extend | 1 refuse | 2 remain | 3 lengthen | 4 revert | — | 20 |
| 21. condemn | 1 false | 2 blame | 3 oppose | 4 alarm | — | 21 |
| 22. humble | 1 secure | 2 dwelling | 3 lowly | 4 proud | — | 22 |
| 23. expert | 1 average | 2 master | 3 business | 4 student | — | 23 |
| 24. apply | 1 piece | 2 use | 3 correct | 4 mean | — | 24 |
| 25. legal | 1 lawful | 2 court | 3 lawyer | 4 humane | — | 25 |
| 26. endeavor | 1 help | 2 hero | 3 attempt | 4 harm | — | 26 |
| 27. conclusion | 1 settlement | 2 end | 3 journey | 4 right | — | 27 |
| 28. obscure | 1 clear | 2 hidden | 3 odd | 4 quaint | — | 28 |
| 29. extraordinary | 1 prefer | 2 unusual | 3 particular | 4 favorable | — | 29 |
| 30. location | 1 relieve | 2 choice | 3 view | 4 situation | — | 30 |
| 31. imaginary | 1 existing | 2 trifling | 3 unreal | 4 substantial | — | 31 |
| 32. escort | 1 avoid | 2 occasion | 3 attend | 4 remain | — | 32 |
| 33. merit | 1 deserve | 2 merry | 3 desire | 4 just | — | 33 |
| 34. compile | 1 aid | 2 ample | 3 collect | 4 answer | — | 34 |
| 35. console | 1 empower | 2 reduce | 3 order | 4 comfort | — | 35 |
| 36. legislator | 1 elector | 2 lawmaker | 3 minor | 4 citizen | — | 36 |
| 37. revert | 1 persist | 2 perplex | 3 return | 4 unknown | — | 37 |
| 38. significance | 1 prevention | 2 treatment | 3 meaning | 4 certainty | — | 38 |
| 39. petulant | 1 oppressive | 2 stagnant | 3 sprightly | 4 peevish | — | 39 |
| 40. dispute | 1 disturb | 2 question | 3 subdue | 4 disguise | — | 40 |
| 41. deplete | 1 complete | 2 final | 3 exhaust | 4 fearless | — | 41 |
| 42. compassionate | 1 respectful | 2 free | 3 sly | 4 kind | — | 42 |
| 43. deter | 1 meddle | 2 applaud | 3 hinder | 4 reline | — | 43 |
| 44. complex | 1 simple | 2 compliment | 3 complexion | 4 mixed | — | 44 |
| 45. dispatch | 1 discount | 2 mood | 3 relieve | 4 haste | — | 45 |
| 46. venerable | 1 admirable | 2 aged | 3 youthful | 4 reliable | — | 46 |
| 47. conceited | 1 variable | 2 connected | 3 vain | 4 conquest | — | 47 |
| 48. malign | 1 insure | 2 slander | 3 muffle | 4 invade | — | 48 |
| 49. facile | 1 fragile | 2 futile | 3 easy | 4 remote | — | 49 |
| 50. empower | 1 enlarge | 2 permit | 3 surpass | 4 indulge | — | 50 |

TEST 5.

47

Directions: Read the following and draw a line under the correct answer. Write the number of the answer on the line to the right. See sample 0.

0. The name of the story read to you a little while ago is
 1 The Guide 2 A Summer's Outing
 3 In the Rockies 4 The Pack Train 4 0
1. The age of the guide was about
 1 33 2 19 3 29 4 24 _____ 1
2. The guide was
 1 Tall and light 2 Short and dark
 3 Medium height and dark
 4 Average height _____ 2
3. The supply camp was in the
 1 Coast Ranges 2 Appalachian Mountains
 3 Blue Ridge Mountains
 4 Northwestern Rockies _____ 3
4. The number of horses in the pack train was
 1 9 2 13 3 7 4 11 _____ 4
5. The saddle-bags were
 1 Partly filled 2 Almost empty
 3 Bulging 4 Breaking open _____ 5
6. In some of the saddle-bags were:
 1 Miner's headlights 2 Sleeping bags
 3 Chocolate 4 Dynamite _____ 6
7. The trail was
 1 Rather wide 2 Steep and narrow
 3 Slippery 4 Rocky _____ 7
8. A heavy rain fell
 1 Three days before 2 A week before
 3 The morning the pack train started
 4 The day before _____ 8
9. Where the trail was washed out the guide
 1 Found a new trail 2 Made a rough bridge
 3 Led the horses over logs lying near by
 4 Sent word back to camp for help _____ 9
10. Where the trail was under water the pack
 1 Swam across the rushing waters
 2 Waited for the water to lower
 3 The guide rolled logs into the stream
 4 Found a new trail _____ 10
11. The roar of the waterfalls
 1 Rested the horses
 2 Worried the horses
 3 Pleased the guide
 4 Sounded like thunder _____ 11
12. The glacier the guide saw was
 1 Blue in color 2 Cream-colored
 3 Small 4 Melting fast _____ 12
13. The lake was beautiful to the guide because of
 1 The smooth green water
 2 The reflection of the mountain
 3 The almost circular shape
 4 The mist rising from it _____ 13
14. The pack met the grizzly
 1 On the first day out
 2 Near the glacier
 3 The last afternoon of the trip
 4 Near the miner's camp _____ 14
15. The grizzly cleared the trail by
 1 Growling and scattering the horses
 2 Biting the lead horse and scaring the others
 3 Frightening the guide
 4 Striking each horse off the trail _____ 15
16. After clearing the trail Mr. Grizzly
 1 Turned back on the trail
 2 Lay down to rest
 3 Tore open the bags for food
 4 Continued down the mountain _____ 16
17. The horses
 1 Were wildly excited
 2 Turned back on the trail
 3 Ran down the mountain side
 4 Took no notice of the grizzly _____ 17
18. The guide
 1 Unloaded some of the supplies
 2 Led the horses down the mountain side
 3 Led the horses to water
 4 Led the horses back onto the trail _____ 18
19. When the pack reached camp the miners
 1 Were asleep
 2 Gave the pack a hearty welcome
 3 Blamed the guide for being late
 4 Found fault with the supplies _____ 19
20. The horses
 1 Did not quiet down for weeks and weeks
 2 Were ready to take the trail the next day
 3 Soon forgot about the grizzly
 4 Were restless for a few days _____ 20

BIBLIOGRAPHY

Books

- Ayres, L. P., Laggards in Our Schools, New York, Survey Association, Inc., 1909.
- Crow, Alice and Lester D., Learning to Live with Others, Boston, D. C. Heath and Company, 1944.
- Tiegs, Ernest W., Tests and Measurements for Teachers, Boston, Houghton Mifflin Company, 1931.
- Tiegs, Ernest W., Tests and Measurements in the Improvement of Learning, Boston, Houghton Mifflin Company, 1939.
- Skinner, Charles S., Educational Psychology, New York, Prentice-Hall, Inc., 1946.

Articles

- Farley, E. S., "Regarding Repeaters": Sad Effect of Failure upon the Child," Nation's School, VIII (October, 1936), 37-39.
- Smith, H. A., "A Study of High School Failures and Their Causes," Educational Administration and Supervision, VIII (December, 1928), 557-572.
- Tiegs, Ernest W., "Breaking Down the I.Q.," Progressive Education (December, 1936), 603-606.
- Traxler, Arthur E., "A Study of the California Test of Mental Maturity," Journal of Educational Research, XXXII (September, 1938-May, 1939), 329-336.

Bulletins

- California Test Bureau, "The Proper Use of Intelligence Tests," Educational Bulletin No. 14, California Test Bureau, Los Angeles, 1945.
- California Test Bureau, "How to Select Tests," Educational Bulletin No. 2, California Test Bureau, Los Angeles, 1945.

California Test Bureau, "How Tests Can Improve Your School,"
Education Bulletin No. 1, California Test Bureau, Los
Angeles, 1945.

Sullivan, Elizabeth, Clark, Willis, and Tiegs, Ernest W.,
"Manual of Directions," California Test of Mental
Maturity," California Test Bureau, Los Angeles, 1946.

Unpublished Material

Lafferty, H. M., "A Study of Failures of Austin, Texas,"
Unpublished Master's thesis, University of Texas, 1934.

Miller, Zola C., "Mathematics for the Mentally Retarded,"
Unpublished Master's thesis, Department of Education,
North Texas State Teachers College, 1940.

Peters, Ruby G., "Intelligence Quotient and Achievement
Scores," Unpublished Master's thesis, Department of
Education, North Texas State Teachers College, 1946.

Smith, Ellison M., "A Study of Failures in Chattanooga
Junior High School," Doctor's Dissertation, George
Peabody College for Teachers, 1934.

Wolverton, Ethel G., "Intelligence Quotient and Achievement,"
Unpublished Master's thesis, Department of Education,
North Texas State Teachers College, 1936.