THE STATUS OF THE EDUCATIONAL ACHIEVEMENT OF THE ELEMENTARY SCHOOLS OF LYON COUNTY, KANSAS

A THESIS

SUBMITTED TO THE DEPARTMENT OF PSYCHOLOGY AND THE GRADUATE COUNCIL OF THE KANSAS STATE TEACHERS COLLEGE OF EMPORIA IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE

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CONTENTS

THE STATUS OF THE EDUCATIONAL ACHIEVEMENT OF THE ELEMENTARY SCHOOLS OF LYON COUNTY, KANSAS

LIST OF TABLES

LIST OF FIGURES

achievements of pupils of various races -- white, Mexican, and negro -- or of pupils in different countries. An example of a study with pupils of various races is a thesis written by Mr. I.B.Mitchell, at the University of Kansas in 1928, "The Comparative Achievement of White, Mexican, and Colored Children in Public Schools." An example of the study on the achievements of pupils of different nationalities is that mentioned by the Educational Records Bureau, New York City, "Testing School Achievement in America and England." [6]

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Reports on the use of standardized tests and scales in school surveys may also be cited. They are the criteria for an objective conclusion on the results of school accomplishments. Such judgments may be reached in a highly scientific manner and require but little time for their formation.

Again tests may be used to determine the value of supervision and effort made to improve instruction. Other studies show the prognostic value of tests results. The abilities and

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[6] Edith A. Wright, Bibliography of Research Studies in Education, 1929-1930, U.S.Dept. of Interior, Office of Education, Bulletin No.13, 1931, p.61.

CHAPTER I

INTRODUCTION

UNRELIABILITY OF TEACHERS' MARKS

The capabilities of school children to do the work of the school have been measured, in the past, on the basis of the general observations by the teachers. The results of the work done by the children in the school were determined by the grades or marks given by the teacher. These marks or grades were based upon the estimates made by the teacher and upon a more formal measure of written examinations given from time to time, with particular attention to those examinations given at the close of the term. Such methods of measurement are so subjective that an opinion may be influenced by prejudices, preconceived ideas, or by many outside factors. These measurements still largely determine the accomplishments of school work in most of our schools.

The teacher, the pupils, and the parents have considered grades and examinations as instruments that have a high degree of precision and accuracy. The progress of pupils in school, the judgments of parents and patrons of the school, and the awarding of school honors have been based upon these measurements. College admission is also based upon them. Written examinations have also found their way into business and industrial fields. Applicant are rated upon the results of examinations and accepted for positions according the rankings. The procedure used in the civil service may be cited as an example.

In recent years, many investigations have been made to determine the accuracy of the above measures. A repetition of the use of the instrument of measurement should give the same or nearly the same result. This experiment has been made on written examination papers. The same paper, a final examination in geometry written by a student in a high school in Wisconsin, was graded by one-hundred sixteen different teachers of mathematics, each working independently and using the practices and standards of his school. The marks given by these teachers showed a range from 90 to 30.[1] Another illustration showing the vast range of teacher's marks on the same paper is that referred to by Starch.[2] In this investigation, two final examination papers in first-year high school English were graded by one-hundred forty-two teachers of English, one geometry paper from a final examination was marked by one-hundred eighteen teachers of mathematics, and one American history paper was graded by seventy teachers of history. The range on one of the English papers was 64 to 98, on the other English paper the grades ranged from 50 to 98. The geometry paper received grades from 28 to 92 and the history paper had marks from 43 to 90. Other tests have shown similar discrepancies.

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1 W.S.Monroe, J.C.DeVoss, and F.J.Kelly, Educational Tests and Measurements, p.5, revised edition, Houghton Mifflin Company, Boston, c1924, 521 pp.

2 Daniel Starch, Educational Psychology, p.519, Macmillan Company, revised edition, 1927, 568 pp.

Another proof of inconsistency in marking may be made by any teacher. A paper in any subject may be graded and the mark given it recorded but no checks or notations made on the paper. It is then graded again by the same person after an interval of three or four weeks or more. The final grade will probably vary considerably from the previous marking.

Teachers' marks should not be discounted entirely, however. Teachers have more opportunity than anyone else to form an estimate of a pupil's achievement and have, in a large number of cases, made estimates that have been correct. The teacher has in her charge a large number of children, coming from many homes. This gives her a chance to make comparisons that cannot be made in a single home. Usually the teacher is free from parental pride and prejudices and many times is able to make more accurate judgments than others. Many marks, and examinations even, are inaccurate however because of personal opinions and personal reactions on the part of the teacher. The personality of the teacher, both consciously and unconsciously, influences her conclusions. For this reason other means of measurements have been evolved.

GROWTH OF THE MEASUREMENT MOVEMENT

As early as 1864, Professor Thorndike[3] tells us, there was a form of educational measurement. There is a record of the fact that Reverend George Fisher, headmaster of a school in Greenwich, England, devised a "scale book" which he used to measure the degree of proficiency in the different school subjects.

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3 "Educational Measurements of Fifty Years Ago", in JOURNAL OF EDUCATIONAL PSYCHOLOGY, vol.4, pp. 551-2 (November 1913).

In 1894, a superintendent, Dr. J.M.Rice, proposed to measure spelling ability in a great number of classes through the use of a uniform spelling test. About fourteen or fifteen years later a systematically organized form of the Binet scale for the measurement of intelligence and Thorndike's hand-writing scale appeared. Stone's tests in arithmetical fundamental and reasonings followed. The work of Courtis in the field of arithmetic then made available arithmetic tests for a large number of school grades. Many other educational tests were then devised and standardized. Standardized tests became a commonly accepted criterion for use in school surveys after they had been successfully used in the schools of New York City in 1911-1913 for that purpose.

The extensive and satisfactory use of intelligence tests in the U.S.Army in 1917-1918 for placing men where they would be of the greatest value to the service gave impetus to the testing movement, both in intelligence and achievement. The wide spread use of standardized tests and scales in the schools now bears witness to their importance in education. The interest that they have aroused might be attributed to the fact that they are new and spectacular. The possibility of showing the scores of tests graphically attracts attention. The procedure of giving tests and tabulating results may be looked upon as an interesting topic for teachers' meetings or for attracting the attention of a community.

Standardized tests have definite aims, however, They remove the objections mentioned above to teacher's estimates and the former type of examinations. Perhaps they need not displace the marks of teachers entirely. The results of the tests should be used along with the grades of teachers. When the test score and the teacher's grade show a marked difference both of them should be thoroughly investigated. Neither is infallible.

The teacher who uses educational measurements has a wider, more intimate, and more definite knowledge of her pupils than one who does not. The standards set up are definite and precise. Both the teacher and the pupil may know what they are expected to accomplish. Pupils may be places so they may better utilizt their talents or with proper regard for their disabilitie

Elwood P. Cubberley says the educational measurement movement will eventually mean to the teacher [4]

> "not only concise and definite statements as to what she is expected to do in the different subjects of the course of study, but the reduction of instruction to those items which can be proved to be of importance in preparation for intelligent living and future usefulness in life."

He further refers to standardized tests and scales as "definite measuring-sticks" that eliminate the assignment of tasks by the teachers and the procedure on the part of the teacher to "trust to luck and the growth process in children for results".

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4 W.S.Monroe, et al, op.cit. Editor's Introduction, page XIII.

Standardized measurements have attempted to apply scientific knowledge and scientific methods to education. Not only will the teacher and the pupils profit by the use of these measurements but also the supervisors, the administrators, and the parents and the patrons who support the school.

The parents and the patrons may gain from the movement through the establishing of standards of accomplishment that are clear-cut and with which they themselves may judge the efficiency of the schools. For the administrator and supervisors, standardized tests make possible a diagnosis of school problems and situations. The use of tests opens the way for the applications of remedial instruction and organization.

Since standardized tests are being used so extensively in the schools, often by teachers not especially trained, every teacher who is thoroughly equipped must know something of the aims, methods, materials, results, and the general educational implications of the measurement movement. A teacher with such knowledge will be able to cooperate wholeheartedly with the specialists who may do the testing and to aid intelligently in the application of the results for the betterment of the schools. The value of the tests and scales rests upon an understanding of the results obtained and of how to remedy the defective conditions the tests may reveal.

Survey of similar studies

A number of articles have been written and numerous studies have been made in which comparisons are drawn between the intelligence of pupils and teachers' marks, bewteen intelligence and educational achievement as measured by standardized tests, or between school achievement as determined by tests and by teachers' marks.

Every year many reports are made by those directing the testing program in many large city school systems of the results found through the use of tests. These reports aid in the organization and classification of classes and pupils and are sometimes used in comparisons of school accomplishments of various grades, classes, or buildings within the school system. Comparisons are drawn too with the established norms for the tests and often with other school systems.

Studies have been made by means of the results of standardized intelligence and achievement tests on the comparisons of entrance classes in high schools and colleges in various years, over a period covering a consecutive number of years, or of the two entrance classes of the same year, or other similar comparison The differences or likenesses of the preparation made by pupils in rural and urban schools, as determined by standardized tests, form the materials for other studies.[5] Still other comparisons have bee made by the use of the results of standardized tests on the

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[5] H.W.McIntosh and H.E.Schrammel, "Comparison of the Achievement of Eighth Grade Pupils in Rural and in Graded Schools", in ELEMENTARY SCHOOL JOURNAL, vol.31, pp.301-306. (Dec.1930)

achievements of pupils of various races -- white, Mexican, and negro -- or of pupils in different countries. An example of a study with pupils of various races is a thesis written by Mr. I.B.Mitchell, at the University of Kansas in 1928, "The Comparative Achievement of White, Mexican, and Colored Children in Public Schools." An example of the study on the achievements of pupils of different nationalities is that mentioned by the Educational Records Bureau, New York City, "Testing School Achievement in America and England." [6]

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6 Edith A. Wright, Bibliography of Research Studies in Education, 1929-1930, U.S.Dept. of Interior, Office of Education, Bulletin No.13, 1931, p.61.

capacities of pupils to do high school or college work may be discovered and measured, with various degrees of success, by tests.

The three testing programs carried on in the Girls Industrial School at Beloit, Kansas by the Bureau of Measurements of the Kansas State Teachers College of Emporia, Kansas, one in the year 1923,[7] one in 1926,[8] and one in 1931,[9] included both the intelligence and achievement tests. A recent publication[10] shows the results of intelligence and achievement tests given to the inmates of the Kansas State Industrial Reformatory at Hutchinson, Kansas.

SCOPE OF THIS STUDY

This study attempts to determine the status of the educational achievement of the elementary schools in Lyon County, Kansas, as indicated by the results of the New Stanford Achievement Test. Data were secured from the testing program carried on in a county-wide movement in all the elementary schools, including all one-teacher schools and all graded schools with two or more teachers, excepting only the elementary schools in the city of Emporia.

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7 and 9 Reports not available in printed form.

8 E.R.Wood and H.E.Schrammel, "Report of the Survey of the Girl's Industrial School, Beloit, Kansas", in TEACHING, vol.8, No.4, pp 3-21. (Jan. 1928)

10 Randall Garrett, Summarized Report on the Activities of the School Department, 1930-1931, 7 pp. Kansas State Industrial Reformatory, Hutchinson, Kansas.

MATERIALS USED

The pupils in the grades, from the second to the eighth inclusive, in all the schools were given the New Stanford Achievement Test, devised by Kelley, Ruch, and Terman. The Primary Examination, Form V, was given to the second and third grades and the Examination for the advanced group, Form V, to the other grades.[11] The tests were given in September of the school year 1930-1931. Over two thousand pupils from more than one hundred ten school districts participated. This testing program was sponsored by the superintendent of public instruction of Lyon County, Kansas, Miss Jean Cowan, and the Lyon County Teachers' Association. The latter organization contributed a fund of $100 toward defraying the expense of the testing materials. The individual school districts paid the remainder of the expense.

In the following spring, some of the schools checked the achievement made during the school year by giving Form W of the same test. Less than forty schools took part in the spring. A few more than six hundred pupils were involved in this test. The individual school districts assumed all the expense of the testing materials for this program. Probably because of the present economic depression, many schools did not give the test a second time. A comparison of the results found in the schools that were tested both in the fall and the spring will be found in a later chapter.

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[11] See Appendix for samples of these test booklets

The tests, at both times, were given by the teachers of the various schools and were scored by them. They were rescored and the results were tabulated by the students in the measurement classes at the Emporia Teachers College, under the direction of Dr. W.H.Gray and Dr. B.E.Tomlinson of the Department of Psychology.

DESCRIPTION OF THE TESTS

The New Stanford Achievement Test that was used as a basis for this survey is made in two divisions: a Primary Examination for Grades 2 and 3, and an Advanced Examination for Grades 4 to 9, inclusive. The test was first published in 1923, in the forms A and B. In 1925, the norms were revised on the basis of additional cases. A thorough revision of the test was made in 1929, giving the new series of forms, V, W, X, Y, and Z. The battery of tests contains ten separate sub-tests as follows: Paragraph Meaning, Word Meaning, Dictation, Language Usage, Literature, History and Civics, Geography, Physiology and Hygiene, Arithmetic Reasoning, and Arithmetic Computation. The Primary Examination contains only the easier portions of Paragraph Meaning, Word Meaning, Dictation, Arithmetic Reasoning, and Arithmetic Computation.

The tests are so devised that the scores in any one subtest can easily be compared with those obtained in any of the other tests and so as to obtain an average or composite achievement score. The scores also may be compared to norms for educational age, chronological age, and the school grade. The norms for the ten tests have been equated so that the score norms for a given age or grade are the same for all tests. The time limits of all the tests are liberal, so that the tests measure power

rather than speed. The aim is to measure all of the pupil's knowledge, not the rate in which he can perform certain assigned tasks.

The responses called for in the various tests follow a constant form whenever possible. A new type of response is explained, through properly marked samples, if a change is made. The scoring key makes the scoring highly objective and consumes but a little time. The fact that the responses are not in a straight column down the page, however, does add difficulty to the scoring process.

Each test is accompanied by a set of equivalent values by means of which the score on that test is made into a score that is comparable to the age or grade norm and has the same age and grade significance as a similar score made in any of the other tests in the battery. For example, if the number of correct responses on the first test in Paragraph Meaning, Form V, is 44, the score, as given in the table across the bottom of the test, is 82. If the number of correct answers in the test on Arithmetic Computation is 44, the score of that test is 109. If the number right in the third test, Dictation, is 44, the score is 84. By the use of these tables, then, all the scores of the tests are "derived" scores and have values that may be compared each with the other, without further mathematical computation or may be added for a composite score. By dividing this total score by the number of tests, a correct average achievement score is obtained for all the school subjects covered by the battery of tests.

A chapter will be devoted to each of the sub-tests in the battery. A detailed explanation of the test will be given and the results found in the testing program of the county will be compared with the norms set up for the test.

CHAPTER II

TEST NO.1 — PARAGRAPH MEANING

NATURE OF THE TEST

This test purposes to measure the ability of the pupil to obtain the thought from a given selection. It is a completion type test. The pupil's response is to write a word on each blank in the paragraph so that the meaning will be complete. An excerpt from the test, taken at random, will serve to illustrate the procedure:

> " Steel is made from iron and is therefore a manufactured product. Similarly brass is commonly made from copper and zinc. This explains why we never hear of .....and ..... mines."

The Primary Examination, Form V, contains a possibility of fifty-four responses. From the table of equivalent values at the end of the test, any number of correct answers can be converted into a derived score as explained above. The maximum score for this test is ninety-five. The Advanced Examination has eighty blanks on which words may be written to give complete meaning to the paragraphs for which a maximum score of one hundred thirty-four is given. The lowest score given is three.

When selecting the items for the test, the paragraph was arranged so that a complete reading of the selection is necessary before the blanks can be properly filled. This insures an understanding of the whole rather than a small part of the paragraph. The few possible correct answers for the blanks add both to the reliability and the objectivity of the test. The content of many of the paragraphs carries some useful or interesting information. This fact gives additional value to the test. It attracts the attention and interest of the pupil.

The test includes items touching many fields. There are parts dealing with fairy stories and games and activities of children. The subjects mentioned are those with which the children are familiar and with which they come in contact in their work and play. Animals and inanimate objects are personified to add story form to the material used. The gray pussy, the lark, the squirrel, the child's toys and his story books are used in the paragraphs. Natural science items that mention animal life are a part of the test. The bear, the lion, the rhinoceros, the deer, trout, cattle and buzzards are mentioned. Items concerning plant life and information on minerals and natural resources are included. The Eskimo, the Indian, the Chinese and other foreign people and the customs and modes of living are mentioned also. Items pertaining to history, to education, to physiology, and to psychology form a part of the test. It can be seen, then, that there are selections that will appeal to all and that cover many lines of interest. This is a timed test but the time given is sufficient for all but the slowest to finish all the test that they are able to do. It is really a work limit test.

As stated above, this test is of the completion type, one of the "new-form" examinations. It was a new type to most of the pupils in the county. In fact a number of the pupils tested had not taken a standardized test before. People working with the testing movement recognize that pupils become familiar with the content of many tests, that they may be coached and may learn the responses to the test items. Pupils accustomed to

taking tests show a "practice effect" and on successive tests make better scores than those to whom the whole testing procedure is entirely new. Without a doubt the pupils of the county had received no coaching on this test. The fact that so few of them had taken similar tests previously probably will make them lack the practice effect just mentioned, and hence might account, in part, for the low results.

NEW-FORM EXAMINATIONS

In order to obtain a clear idea of the test, and of the others following which are of the same type, the "new form" examination referred to above will be explained. The "new form" examination is the name given to those examinations that have appeared to replace the older "essay type" examinations. As stated before, the latter type examination had many faults and shortcomings. It is unreliable to a large extent because the opinion of the examiner is so great a factor. The new type examination includes those tests and exercises that may be scored objectively and that require only a little writing on the part of the pupil examined. It is obvious that in this type of test the pupil may be examined more minutely, more in detail, and over more subject matter than in the essay type test.

Standardized tests are of the new form type. The teacher often finds a need for testing a particular phase of subject matter in a certain class that is not covered sufficiently by a standardized test. Many times, then, the teacher may construct a test of the new form type to fit the particular need of a class.

The directions for these tests must be specific and complete. The pupil must be given explicit directions as to just what is to be done. Sample items, correctly solved, aid the pupil to understand what he is to do. Samples should be given before each new type of exercise included in the examination. Sample exercises are found valuable in helping the pupil become acquainted with the testing procedure. They are referred to as "shock-absorbers" by Paterson. The selection of items to include in the test requires careful attention. An examination of the new form type requires more of the teacher than does the essay type. The statements must be carefully worded to avoid ambiguity. The correct responses should not be made too evident nor the incorrect statements so far-fetched or absurd that they may be recognized without any special knowledge of the subject matter being tested. The responses to be made by the pupils should be arranged so that the scoring or marking is simplified and may be rapidly done.

The pupils' answers should be concentrated on either side of the page and kept in a vertical column. A scoring key with the correct responses spaced the same as the pupils' answers may be laid on the test page. The two may then be rapidly and easily checked. The Stanford Achievement Test does not follow such a procedure, except in one test, No.9, in Arithmetic Reasoning. For example, in the multiple-choice exercises in this test the pupil is directed to underline the proper word. The words that are to be underlined cannot be found in a vertical column but will be scattered over the entire page. This makes the scoring quite difficult. Much time is required for the scoring whensuch a

procedure is followed. A better arrangement for scoring could be obtained if the words were numbered and the pupil directed to write the numbers of the words chosen as correct in a box, in parenthesis, or on a line at the margin of the page. The responses then could readily be matched with the correct answers on the scoring key.

The rapid and fluent writers, who stood out so prominently in the essay or discussion type examination have no advantage over those not so talented in these tests because the answers are brief and but little writing is required of the pupil. Poor quality of writing, spelling, punctuation, and such elements not an actual part of the test do not influence the teacher in the grading in the new examination.

It must not follow that the discussion examination should be entirely replaced by the other type. The essay test gives training in organization of thought, in written expression, and in discrimination and evaluation that the new-form type lacks.

The new-form examinations are of various types: the simple recall, completion, matching, multiple-choice, and the true-false exercises. There are many others but these are the most commonly used types.

The simple recall exercises are the easiest to prepare. A single word or expression is the only correct answer to the question asked. Examples of this type are:

1. Who is the French President today? _____

2. What is the sum of $3x - y$ and $5x - 3y$? _____

Completion exercises are quite valuable. They may be classified as recall exercises also. The pupil must have definite knowledge of the subject matter to choose the correct response. These call for clear understanding and exactness. The pupil must know the materials involved or he cannot supply the missing words or phrases. It is perhaps the most valuable type of test, especially from the view point of pupil response. It is a difficult type, however, for the pupil and fewer items can be answered by the pupil in the same time limits than in other types. Examples are:

1. .....is a character in the "Ancient Mariner".
2. Water freezes at ..... degrees Centigrade.

Multiple-choice exercises consist of statements which may be made true or correct by the selection of one of the several words or phrases given in the sentence. These words may or may not be related. The proposed choices may be numbered and the number of the proper choice may be written on a line on the margin of the page. The word written on the line would answer the same purpose. This makes for ease in scoring. If the word were underlined, the response could be checked for accuracy but, as previously pointed out, the scoring would be more difficult. Examples of this type are:

1. Napolean was a (1) German, (2) French, (3) British, (4) American, (5) Italian general. ..(2).

2. The I.Q. of a normal child may be (1) 70, (2) 130, (3) 25, (4) 95, (5) 140. ..(4).

The statements used in the true-false exercises are answered by writing, checking, or underlining the words "true" or "false" or the words "yes" or "no", after the exercises. The omission of both sets of words after the statement often is found, especially for older children and adults. A plus or a minus or a zero may be used to indicate true or false statements. Scoring is much more rapidly done when this method is used than when the words are used. The element of guessing is a bad feature of this type. Allowance for this is made in some cases by subtracting the number wrong, or one-half of that number, from the number right. Another means of correction is to use a double true-false statement, one true and one false for each test item. Some illustrations are:

1. The pilgrims landed at Jamestown in 1620.	TRUE	FALSE
2. The President holds office for four years.	TRUE	FALSE
3. Purple is one of the primary colors.	YES	NO
4. Water power is used as much as coal to generate electricity.	YES	NO

If the test under consideration, Paragraph Meaning, is examined now in light of the foregoing discussion, it is found that it falls under the completion type. The pupil must read for comprehension if he is able to supply the words on the blanks. He must understand what is asked for. It requires exactness and clear-cut thinking ability. It tends to measure all of a pupil's ability in comprehension.

RESULTS OF THE TEST

The median scores made by the pupils in the county in the grades from the second to the eighth, inclusive, and the norms for each grade for this test are shown in Table 1. The medians were computed to two decimal places and then taken as whole numbers, a half or more counted as one. The graph in Figure I contains the same data. The relation of the median scores of the county to the norm is pictured more clearly in the graph than in the table. At a glance the score can be seen as equal to, below, or above the norm. The relative amounts of departure of the medians from the norms are shown rather clearly.

TABLE 1

Showing the Number of Pupils in Each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the Pupils in the County on Test No.1, Para graph Meaning.

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
II	295	14	13
III	277	30	28
IV	324	48	43
V	295	63	60
VI	283	74	71
VII	284	82	81
VIII	275	90	90
Total	2033		

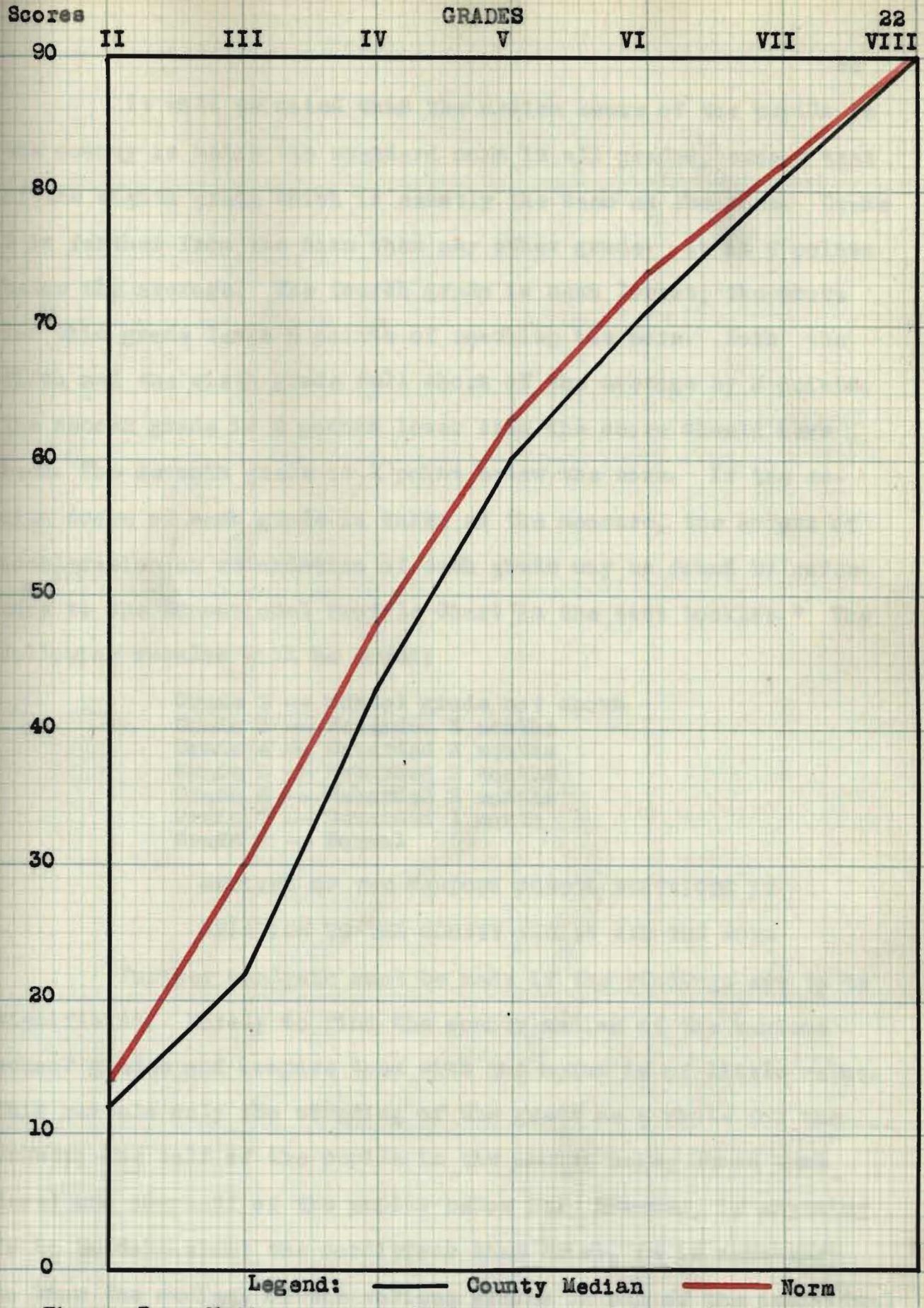


Figure I. Median scores of the grades of Lyon County, Kansas, for Test No. 1, Paragraph Meaning, of the New Stanford Achievement Test in comparison to the norm.

It will be noted that the median score of the pupils in the county is below the standard norm in all grades, except that of the eighth grade which is exactly the same as the norm. Grade 3 is farther from the norm than any other grade. It is 8 points below the average. The fourth grade is next lowest; the score for this grade lacks 5 points of reaching the norm. Both the fifth and the sixth grade fall short of the average by 3 points. The second grade is 2 points lower than the score should have been. The seventh grade is 1 point below the norm. If the median score of each grade is taken as the measure, the amount of acceleration or retardation of each grade may be found by reference to the Educational Profile Chart in the test booklet.* The following results will be found:

Grade 2 -- School grade not shown
Grade 3 -- Retarded 3 months
Grade 4 -- Retarded 3 months
Grade 5 -- Retarded 2 months
Grade 6 -- Retarded 2 months
Grade 7 -- Retarded 1 month
Grade 8 -- Normal

MEDIANS OF THE VARIOUS SCHOOL DISTRICTS IN RELATION TO THE COUNTY MEDIAN AND THE NORM

Further analysis must be made if the findings are to be significant. Merely to find the county median of the various school grades and compare them with the norms is of little value. This reveals only the standing of the grade as a whole for the county; one half of the pupils in the county being above that level and one half of the pupils below it. However, if anything is to be done about the conditions that exist, it is necessary to know the medians of the various grades in all of the individual school districts in the county and their relation to the county

* See page 2 of the test booklet, in appendix

TABLE 2

Showing the Medians of all of the Grades in the School Districts of Lyon County, Kansas for Test No.1, Paragraph Meaning of the New Stanford Achievement Test.

Dist. No.	GRADE						
	E	3	4	5	6	7	8
C.1	3	16	52	62	67	84	90
C.2	3	32	61	65	72	80	96
C.3	3	18	61	72	73	78	95
C.4	3	30	35	65	74	82	98
Jt.3			37	38		81	96
3				56		83	91
4	3	9	37	58	74	76	97
5	3	3		39	65	69	
6				77	60	95	84
7	3	19	39	25	81	79	99
8	3	14	39	43		88	
9				84	67	82	
10	22	13		71	81	54	93
11	3	23	50	56	71	89	80
12			37	64	65	72	76
13	3	8	54	58	73	82	95
14	12	3	15	57	60	75	90
15	24	26	25	40	85	75	85
16	23	41		31	74	69	91
17		31	47	40	64	77	78
18		28	53	44	77		95
19	3		14	34	74	85	71
20	12	18	40	70	77	83	90
21		20	49	53	59		61
22	3	18	38	42	78		87
23	3	58	49		91	85	94
24	3	3	35		75	90	86
26	3		13	58	54	81	94
27	35	44	33	52		78	
28	29		46	76	83	86	
29		16	51		67	76	88
30	3	20	48	57	56	84	77
31		25	46	65	70	83	91
32	3	3	50	45	50	83	62
33	47		37	45	63	64	79
34	8	28	18	61	51	74	91
36	18			65	53		90
37		31	43		83		
38	8		51				
39	13	31	42	63	51	56	88
40	35	29	49		71	66	95
40E	3	3	38	58		76	101
42	3	3	67	72	72	88	83
43		46	52	72	88	88	97
44	12	8	30	65	66	51	102
45	12	18	25	54	47	79	82
47	12	12		46	75	71	92
48	13	21	31	35	67	71	80
51	9	13	41	65	67	81	117
53	3	31	35	75	65	89	95
54	3	23	53	50	65	37	77
55	3	26	30	60	75	77	94
56		61	62		79		86

Dist. No.	GRADE						
	2	3	4	5	6	7	8
58	14	28	58	71	77	88	86
59	20		55			67	80
60	18	31	47	46	72	67	69
62			46	65		67	77
63	8		37	44	77	64	87
64	3	3	45	50	37	82	72
65	13		54	52	67	84	68
66	16		23		53	58	80
68			51	46	77	64	
69	39	14	35		57	81	
71	3	14		47	75	65	70
72	16	16	30	60	65	83	102
73	3	26	63	47	59	91	
74	3	22	42	75	65	72	85
75	18		35	62	75		85
76	12		22	73	60	87	67
77	3	16	40	40	60	67	80
78	15	18	33	35	62	72	84
79	31	30	38	37	70	62	73
80	3	28	35	60	75	87	90
81			35	64		72	83
82	16	13	29	60	100		92
83	41	46	53	60	73	74	100
84	3	18	54	72	66	93	
85	16		35	50	55		80
86	24	30	35	55	70	92	90
87	13	46	33	53	59		71
88		3	25	54	66	94	87
89		18	57			84	81
90			53	54			94
91		3	57	37	67	73	
92			42	77	67	87	72
95	3	3	33	44	70	64	98
96	30			70		42	
97	3	16	52	62	61	53	95
98	3		44	47	56	63	85
100		18	54	64	87	84	74
101	3	20	18			67	91
103		18	43	61		70	64
104	3	24	44	78	87	91	100
105	13	13	67		75		
106	18	16	19		76	90	90
107	10	49	83	89			
108	3		57	62	69	76	96
109	16	18	31	58	29	75	82
110	3	3	30	42	50	72	87
111	17	23	65	56	27	87	90
112			20	60			89
113	3		46	53	62		95
114					76	68	80
116	3		44	61		72	
117			41		84	87	92
118		33	33	61	77	76	90

median and to the norm for the average. These medians are given in Table 2. From the table it is possible to locate the median of every grade in every school district in the county that participated in the testing program, and to know just which grades were above and which were below the standard. If no median is given there were no pupils in that grade in the school district. By locating the medians for the individual school districts, it is possible to know which schools fall short of the standard level and in which school remedial measures should be applied to raise the standing of the grade as a whole in the county. It is in these grades that intensive work in this phase of reading instruction need to be done.

In order to show more clearly the various school districts that are above and those that are below the county median and the norm, the data in Table 2 are shown graphically in Figures II - VIII. The medians for all the school districts for th test, Paragraph Meaning, are shown in these figures. The graph for each grade is given in a separate figure. The county median and the norm are drawn on each graph so that each school distric can be located in relation to these levels, as well as compared to all others. School districts not having a particular grade are omitted from the graph for that grade. It should be kept in mind in examining these graphs that the county median is determined by the number of pupils above and below the mid-point and not the number of school districts above and below that point.

The range and the quartile deviation, the Q, should be considered in the examination of the distribution of scores as well as the median. The range takes account of the extremes of the series and does not show when frequent or large gaps occur in the distribution. For example, one pupil may have a very high or very low score when compared with others in the group but he may be the only one far from the average or median. Again, a few pupils may have scores that are separated from the others in the class by a gap of fifteen or twenty points. These scores may affect the range but may or may not change the median score.

The quartile deviation is a measure that shows the compactness with which the scores are grouped about the median. It marks off the limits within which fall the middle 50% of the measures in the distribution. If the scores are closely packed together, the Q will be small; if the scores are scattered, the quartile deviation will be large. By this measure the variability of two groups of scores around the median may be compared, the size of the Q showing the difference in the "scattering" of the scores. The quartile deviations for the various grades on Test No.1 are shown in Table 3.

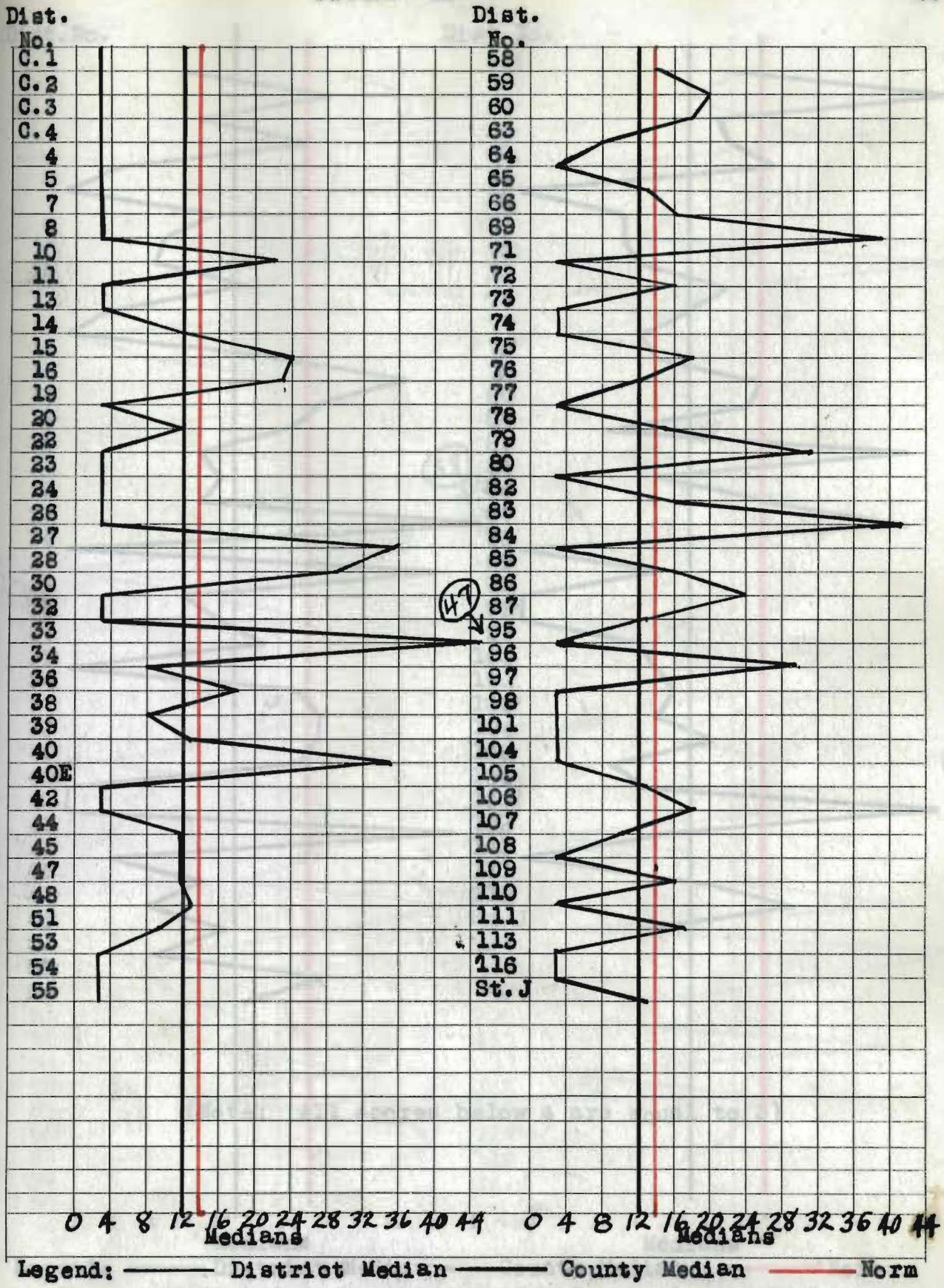
In the graph for Grade 3, Figure II, one school, District 33, had a median that was quite above the county median and the norm. The median score was 47 and extended beyond the limit of the graph section. It will be noted in this graph that four other districts had outstandingly high median scores. District 83 had a score of 41, District 69 had 39, District 40 had a median of 35, and District 27 had 35. Many of the schools had

medians of 3, showing a range of median scores on this test of 44. The quartile deviation, according to Table 3, for this grade was 7.28. It should be recalled that the county median on the test was 12 and the norm was 14 for the second grade.

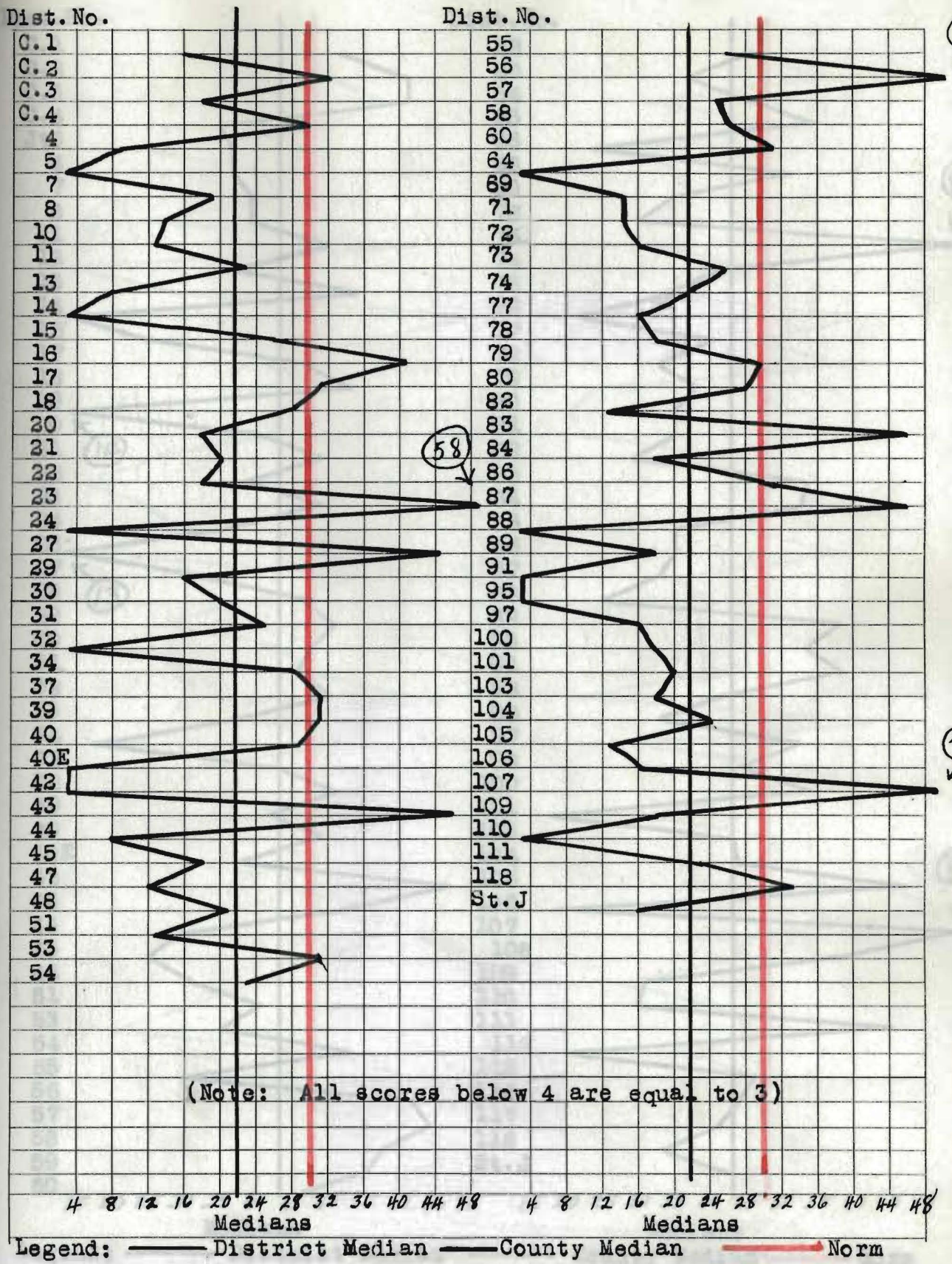
The graph for Grade 3 in Figure III shows several districts had a median score of 3 on this test. Three Districts had medians above the graph: District 107 had a score of 49, District 23 had 58, and District 56 had 61. The scores of the schools deviate quite a little from the county median of 22 and the norm of 30. The range of medians for this grade was from 61 to 3, or 58 points. The Q was 9.92 which shows more scattering than in the second grade.

In the fourth grade shown in Figure IV, the county median was 43 and the norm was 48. On the lower side of these levels District 26 with a median score of 13, District 19 with 14, and District 14 with 15 stand at the bottom. Two of these are below the limit of the graph. On the other side, there are two districts, Numbers 73 and 107, each of which had a median of 83 which is not shown on the graph. The range in this grade was 70. The Q was 11.73, according to Table 3, which is larger yet than those already mentioned.

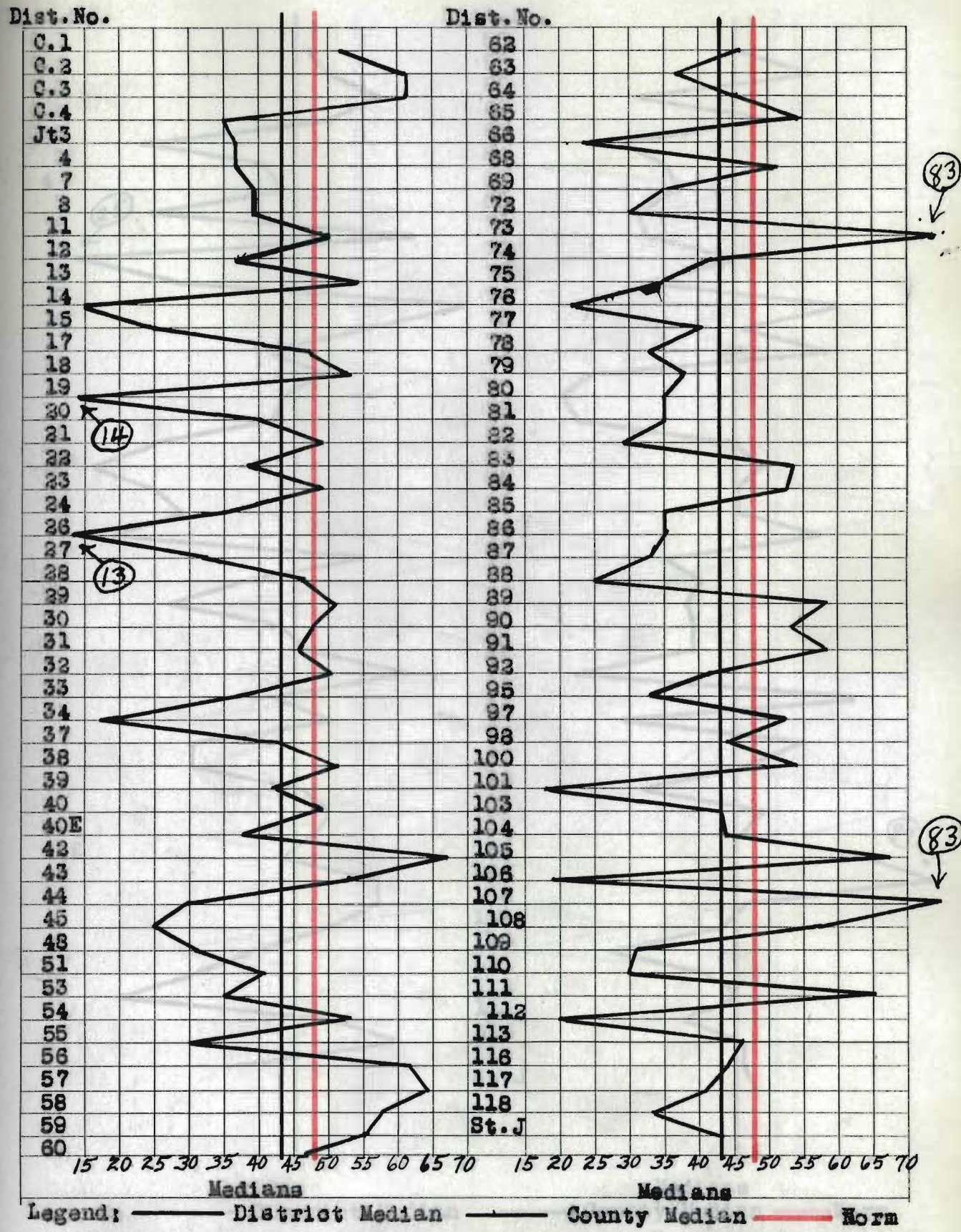
The graph for Grade 5, Figure V, shows one district, Number 107, with a median above the limit of the graph with a score of 89 and one district, Number 7, with a median of 25, extending beyond the limit in the opposite direction. District 9 is second highest in this grade with a score of 84. Since the low score in the group was 25 and the highest was 89, the medians have a range



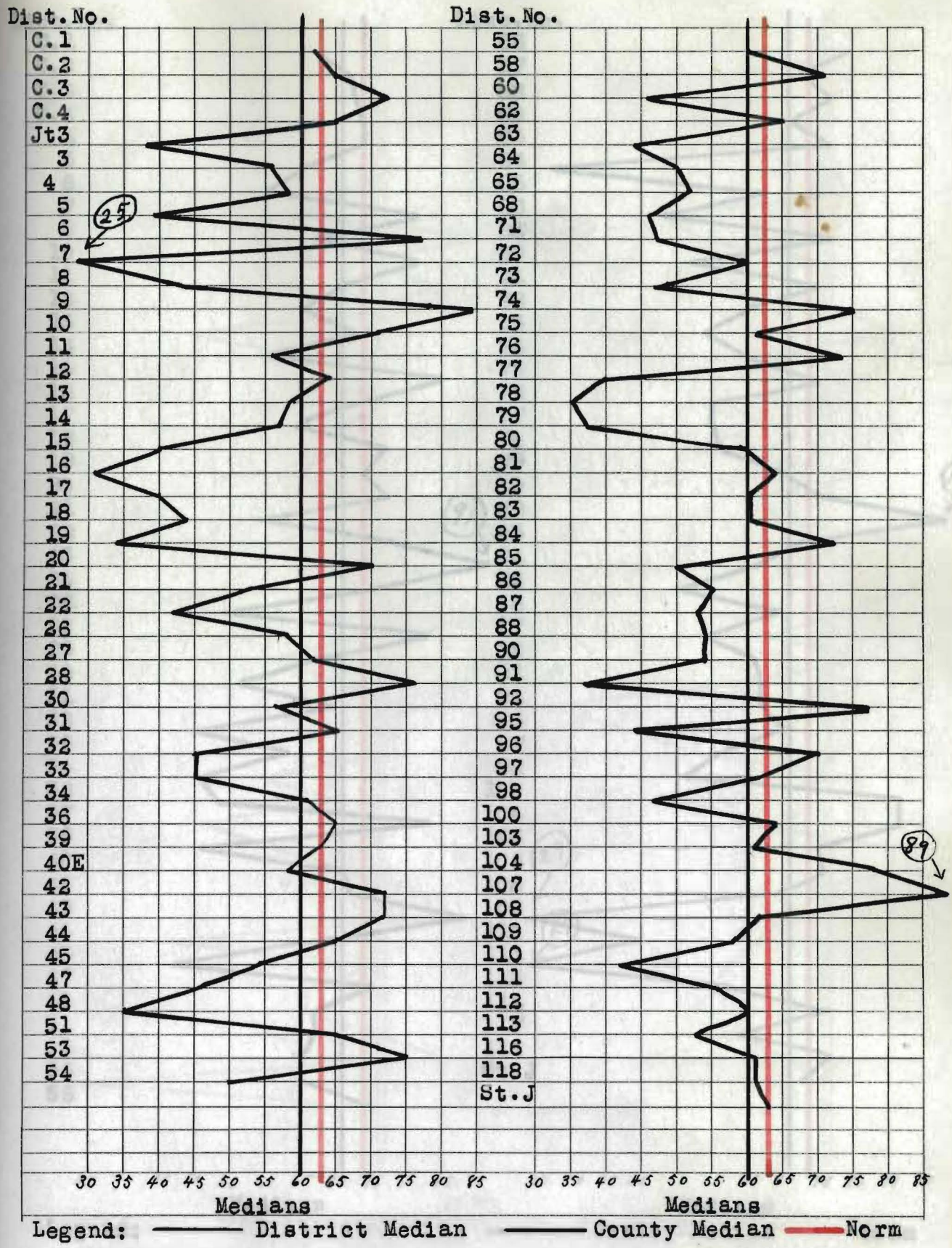
Showing medians of the second grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.1, Paragraph Meaning, of the New stanford Achievement Test.



Showing medians of the third grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.1, Paragraph Meaning, of the New Stanford Achievement Test.

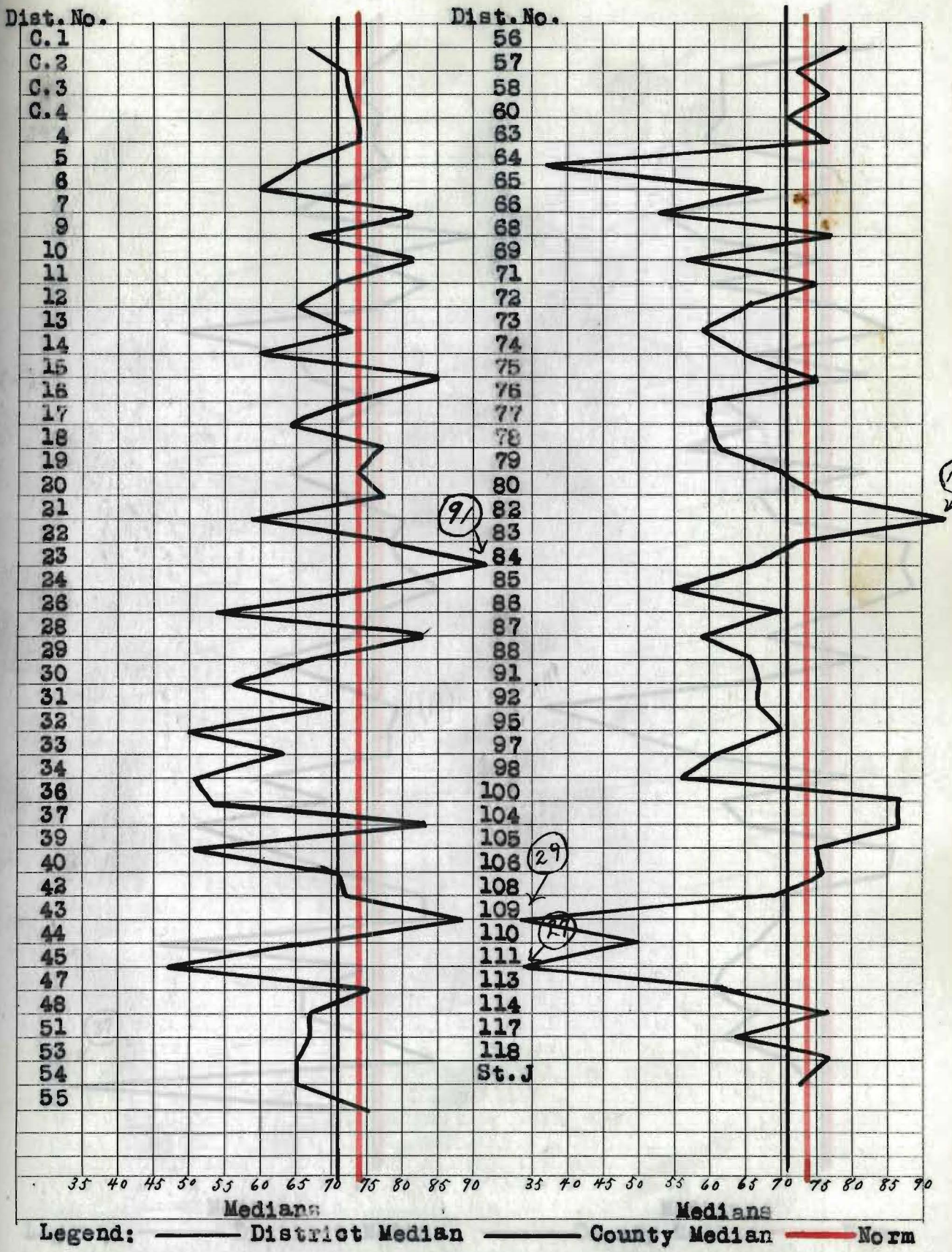


Showing medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.1, Paragraph Meaning, of the New Stanford Achievement Test.



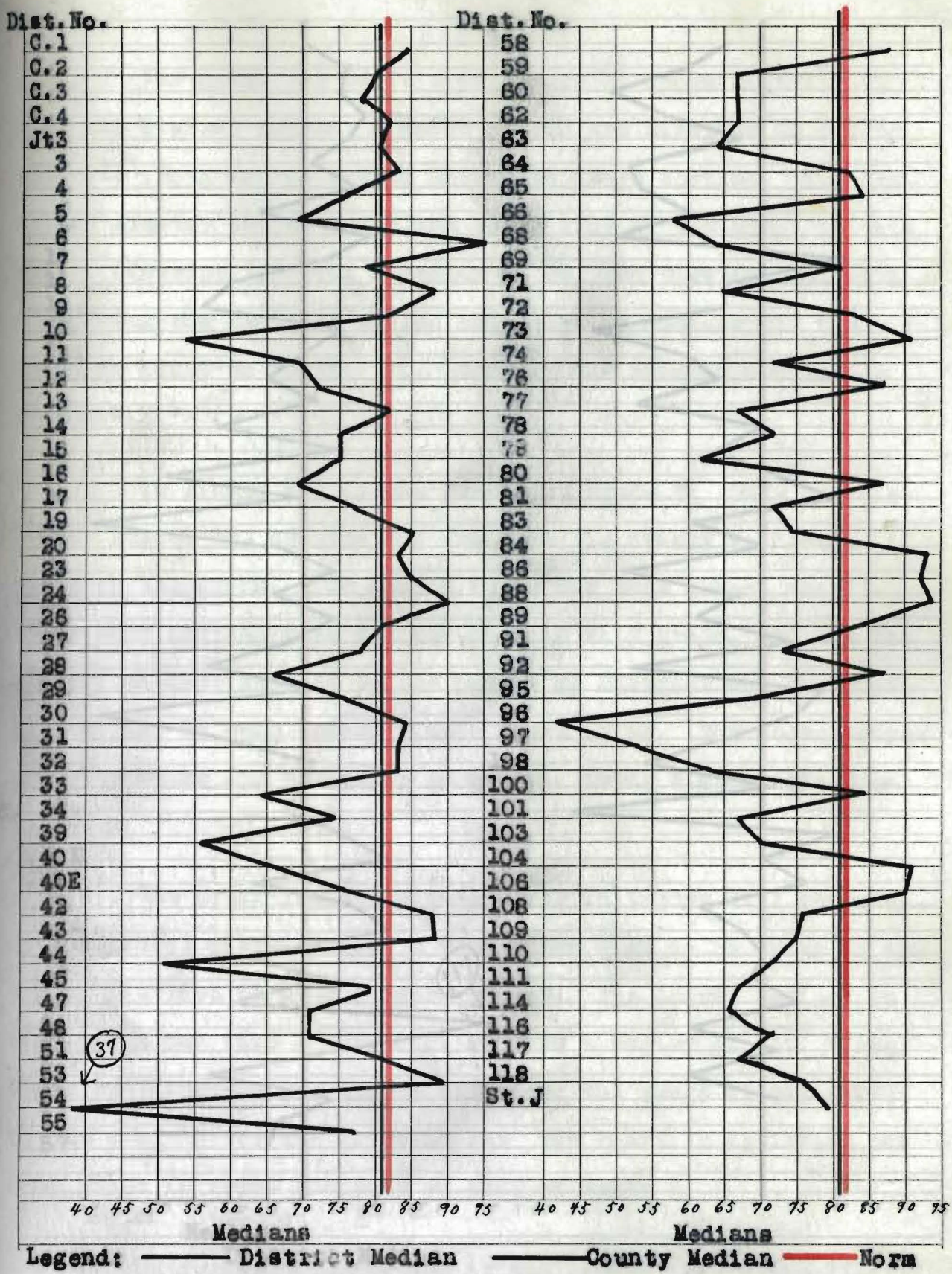
Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.1, Paragraph Meaning, of the New Stanford Achievement Test.

FIGURE VI



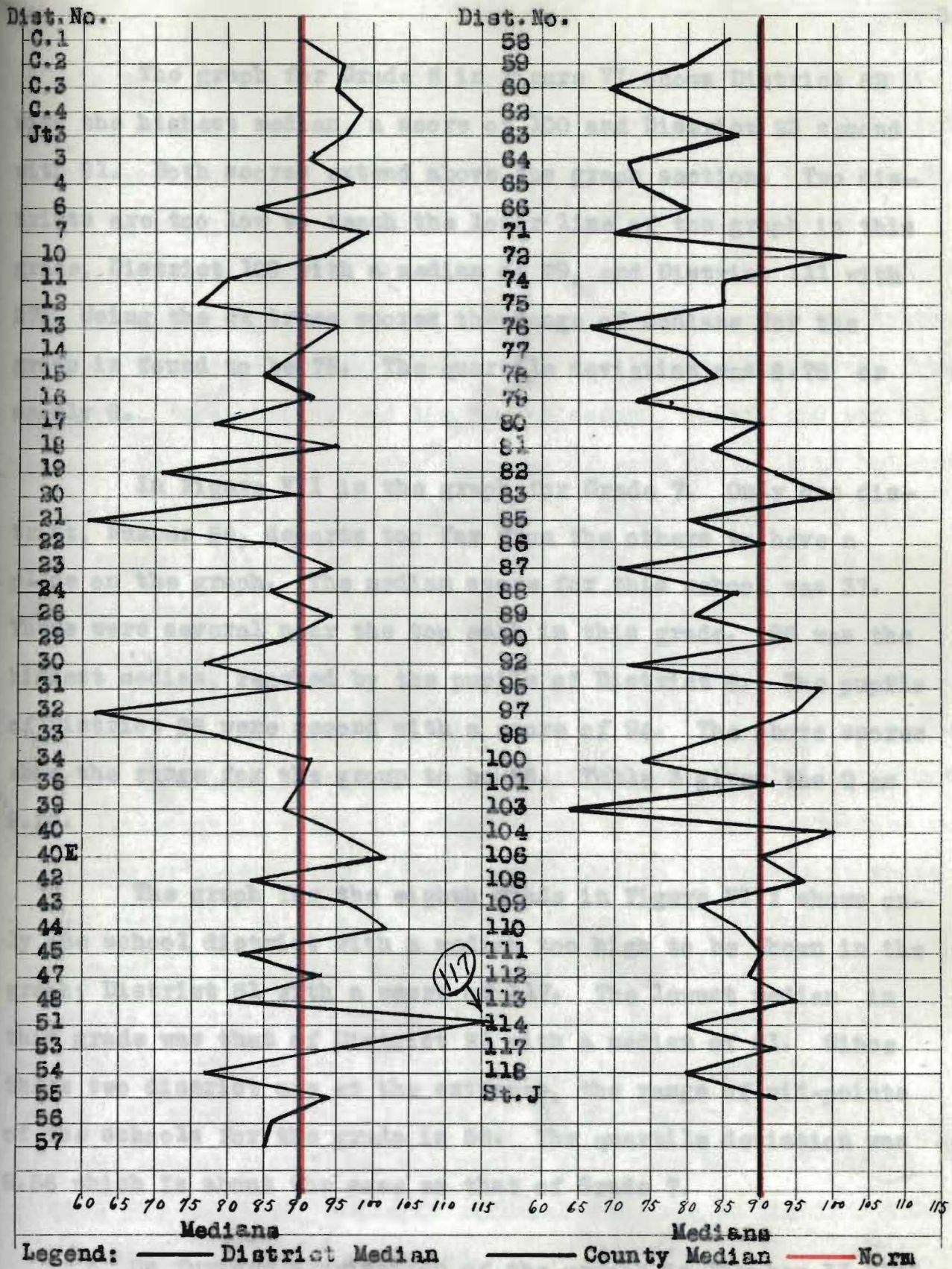
Showing medians of the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.1, Paragraph Meaning, of the New Stanford Achievement Test.

FIGURE VII



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.1, Paragraph Meaning, of the New Stanford Achievement Test.

FIGURE VIII



Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.1, Paragraph Meaning, of the New Stanford Achievement Test.

The graph for Grade 6 in Figure VI shows District 82 with the highest median, a score of 100 and District 23 second with 91. Both scores extend above the graph section. Two districts are too low to reach the lower line of the graph in this grade, District 109 with a median of 29, and District 111 with 27. Using the ex treme scores the range of medians for the group is found to be 73. The quartile deviation was 8.76 or nearly 9.

In Figure VII is the graph for Grade 7. Only one district, Number 54, departs too far from the others to have a place on the graph. The median score for this school was 37. There were several near the top mark in this grade. 95 was the highest median, reached by the pupils of District 6. The pupils of District 88 were second with a score of 94. The above scores show the range for the group to be 58. Table 3 gives the Q as 9.26.

The graph for the eighth grade in Figure VIII shows only one school district with a median too high to be shown in the graph; District 51 with a score of 117. The lowest median in this grade was that of District 21 with a median of 61. Since these two district are at the extremes, the range of mid-points of the schools for the grade is 56. The quartile deviation was 9.56 which is about the same as that of Grade 7.

On further examination of the graphs in Figures II-VIII, it can be seen that only a few districts had high median scores

on this test in two or more different grades. District 107 ranked first or near the first in three different grades, in the third, fourth, and fifth. District 23 was among the schools having high scores in two grades, the third and the sixth. District 27 and District 83 were high in the second and third grades. Only two schools were among those whose medians placed them near the bottom in three different grades. District 19 was low in the second, fourth, and fifth. District 33 was low in the second, third, and eighth grades. In a like manner the standing of each district in relation to the norm, to the county median, or to other schools can be located for all the grades in that particular school for this test. With the use of similar graphs in the succeeding chapters of this study, each grade may be traced through all the tests or each district school for all the grades in all the tests.

As stated before, the graphs in Figures II-VIII point out those districts in which the pupils need to give more attention to the study of reading for better comprehension. Not only in those school districts which have been singled out as bottom rank in the preceding paragraphs does particular attention need to be given the reading classes, but also in all the school districts whose median scores were inferior to the average norm for the grade. If the individual scores of the pupils are now examined in these school districts, the pupils with whom the work should be done may be found, and such remedial measures as the individual case warrants may be applied.

INDIVIDUAL SCORES OF THE PUPILS

Thus far each grade in the county as a whole has been compared with the norm, and the medians of the various school districts of the county were compared to the county median and to the norm. Now the individual score of each pupil may be taken for analysis; for comparison to the scores of other pupils of the same grade in the county and to the scores in his grade in his own school.

For an illustration, the individual score of W.H. in the fifth grade of District 58 may be taken. His score on Test No.1, Paragraph Meaning, was 51. The median for that grade, according to Table 1, was 60. This pupil then was much below this score. In the same table, the norm of the average fifth grader was 63. He was still further below this score in this test. He was decidedly inferior to the average pupil in his grade in interpreting the meaning of the paragraph. The median score for the fourth grade, found in the same table, was 48. W.H. was only 3 points above this level; he was retarded almost a full year in this phase of reading. By reference to the Educational Profile Chart* it is found that 51. is equivalent to the first month's performance for the fourth grade. This shows, then, that the pupil was eight months below his grade level in reading according to the results of his work with this test.

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* See test booklet, op.cit.

QUARTILE AND DECILE DEVIATION

It already has been found that W.H. was below the median of the county in his grade. Below the median indicates but one thing, that he stands in the lower half of the group. It is impossible to determine in just what part of this portion of the group he ranks, if only the measure of central tendency, the median, is used. By placing the pupil according to his quartile ranking, it is possible to find whether he is in the upper one-fourth of the group, in the middle half, or in the lower fourth of the distribution. The quartile measure of deviation divides each half again so that there is an upper fourth and a lower fourth of the entire group. The median itself divides the two middle fourths. The quartiles are found in the same way that the median is found, except the one-fourth and three-fourths of the number of frequencies in the distribution are used instead of one-half of that number as is used to find the median.

Now since the score of W.H. is below the median, he is eliminated from the upper half of the group. To discover his standing in reference to the first quartile mark, Table 3 is used. This measure for the fifth grade is 47.43. The score of W.H. was 51, so that places him in the second quarter or fourth of the group. He is between the first quartile mark and the median.

In the county there were 295 fifth grade pupils tested. By the above analysis, the score of this pupil has placed him in the fourth of the group below the median and above the first quartile. There were about 74 pupils in this group, however, and the

ranking of the pupil still is rather coarse. The group may be still further divided by the use of decile ranking, dividing the entire distribution into tenths. The deciles are found just as were the medians and the quartiles, using the various tenths, however, 1/10, 2/10, and so on. The scores obtained by such ranking for the several grades of the county for this test are shown in Table 4. By reference to this table now, the score of 51 is shown to be above the third decile.

The score of W.H. is now rather definitely located as to his standing in the county in relation to others in the fifth grade as well as to the county median. It is clear that he ranks not only in the lower half but above the third decile mark, or in the fourth tenth from the bottom of the group in the fifth grade.

SCORES OF AN ENTIRE CLASS

The scores of the Fifth Grade of District 58 for Test No. 1 will be examined now. The scores of the pupils in this class, arranged in order from highest to lowest were:

95	67
77	66
75	64
75 Third Quartile	60 First Quartile
73	60
73	60
73	58
72	51 — Score of W.H.
71 — Median	

Total 17

By referring to Table 1, the scores of this school grade may be compared to the median score of the county for the fifth grade, which was 60, and to the norm, which was 63. The median for District 58 was 71, which was much above the county median

TABLE 3

Showing the Quartiles and the Quartile Deviations of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.1, Paragraph Meaning, of the New Stanford Achievement Test given in September, 1930

	GRADE						
	2	3	4	5	6	7	8
Third Quartile	17.59	33.12	55.96	69.18	79.43	88.89	97.64
Median	12.09	22.33	42.82	60.06	70.81	80.52	89.66
First Quartile	3.02	13.27	32.50	47.43	61.91	70.36	78.51
Quartile Deviation	7.28	9.92	11.73	10.88	8.76	9.26	9.26

TABLE 4

Showing the Decile Ranking of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.1, Paragraph Meaning, of the New Stanford Achievement Test.

	GRADE						
	2	3	4	5	6	7	8
9th Decile	28.75	44.10	64.76	77.74	86.21	98.40	104.22
8th Decile	19.38	35.15	59.08	71.67	81.31	91.48	99.57
7th Decile	16.54	31.25	53.13	67.07	77.75	86.92	95.64
6th Decile	13.19	27.20	47.66	63.33	74.35	83.48	92.65
5th Decile (Median)	12.09	22.33	42.82	60.06	70.81	80.52	89.66
4th Decile	3.63	18.70	38.84	55.61	67.40	77.08	84.10
3rd Decile	3.22	16.20	35.24	50.89	63.88	72.89	80.58
2nd Decile	2.81	12.12	29.65	43.64	59.88	67.56	76.29
1st Decile	2.41	3.15	23.94	35.50	49.39	57.29	68.75

and above the norm for the average fifth grade as well. In fact, it was equal to the county median for the sixth grade and only 3 points below the norm for the sixth grade which was 74. If the score of 71 is found in the Educational Profile Chart* it will be found to be equivalent to the work of the seventh month of the fifth grade. This showed an advancement of the grade of more than half a year. The first quartile of the class was 60 which was equal to the median made by the pupils of the fifth grade of the county as a whole. All of the pupils in the upper fourth of the group had scores that were above the norm of the average sixth grade. There were only five pupils in the district in this grade whose scores were below the norm of 63 and only two who ranked below the median of the county, 60. There was one pupil, the one with the highest score of 95, that did work that was above the norm for the eighth grade. W.H. whose case was used in the above analysis, whose score was 51, was at the bottom of his class. He was found to be poor in his own group, and as pointed out before, was inferior in the whole group of fifth graders in the county.

By a process similar to this, then, it is possible to locate the standing of each pupil in every grade in his own school and in his grade in the county taken as a unit. The entire grade of any school district also may compared in its standing with that grade as a whole in the county. Although the sample pupil and grade in District 58 did not show it, it is possible for a pupil to rank above the median in his own grade in his school, even in the upper fourth of the class, and yet be below the county median and the norm. The entire class in his school might be doing inferior

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* See test booklet, op.cit.

article on the relation of reading ability to scholastic achievement Mr. C.E.Dickinson[1] states that pupils poor in ability to read and comprehend have been found to be poor in all school work and often drop out of school early because of failure to do passing work. He holds that there is a positive correlation between reading ability and school achievement.

The fact, then, that the pupils in Lyon County are below the standard in reading comprehension is a challenge to the teachers of the county, especially when reading is such an important tool subject. Since the status of reading comprehension has been determined and found below the norm, a need for remedial treatment is revealed. The steps and methods in such treatment largely depend upon the individual pupil, the school situations and conditions, and the teacher.

The meaning of a sentence or a paragraph depends upon the combined meaning of the individual words used and the relationship between the words. The next test deals with word meaning and should show results similar to this test. There is a high correlation existing between a test in reading that stresses comprehension or paragraph meaning and a test for word meaning or vocabulary A study that shows a correlation between a reading test and a vocabulary test is that of Dr. H.E.Schrammel and Dr. E.R.Wood,

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[1] C.E.Dickinson, " A Study of the Relation of Reading Ability to Scholastic Achievement", in SCHOOL REVIEW, vol.33, pp.618-626, (October 1925).

"Success and Failure of College Students."[2] Intercorrelations were found for the several tests given to freshmen entering college. The coefficient of correlation between the two tests mentioned above was .57 .02.

In order to understand the significance of a coefficient of correlation, the following is quoted from Tiegs and Crawford:[3]

> A coefficient of correlation
> "Below .15 or .20, 'negligible or indifferent'
> From .15 or .20 to .35 or .40, 'present but low'
> From .35 or .40 to .50 or .60, 'markedly present'
> Above .50 or .60, 'high'.

An examination of the results of the test on word meaning, in the next chapter, will show that the two phases of reading ability tested yielded similar results.

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[2] H.E.Schrammel and E.R.Wood, Success and Failure of College Students, p.13, Studies in Education, Kansas State Teachers College, Emporia, Kansas, No.3, Jan.1931, 103 pp.

[3] E.W.Tiegs and C.C.Crawford, Statistics for Teachers, p.163, Houghton Mifflin Company, Boston, c1930,212pp.

CHAPTER III

TEST NO. 2 -- WORD MEANING

DESCRIPTION OF THE TEST

This test measures the vocabulary of the pupil. It is the second part of the reading test. Of course, word meaning largely determines the amount of meaning a pupil can obtain from a sentence or a paragraph. In this test, the sentences listed are given complete, correct meaning by using one of the five words given after each. Examples from the test are:

1. A farmer works chiefly with
   FISH COAL PLANTS ROCKS WOOD

2. A ballot is used in
   DRAINING FREEZING GRINDING VOTING WRAPPING

3. A legacy is an
   INHERITANCE INSCRIPTION OX ANKLE ELF

4. To impair is to
   BRAND COMMEND DAMAGE MINGLE SCRAPE

There are two types of items, one in which the critical word is easier than the response words and one in which it is harder. Usually the response word and the critical word in a given item are the same part of speech. Various parts of speech are used. Both easy items and quite difficult items are included in the test.

If reference is made to the discussion of the "new-form" examination in Chapter II, this type of test will be classified as multiple-choice. The pupil is to underline the word that makes the sentence true. This practice does not put the responses in a vertical column however, and makes the scoring rather difficult.

In considering the vocabulary of pupils, it should be kept in mind that each child has a number of vocabularies. His speaking or working vocabulary is perhaps the most meager. He tends to express himself briefly and at all times and under most conditions, with about the same range of words. The child continues this practice even in adulthood. The average person uses a very limited number of words under ordinary circumstances. In an article by Henry M. Robinson the differences existing between the "recall" or working vocabulary and the "recognition" vocabulary are adequately discussed. A quotation from Mr. Robinson concerning the comparative size of vocabularies follows:[1]

> " By a complicated experiment carried on by Dr. E.L.Thorndike, the distinguished psychologist of Columbia University, the recognition vocabulary of the normal individual was found to be three times as large as the working vocabulary."

In addition to a general vocabulary, there are vocabularies for each of the various kinds of occupations and professions, technical vocabularies. The business world uses words peculiar to itself, such as bond, interest, policy, and the like. Some of the words have different meanings under conditions in other fields. There is a separate list of words in the scientific and technical fields. still other vocabularies similar to these might be enumerated; those of government, religion, politics, and education. The ones most pertinent to this discussion, however, are the speaking or working vocabulary and the recognition vocabulary used in reading.

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1 Henry M. Robinson, "What's The Good Word?" in AMERICAN MAGAZINE, vol.111, No.3, p.36 (March 1931)

The word list drawn upon when writing is much larger than the one used when speaking. A larger number of different words are used in writing the description of an incident than when the same thing is given orally. The general reading vocabulary of the average person increases again over that of the writing word list. The meanings of many words that are never spoken or written by an individual are understood well enough to be included in his reading vocabulary. One of the problems confronting teachers is that of enlarging the writing and speaking vocabularies of children as well as the general reading vocabularies. Professor E.L.Thorndike, according to Edgar Dale[2], states that both a knowledge of the importance of words and of their difficulty are factors in teaching word meanings. The teacher meets many new words in the teaching of every lesson; words that are new to the pupils. The question as to whether all of them or just a few of them should be taught so as to make them a part of the child's vocabulary presents itself to the teacher. Doctor Thorndike's book, "Teacher's Word Book", published in 1921 with a second edition in 1927,[3] is valuable to the teacher for evaluating words and helping to teach word meaning. It contains a list of 10,000 words selected from 41 different sources: from newspapers, literature for children, the Bible, English classics, elementary school text books, and books about sewing, cooking, farming, and the trades. Each word is classified according to the importance of the word; how widely it is used and on the frequency

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2 Edgar Dale, "Evaluating Thorndike's Word List", in EDUCATIONAL RESEARCH BULLETIN, Bureau of Educational Research, Ohio State University, Columbus, Ohio, vol.X, No.17, November 25,1931,p 451.

3 E.L.Thorndike, Teacher's Word Book, Teachers College, Columbia University, 2nd edition, 1927, 134 pp.

of the use of the word.

A second book by the same author has recently been published. Twenty thousand words were included in this last book, "Teacher's Word Book of Twenty Thousand Words", published in 1931 by the Teachers College, Columbia University.

Professor L.M.Terman of Leland Stanford University holds that there is a high correlation between the vocabulary of a pupil and his intelligence. In one of his books, he says:[4]

> " That it (the vocabulary test) measures general intelligence rather than special ability is shown by the high correlation of the vocabulary score with the Binet-Simon mental ages."

He states that when the vocabulary test alone is given and evaluated that the mental age so obtained is not far from the one found by using all of the Binet-Simon test.

In an article by Professor Terman and others, the significance of the vocabulary is further shown. Facts are brought out in this study that show the high correlation of vocabulary and intelligence. Quoting from the summary:[5]

> " For a miscellaneous group of 631 school children the correlation between vocabualry and mental age is .91. The probable error of a mental age based upon the vocabulary alone is only 9.6 months ..... Children of a given mental age have approximately the same vocabulary regardless of chronological age."

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4 L.M.Terman, Intelligence of School Children, p 309, Houghton Mifflin Company, New York, c1919, 317 pp.

5 L.M.Terman and others, "The Vocabulary Test as a Measure of Intelligence," in JOURNAL OF EDUCATIONAL PSYCHOLOGY, vol.9, pp 452-466 (October 1918).

THE RESULTS FOUND IN THE SURVEY

Table 5 contains the median scores of the pupils in the county for this test and the norms for the various grades. The same items are shown in the graph in Figure IX. The graph shows the comparison more readily than the table.

TABLE 5

Showing the Number of Pupils in Each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the Pupils in the County on Test No. 2, Word Meaning.

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
II	295	14	17
III	277	30	25
IV	324	48	46
V	295	63	56
VI	283	74	67
VII	284	82	77
VIII	275	90	85
Total	2033		

In test No.2, it is found that all the median scores of the county were below the norm, except that for the second grade, which was three points above. The fourth grade was below the average 2 points, while three grades: the third, the seventh, and the eighth, were 5 points below. The other two grades, the fifth and the sixth, lacked 7 points of reaching the norm. This was nearly a grade below those levels. The grades on the whole ranked farther below the standard on this test than they did on the first test.

By reference to the Educational Profile Chart* the median scores show the following retardations for the several grades:

Grade 2 -- School grade not shown
Grade 3 -- retarded 2 months
Grade 4 -- retarded 1 month
Grade 5 -- retarded 6 months
Grade 6 -- retarded 6 months
Grade 7 -- retarded 7 months
Grade 8 -- retarded 6 months

MEDIANS OF THE SCHOOL DISTRICTS

In this test, as in the first test, the medians in the individual school districts must be found so that the grades or classes and the schools whose medians were inferior can be singled out. Since all the grades, except the second were below the standard, the schools having low scores must be found and the pupils in these schools be given special instruction in vocabulary building if the testing program is to be of any benefit. It is in the school grades that were low that more attention to word meaning should be given. Table 6 shows the median scores of the districts, by grades. If no median is given the school had no pupils in the grade. The medians are also shown in the graphs in Figures X-XVI. Each grade is shown in a separate graph. School districts not having a particular grade are omitted from the graph. The county median and the norm are given in the graphs so that comparisons can be readily made for each school. The graph for each grade should be examined, as in the previous test.

In Figure X the medians for the second grade in each school district are shown. Many of the schools had medians of 3. One school, District 33, had a median score of 46 which was the highest score of the group. District 10 had the second highest

* See test booklet, op.cit.

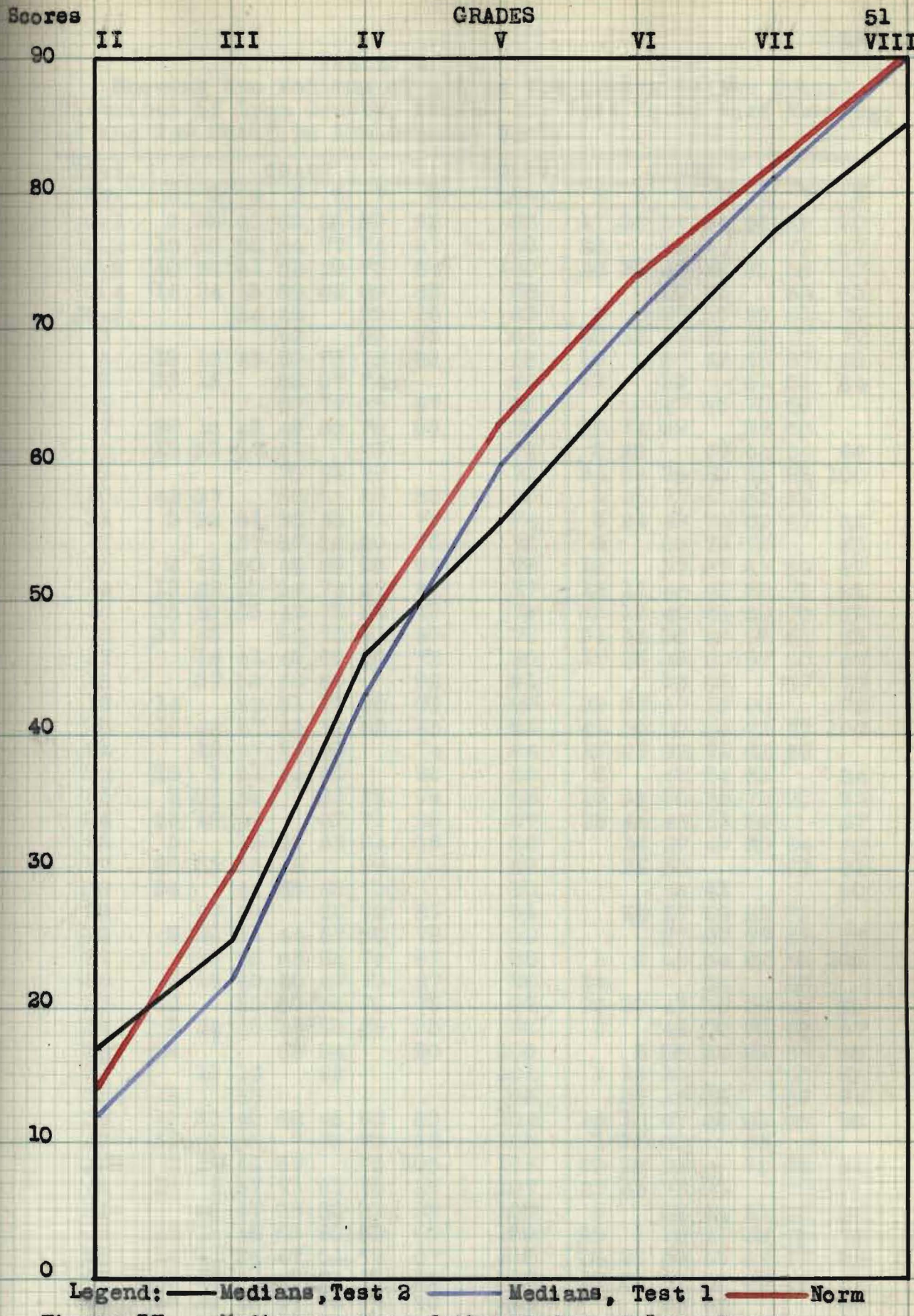


Figure IX. Median scores of the grades of Lyon County, Kansas, for Test No. 2, Word Meaning, of the New Stanford Achievement Test in comparison to the norm.
(Medians for Test 1 are added so that the results of both Reading tests may be compared with the norm.)

TABLE 6

Showing the Medians of all of the grades in the School Districts of Lyon County, Kansas for Test No.2, Word Meaning, of the New Stanford Achievement Test.

Dist. No.	GRADE 2	3	4	5	6	7	8
C.1	3	22	46	62	68	80	82
C.2	16	28	52	64	77	74	87
C.3	10	22	51	62	69	73	84
C.4	16	24	43	65	69	69	88
Jt.3			34	45		80	98
3				58		80	93
4	19	18	43	60	75	75	83
5	23	13		52	57	74	
6				67	77	85	87
7	29	18	43	48	85	78	90
8	19	32	47	41		89	
9				70	63	79	
10	42	37		66	68	83	80
11	3	22	51	56	65	71	73
12			57	67	58	80	76
13	3	15	50	45	69	93	94
14	13	22	30	54	72	67	84
15	15	20	35	42	75	64	79
16	31	43		52	75	61	80
17		16	41	40	66	80	72
18		37	52	50	89		92
19	14		22	51	77	80	70
20	18	23	47	63	70	83	85
21		19	47	62	69		74
22	25	3	51	43	80		80
23	3	53	52		93	78	92
24	23	19	25		67	79	89
26	3		35	55	55	84	85
27	29	33	33	63		69	
28	33		44	68	69	70	
29		27	49		80	72	87
30	3	19	51	44	57	80	79
31		22	52	63	66	78	92
32	3	18	40	40	47	70	87
33	46		58	80	64	78	75
34	3	24	33	56	52	69	85
36	29			66	54		90
37		18	33		68		
38	19		45				
39	13	33	40	62	45	55	80
40	39	43	55		78	73	86
40E	3	16	41	57		73	105
42	10	3	57	71	80	76	87
43		46	47	63	80	82	98
44	16	13	45	63	60	55	85
45	14	24	34	47	51	79	87
47	3	13		49	68	72	82
48	16	20	43	47	75	74	80
51	3	16	44	59	60	79	114
53	13	31	37	63	73	83	100
54	3	29	47	49	69	63	77
55	17	31	50	55	85	78	87
56		58	52		77		87
57		16	55		74		87

Dist. No.	GRADE 2	3	4	5	6	7	8
58	17	26	54	64	68	85	90
59	28		52			72	87
60	26	33	44	49	68	58	87
62			53	63		62	83
63	3		37	37	72	61	78
64	10	12	37	52	42	77	77
65	19		57	49	62	87	69
66	22		33		51	53	84
68			47	45	72	89	
69	35	14	39		57	66	
71	3	20		47	64	64	68
72	24	24	38	52	63	85	100
73	3	25	77	47	53	82	
74	3	24	42	72	62	67	82
75	3		35	72	72		85
76	18		37	67	57	80	87
77	13	17	48	42	63	72	82
78	23	13	40	48	60	70	89
79	31	34	38	48	68	61	83
80	12	28	42	52	67	80	87
81			35	53		87	77
82	22	37	47	70	90		92
83	41	50	50	64	73	77	107
84	19	27	52	71	62	89	
85	8		43	54	62		84
86	10	28	36	55	72	90	87
87	25	44	45	51	56		87
88		16	27	49	50	64	82
89		25	50			69	81
90			54	41			90
91		28	57	52	52	77	
92			57	67	77	87	77
95	3	3	45	54	67	68	105
96	24			55		62	
97	25	30	47	55	66	59	85
98	3		42	50	60	65	87
100		3	58	52	92	82	68
101	3	13	16			63	95
103		35	16	55		69	94
104	16	18	47	68	82	88	98
105	3	16	63		55		
106	29	25	25		76	86	86
107	27	43	77	93			
108	3		58	64	61	53	87
109	25	3	39	55	35	70	76
110	26	28	30	53	57	77	87
111	17	23	57	55	49	68	82
112			22	52			84
113	16		41	49	57		88
114					71	64	73
116	22		55	61		68	
117			55		54	58	95
118		27	41	58	61	78	71
St.J.	17	28	46	57	68	77	83

median score with 42 and District 83 was third with 41. The range of medians in this grade was 43, which was about the same as the range for this grade in Test No.1 which was 44. The quartile deviation, the Q, on this test for the grade was 10.89, according to Table 7. When compared with the Q for Test No.1, 7.28, it is noted that the deviation for the second test is much larger, hence a more widely scattered distribution of scores about the median on Test No.2 than on Test 1. Forty-eight of the eighty school districts that had a second grade had medians that were equal to or above 14 which is the norm for the grade. The county median, a score of 17, exceeded the norm in this test.

The median scores for Grade 3 for this test are shown in Figure XI. There was one district whose score was at the top of the group that was too far removed from the others to be shown on the graph, District 56 with 58. District 23 was second with 53, and District 83 had 50 for third highest. The low score was 3. It was the median for five schools; Numbers 22, 42, 95, 100, and 109. The range of medians for the third grade in this test was 55. This was smaller than that found in Test No.1 which was 58. It was more than the range in the preceding grade however. The Q for Test 2 was 8.36. This was a smaller number than the Q for grade 2.

The median scores of Grade 4 for each school district are given in the graph in Figure XII. These medians cover a range from 77 to 16, or 61 points. Two school districts, Numbers 73 and 107, had a median score of 77, which was too far above the other scores to be shown on the graph. There were two districts that made 16

as a median score: Districts 101 and 103. It was the lowest score in the group. The county median was 46 and the norm was 48 for this grade. The quartile deviation was 9.52 according to Table 7.

The graph in Figure XIII shows the median scores for Grade 5. The range in this grade was from a score of 37 to 93, covering 56 points. The Q was 8.18 which was the smallest in any grade on this test. District 107 had the highest median, 93, which was above the top of the graph. District 63 had the lowest score, 37. The second highest score was 80, made by the pupils in District 33, and the third place was held by two districts, Numbers 74 and 75, with a score of 72. The two highest scores were widely separated from the others in the group. At the lower end of the distribution the school with the score of 37 was not far from others in the group. Table 5 shows a county median of 56 and a norm of 63 for this grade.

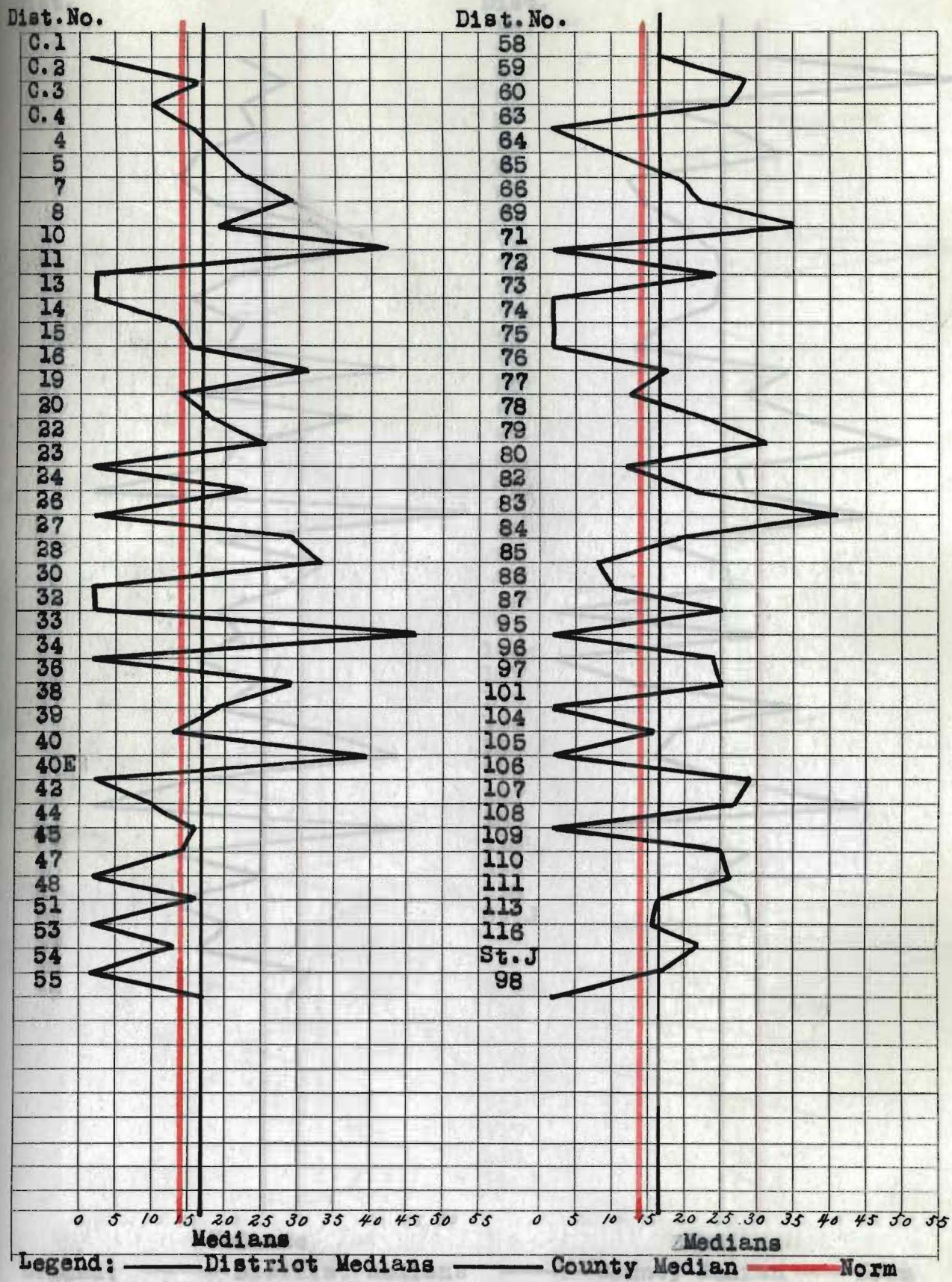
Figure XIV shows the medians for Grade 6. The lowest score was 35, made in District 109 and the highest score was 93 which was the median of District 23. The second highest score was 92, that of District 100. The scores of 92 and 93 extend above the graph. The range of medians was 58 points. The county median was 67 and the norm was 74. The Q was 8.56 which is about the same as the Q of the other grades on this test.

The graph in Figure XV contains the median scores for Grade 7. The scores in this group cover a range of only 40 points. The Q was 8.23, however. This shows about the same scattering of

scores in the middle 50% of the group as in the other grades. The extremes scores were closer to the median in this grade than in the others. The high score was 93, made in District 13 with District 82 second with a score of 92. District 108 and District 66 both had a 53 which was at the bottom of the group. The county median was 77 and the norm was 82 in this grade.

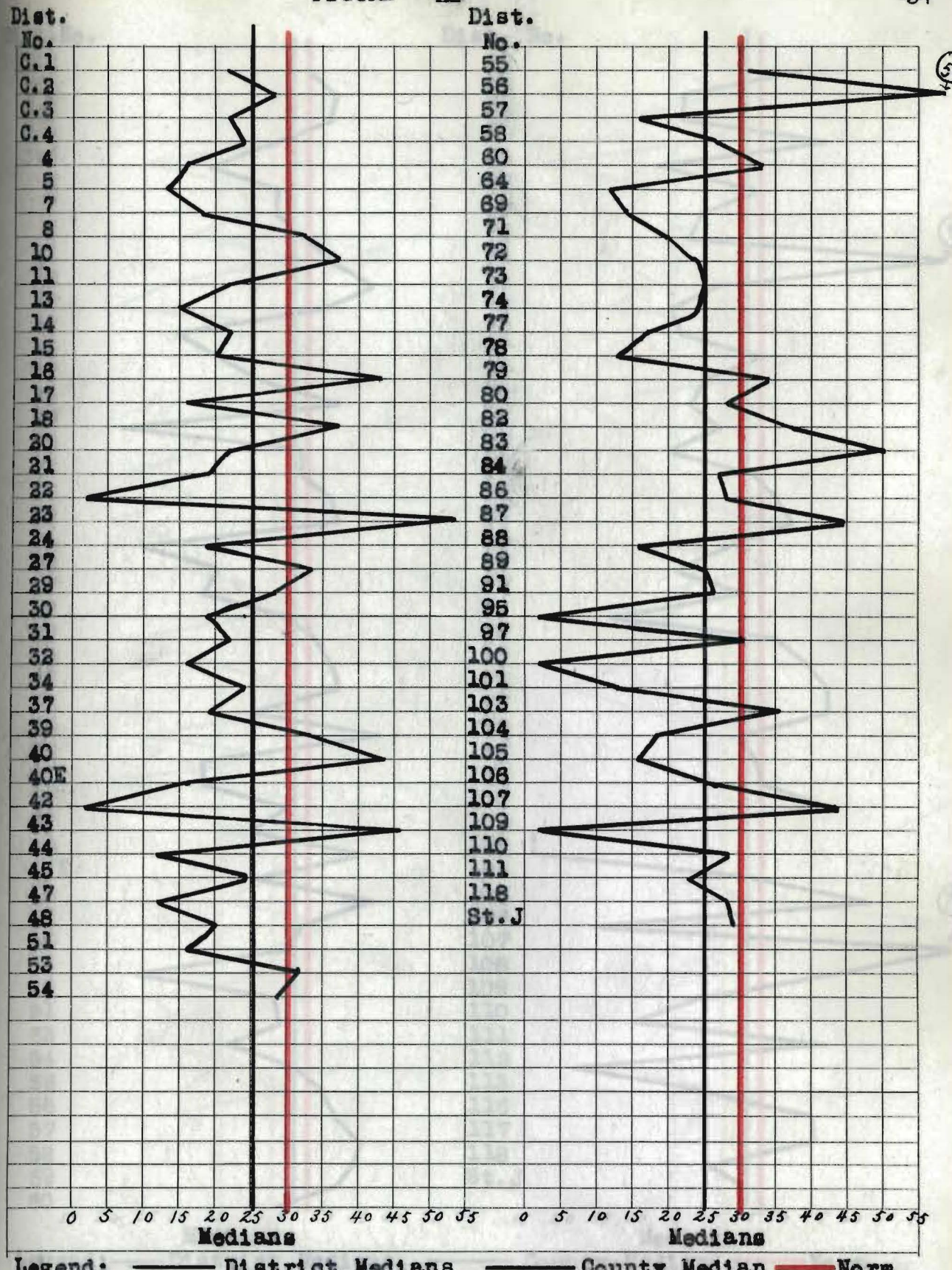
The eighth grade median scores are given in the graph in Figure XVI. They extend from a score of 114, the median for District 51, to a score of 63 which is the median for District 79. The county median is located at 85 and the norm at 90 for this grade. The Q was 8.32 and the range was 51.

If one school district is followed through the several grades, its relative standing in the group of schools in the county may be determined. Four districts, Numbers 33, 23, 83, and 107 were at the top in two different grades and were above the norm in the other grades. Some districts probably will rank low in all the grades. District 63 was among the lowest in this test in two grades and was quite low in all the other grades with but one exception. In the sixth grade this school was above the county median but still was below the norm. District 95 is another school that was low in several different grades. In the eighth grade, however, District 95 was considerably above the norm. District 101 ranked about the same as 95.



Showing medians of the second grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.2, Word Meaning, of the New Stanford Achievement Test.

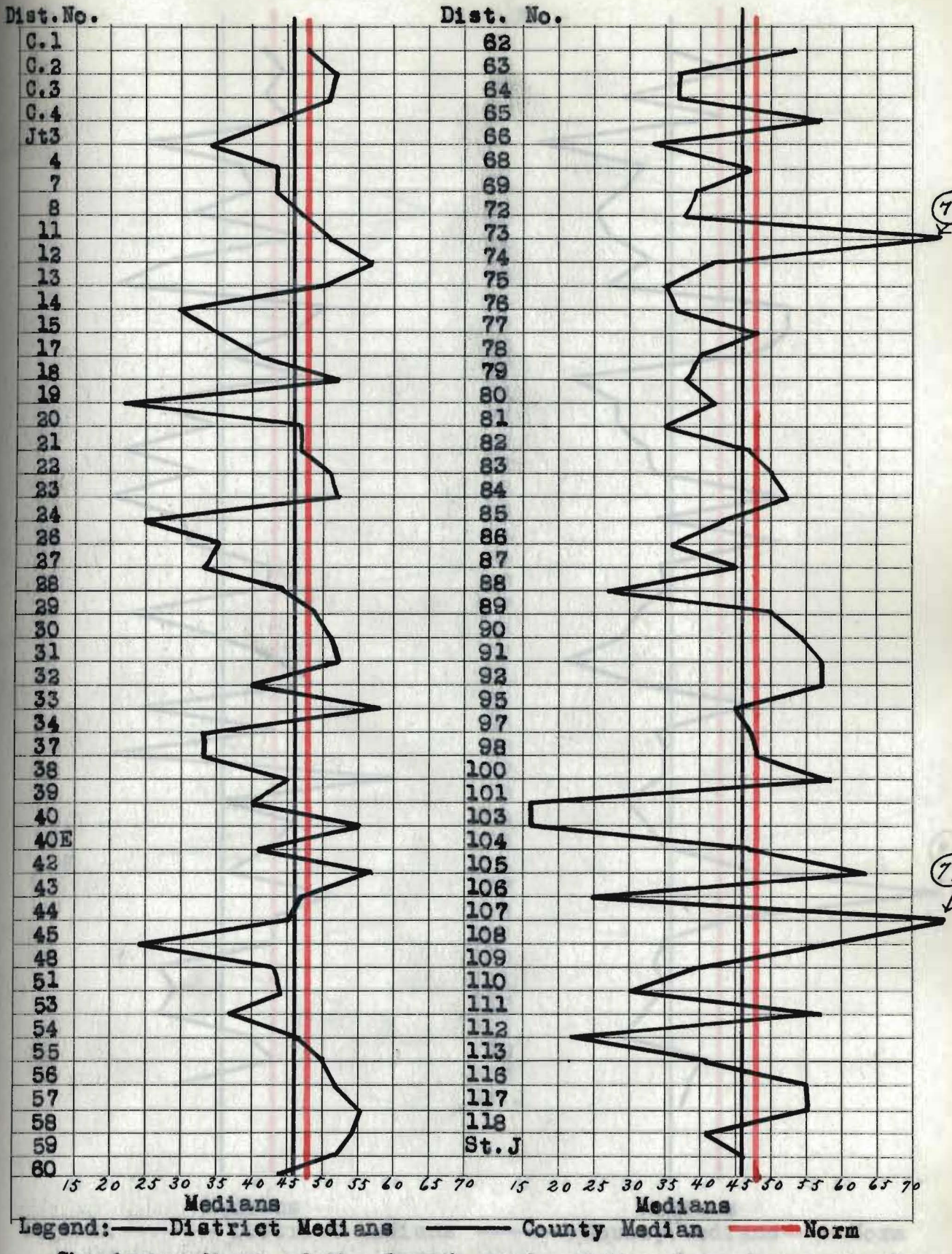
FIGURE XI



Legend: ——— District Medians ——— County Median ——— Norm

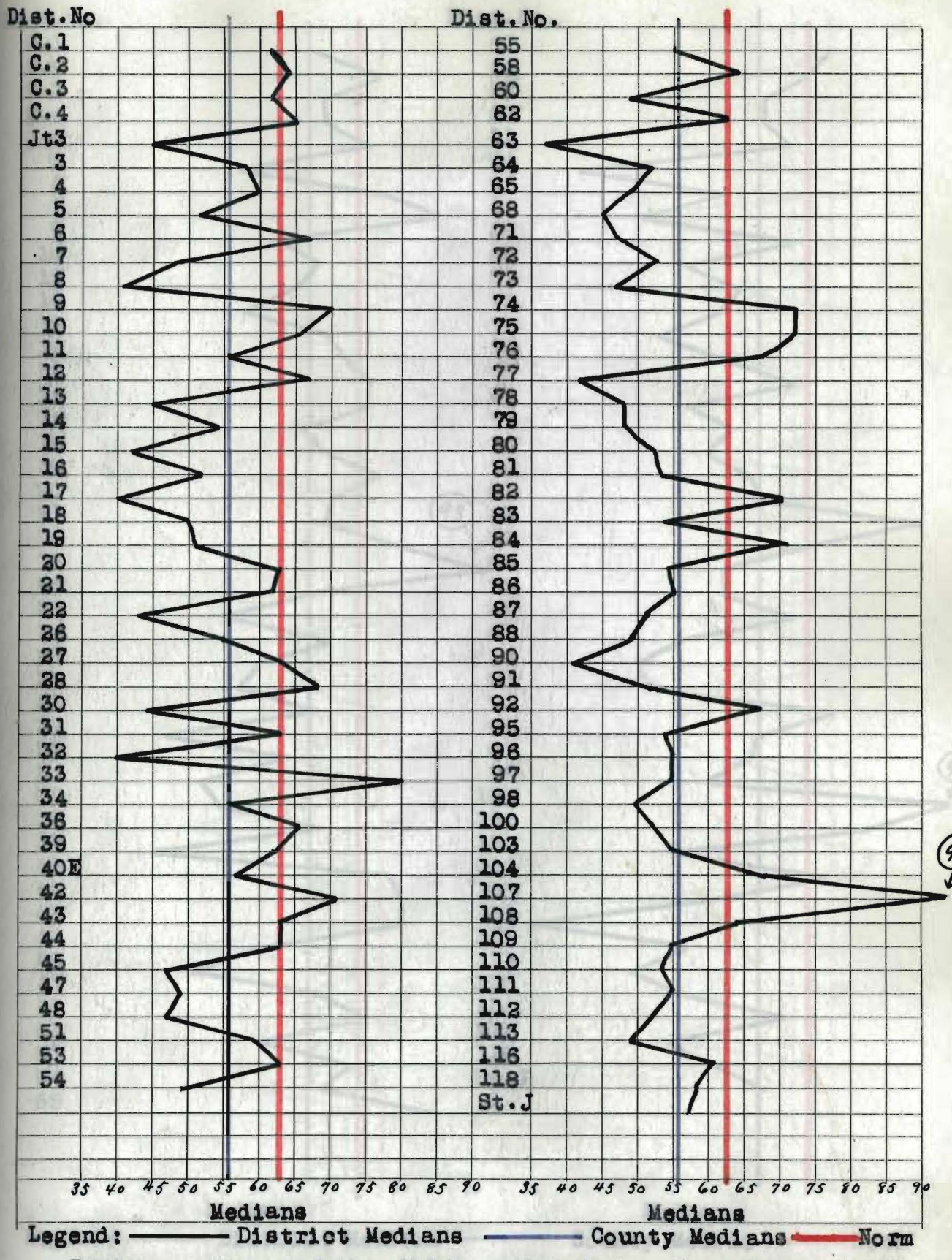
Showing medians of the third grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.2, Word Meaning, of the New Stanford Achievement Test.

FIGURE XII

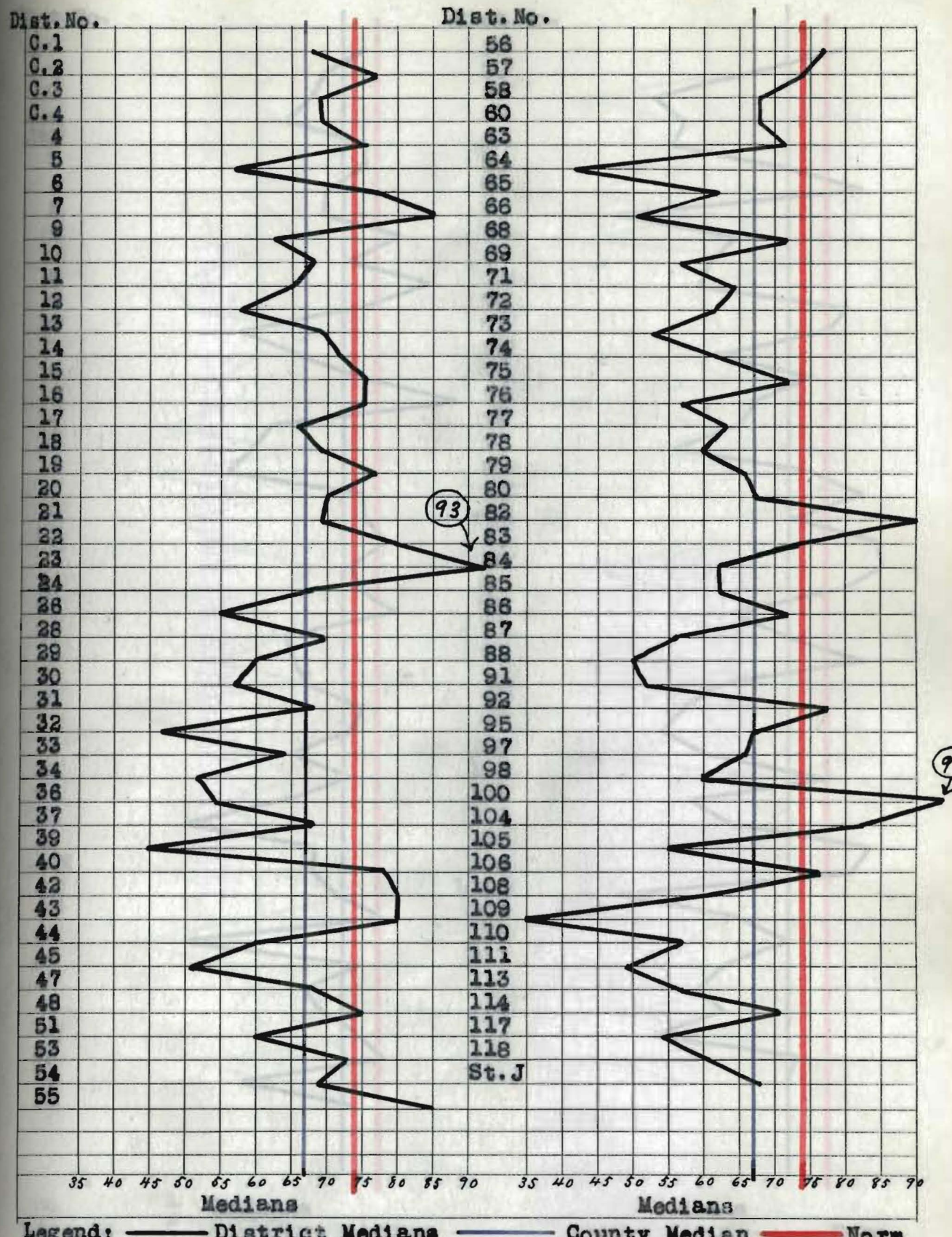


Showing medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.2, Word Meaning, of the New Stanford Achievement Test.

FIGURE XIII

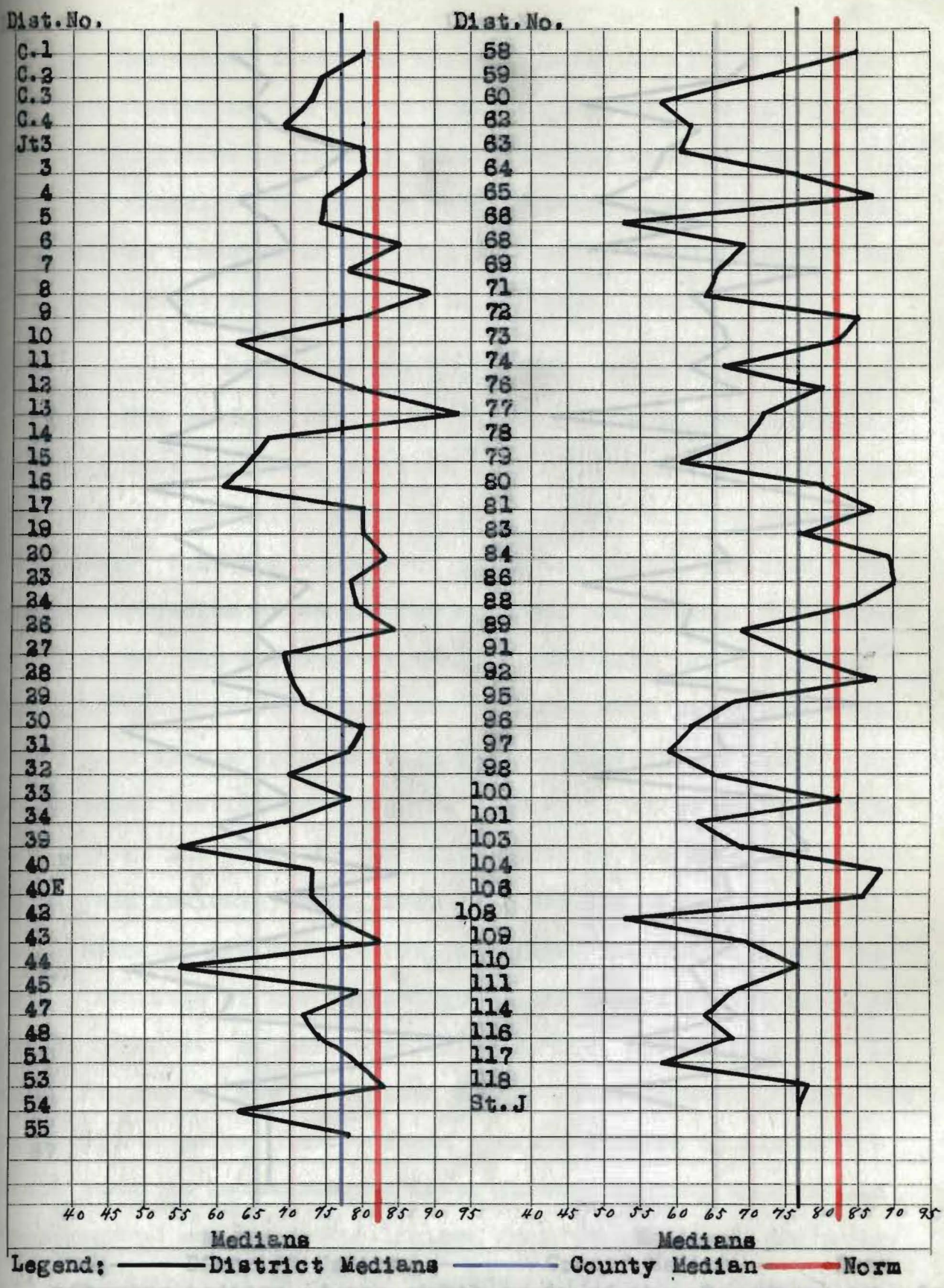


Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.2, Word Meaning, of the New Stanford Achievement Test.



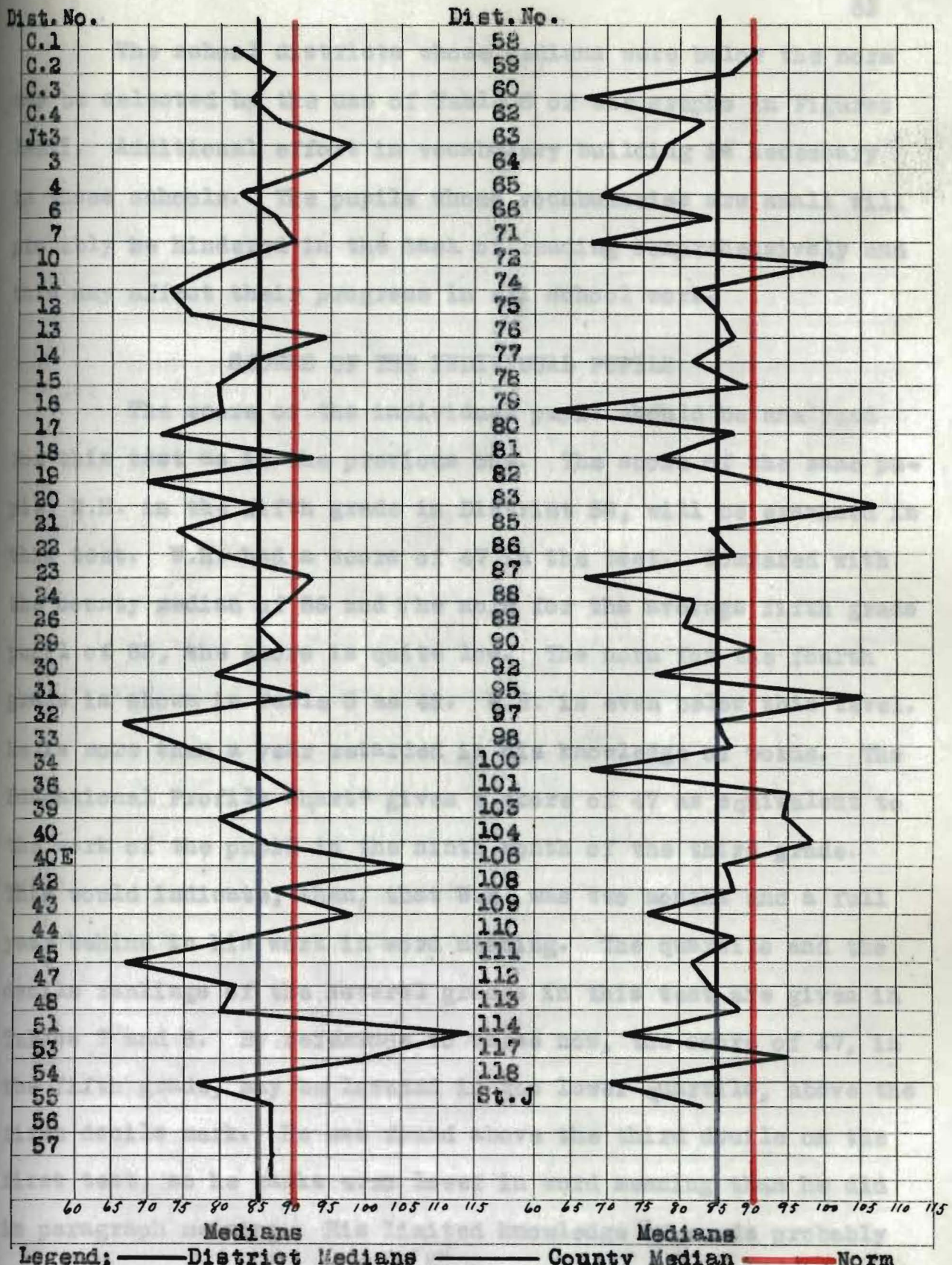
Showing medians of the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.2, Word Meaning, of the New Stanford Achievement Test.

FIGURE XV



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.2, Word Meaning, of the New Stanford Achievement Test.

FIGURE XVI



Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.2, Word Meaning, of the New Stanford Achievement Test.

The school districts whose medians were below the norm may be selected by the use of Table 6 or the graphs in Figures X-XVI. Additional effort in vocabulary building is necessary in these schools. The pupils whose vocabularies are small will probably be hindered in the task of reading comprehensively and this may affect their progress in all school work.

SCORES OF THE INDIVIDUAL PUPILS

The score of the individual pupil should be analyzed for this test as in the previous one. The score of the same pupil, W.H. in the fifth grade in District 58, will be examined in this test. W.H. had a score of 47 in the test. Compared with the county median of 56 and the norm for the average fifth grade pupil of 63, the score is quite low. The norm for the fourth grade is shown in Table 5 as 48. W.H. is even below this level. He is more than a year retarded in his knowledge of words. The Educational Profile Chart* gives a score of 47 as equivalent to the work of the pupil in the ninth month of the third grade. This would indicate, then, that W.H. was two months and a full year behind in his work in word meaning. The quartile and the decile rankings of the several grades in this test are given in Tables 7 and 8. By reference to these now, the score of 47, in the fifth grade, may be located in the lower quartile, above the first decile mark. He was found above the third decile on the first test, so he ranks even lower in word meaning than he did in paragraph meaning. His limited knowledge of words probably was a contributing factor to his low standing in understanding the meaning of a given selection.

Table 7

Showing the Quartiles and the Quartile Deviations of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.2, Word Meaning, of the New Stanford Achievement Test given in September,1930

	GRADE						
	2	3	4	5	6	7	8
Third Quartile	26.18	34.42	55.44	65.71	77.08	84.12	93.95
Median	17.26	25.38	46.30	57.79	67.34	77.04	85.27
First Quartile	3.82	17.70	36.39	49.36	59.98	67.68	77.30
Quartile Deviation	10.69	8.36	9.52	8.18	8.56	8.22	8.32

Table 8

Showing the Decile Ranking of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.2, Word Meaning, of the New Stanford Achievement Test.

	GRADE						
	2	3	4	5	6	7	8
9th Decile	32.20	41.72	62.71	74.03	84.28	91.08	102.21
8th Decile	27.08	36.45	57.24	68.17	78.90	85.84	96.30
7th Decile	23.76	32.15	53.35	63.88	75.27	82.73	91.69
6th Decile	19.58	28.49	48.30	60.74	70.64	79.94	88.19
5th Decile (Median)	17.26	25.38	46.30	57.79	67.34	77.04	85.27
4th Decile	13.84	23.80	42.76	54.87	65.41	73.89	82.45
3rd Decile	12.24	18.70	38.64	51.09	61.42	70.16	79.45
2nd Decile	3.46	16.58	33.76	47.86	57.60	65.14	75.16
1st Decile	2.73	13.34	26.91	44.50	51.66	60.69	65.71

THE PUPIL'S STANDING IN HIS OWN CLASS AND IN THE COUNTY

The scores of the fifth grade in District 58 for Test No.2, Word Meaning were:

83	64
75	62
72	60
70 Third Quartile	60 First Quartile
70	56
69	56
67	52
66	47 —Score of W.H.
64 -- Median	Total 17

The median of the grade is 64. As shown in Table 5, the median of the county is 56 and the norm is 63 for this grade. The grade, then, ranks above both of these levels. It is so near the norm that it probably would be considered an average fifth grade. The first quartile mark of the grade was 60 which was above the median made by the county as a whole. This would indicate that three-fourths of this particular grade were above the average of the pupils in all the fifth grades of the county. Two of the pupils of this group, the two with the highest scores, 75 and 83, ranked above the norm of the sixth grade. The score of 83 exceeded the norm for the seventh grade by one point. These two pupils are much advanced in their knowledge of word meanings.

The score of W.H., the 47, was at the bottom of his class. Since the class was an average group, his standing was not changed when compared to the normal level of fifth grades. Other pupils and other classes may be compared in a similar manner.

RESULTS OF THE TWO READING TESTS

The graph in Figure IX also shows the median scores of the county for Test No.1, Paragraph Meaning, taken from the data in Table 1. The two tests in reading may be compared with the norm by the use of this graph. The second grade ranked above the norm in word meaning but below in paragraph meaning. This might indicate that the older method of teaching beginning reading still has a carry over. The word is the unit of study and attention, not the sentence or group of words. Children in this grade of course deal with words much more than they do with sentences. Both grades three and four also have higher scores on word meaning than on paragraph meaning, but the grades were below the standard in both tests. The other four grades: the fifth, the sixth, the seventh, and the eighth, all ranked lower on the test for word meaning than on the other test. All of these grades were below the norm in these tests except the eighth grade which had a median equal to the norm in the test on paragraph meaning.

On the whole, both tests in reading show that the pupils of the county were below the normal in both of these phases of reading. Such a condition demands the attention of the teachers in the county. Remedial measures for the teaching of reading should be sought out and applied. Since reading is the fundamental tool subject in school, the results of the teaching of this subject should be normal or above. If other subjects in the school curriculum depend upon reading as a first requirement, an added responsibility is placed upon the teacher in the teaching of reading.

SUMMARY

1. The test in word meaning measures word knowledge of the pupil.

2. The median score of the second grade was above the norm, three points.

3. All other grades had median scores below the norm for the grade.

4. The range of scores below the norm for these grades was from two to seven points. They show a retardation from one to seven school months.

5. In the comparison of the two reading tests, the medians of Grades 2, 3, and 4 in word meaning were above the medians of those grades in paragraph meaning.

6. The fifth, sixth, seventh, and eighth grades had median scores in paragraph meaning that were above the medians of those grades in word meaning.

7. The second grade was above the norm in word meaning but below the norm in paragraph meaning.

8. The eighth grade was at the norm in the test in paragraph meaning but below the norm in word meaning.

9. All grades except the second and the eighth were below the norm both in the test on word meaning and on paragraph meaning.

CHAPTER IV

TEST NO.3 -- DICTATION EXERCISE

THE TEST

This is a spelling test but is called a "dictation exercise" rather than a "spelling test" in order to relieve the strain and nervousness that attends a spelling test for some pupils. The measurement of the ability to spell words in sentences, the sentence method, is a more nearly correct method of judging spelling ability than the procedure of dictating a list of unrelated, single words. The pupils have a need for spelling words when writing sentences. If they are able to write the words correctly when they use them, it is a good indication of their spelling ability.

In the dictation in this test most of the words used count toward the pupils' spelling scores. Less time is consumed in testing when this is done than when only one critical word is used in a sentence. In every sentence used in the dictation above the second grade level, three critical words are used. All of the exercises are counted in the test but the scoring is arranged so that the upper grades need not write all the sentences. Pupils in the advanced grades are given full credit for the words in the test below the point where they begin to write. The sentences that are used for the dictation may be found in the appendix, in the pamphlet, "Directions For Administering"

A few sentences will be given here to show the nature of the test:

1. The agent is the brother of the banker.
2. The gem is probably a novelty.
3. Eliminate disgusting controversies.
4. The Chancellor has rheumatism and pneumonia.

The words used in the exercises were taken from the following spelling lists: Ayres, Buckingham, Horn-Ashbaugh, and Seven-S. Quoting from the "Guide for Interpreting":[1]

> "The difficulty of the exercises ranges in terms of the "78" units of difficulty from 20 in the second grade to difficulty 75 in the ninth grade."

It was in the subject of spelling that much of the pioneer work in the movement of educational measurement was done. Through the work in this subject, along with Arithmetic and with Reading, measurements developed and improved. Spelling readily lends itself to objective scoring. A word either is correctly or incorrectly spelled. Hence it is quite easy to obtain accuracy in scoring. Spelling tests were found among the first of educational tests due to the objective scoring factor.

In the early tests and, in fact, in most of the ordinary tests given by teachers today each word is given equal weight. In a list of twenty words each incorrectly spelled word deducted five per cent from a grade of 100. The tests used by Dr. Rice, mentioned in Chapter I as a measurement for spelling ability, considered all words of equal importance.

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1 T.L.Kelley, G.M.Ruch, and L.M.Terman, Guide for Interpreting, New Stanford Achievement Test, p.6, World Book Company, New York, c1929, revised edition, 15 pp.

Word difficulty is another important factor that must be taken into consideration in the discussion of spelling ability. The old time spelling matches had little concern about average spelling ability. The relative average of the two sides did not determine the outcome. The side having the best speller in the crows usually won. Words of average difficulty did not decide the victory either. The match made use of the "hard" words in the "back of the speller." The investigation of Professor Thorndike, as related by Trabue,[2] with the words used by Dr. Rice in his tests, shows the frequency with which each word had been misspelled in an actual trial with children in a fifth grade and demonstrates that not all words are equally important as measures of spelling ability. Many words that are seldom, if ever, found in the written or spoken vocabularies of school pupils were used in the early tests and in the "spelling bees". The importance of a word depends both upon the difficulty of the word and on the frequency with which school children will find a use for it in their daily work.

The best testsnow in use for measuring spelling ability are builded on the last factor mentioned. The quotation from Pressey and Pressey is to the point here:[3]

> " The best tests are based on very careful research as to the fundamental objectives in the subject concerned, and the material is selected with reference to its importance for these objectives. Thus spelling tests are based on very careful and extended investigations as to words actually used most commonly by adults and by children, in written work. The tests are made to include only words which people frequently need to spell."

2 M.R.Trabue, Measuring Results in Education, p 139, American Book Company, New York, c1924, 492 pp.
3 S.L.Pressey and L.C.Pressey, Introduction to the Use of Standard Tests, p.9, World Book Company, New York, 1931, 366 pp.

The words for the Ayres Spelling Scale were found by determining the most frequently used words in business letters, newspapers, and children's compositions. These are the words that children should know how to spell. The scale includes a thousand words. Monroe, DeVoss, and Kelly[4] say that the list is the "best statement which we have of the words that form the core or foundation of the English language." The difficulty of the spelling of the words in the scale was determined by actual spelling of the list by school children. In all, seventy-thousand children spelled twenty words each, making a total of 1,400, 000 spellings, or an average of 1,400 spellings for each of the one thousand words.

The Iowa Spelling Scales by Ashbaugh and other lists have been derived on much the sam general plan.

B.R.Buckingham has added to the Ayres Spelling Scale. The extension includes 505 new words. They were not chosen in the same manner, however, and are for the most part more difficult than those in the original scale. They were taken according to agreement among spelling books.

In writing letters, compositions, or the like the spelling of the words used should be carried on in the margin of the attention so that the ideas being expressed may occupy the focus of attention. Spelling ability, then should measure the ability of the child to write the most frequently used words without special attention to the act of spelling. This is the plan used in the dictation exercises of this test. The pupils were not

4 W.S.Monroe, J.C.DeVoss, and F.J.Kelly, op. cit., p.207.

aware that the sentences given contain words which composed a spelling test. By such a procedure, the spelling ability that the child uses in his daily work is the one that is measured.

RESULTS OF THE TEST

TABLE 9

Showing the Number of Pupils in each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the Pupils in the County on Test No.3, Dictation.

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
II	295	14	8
III	277	30	26
IV	324	48	48
V	295	63	58
VI	283	74	68
VII	284	82	80
VIII	275	90	86
Total	2033		

Table 9 shows the median scores of the pupils in the schools of the county in the several grades for the spelling test. The number of pupils in each grade and the norm for each grade are also shown. The graph in Figure XVII shows the norm and the median for each grade. It may be noted that the median of the fourth grade was exactly the same as the norm for that grade, 48. The median scores for all the other grades were below the standards set for the various grades. The seventh grade was two points low. The third and the eighth grades lacked four points of reaching their respective norms. Grade 5 was five

points lower than its norm, and the other two grades, the second and the sixth, were six points below the norms. None of the grades had median scores that were above the norm on this test.

Referring to the Educational Profile Chart* the medians of the various grades show that the pupils were retarded in spelling, according to this test, as follows:

Grade 2 -- School grade not shown
Grade 3 -- Retarded 2 months
Grade 4 -- Normal
Grade 5 -- Retarded 4 months
Grade 6 -- Retarded 5 months
Grade 7 -- Retarded 3 months
Grade 8 -- Retarded 5 months

MEDIANS OF THE VARIOUS SCHOOLS

The medians of the grades in the school districts are given in Table 10. The scores above which and below which one-half of the pupils in each grade in every school district were found are shon in the table. Many of the schools did not have pupils in all grades as is indicated by the omission of the median. Each score may be compared to the county median and to the norm. Results that were inferior to the standard were found in the grades in the schools with median scores below the norm. The pupils in these grades need help with their study of spelling. The graphs in Figures XVIII-XXIV show the median scores of Table 10 in relation to the county median and the norm. Each graph has but one grade. If a school district had no pupils in a grade, it is not included in the schools shown on the graph.

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* See test booklet, op.cit.

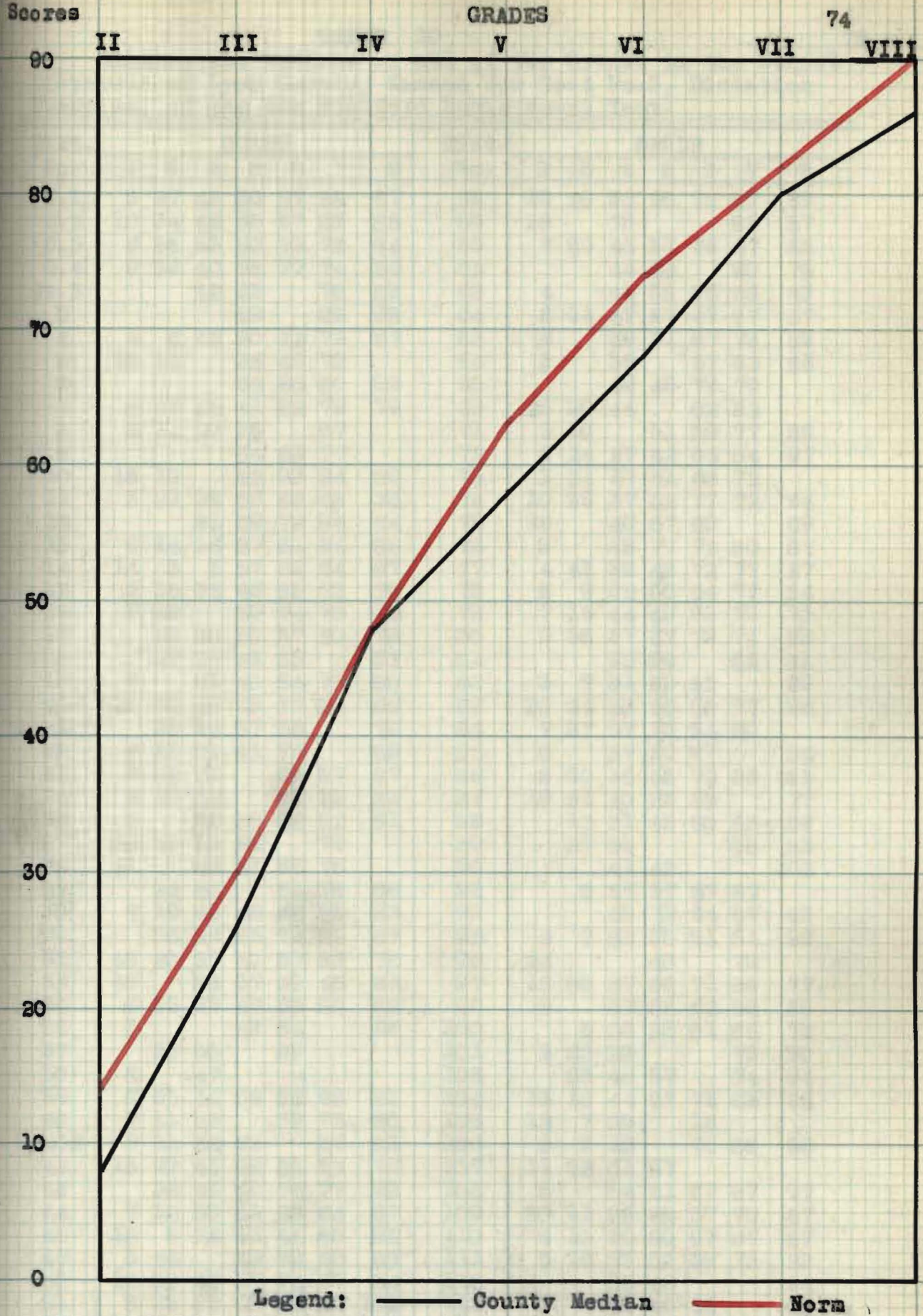


Figure XVII. Median scores of the grades of Lyon County, Kansas, for Test No. 3, Dictation Exercise, of the New Stanford Achievement Test in comparison to the norm

TABLE 10

Showing the Medians of all of the Grades in the School Districts of Lyon County, Kansas for Test No.3, Dictation Exercise, of the New Stanford Achievement Test.

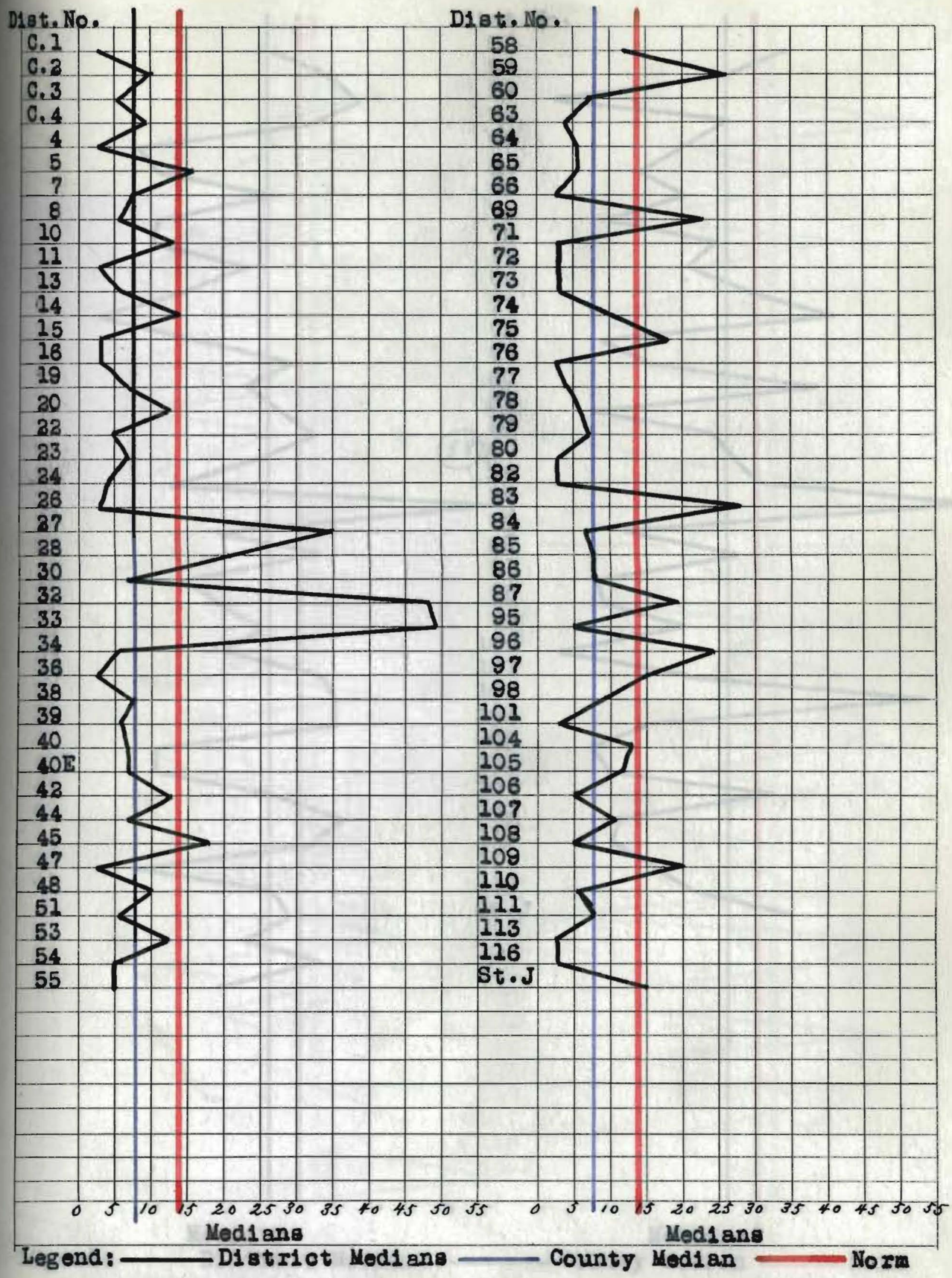
Dist. No.	GRADE 2	3	4	5	6	7	8
C.1	3	27	48	60	67	88	87
C.2	10	34	46	65	67	83	86
C.3	8	38	53	62	73	78	84
C.4	9	32	40	65	77	74	86
Jt.3			42	32		78	83
3				69		82	98
4	3	8	36	50	72	72	87
5	18	11		36	49	78	
6				62	65	80	92
7	8	27	25	41	82	79	79
8	8	11	20	38		87	
9				84	83	77	
10	13	10		63	93	84	80
11	3	23	38	53	68	68	76
12			21	59	72	94	84
13	6	14	26	57	61	84	86
14	14	3	3	57	63	64	87
15	3	15	35	42	85	72	79
16	3	29		33	74	72	78
17		23	20	30	37	20	78
18		27	51	43	85		97
19	7		21	40	64	72	80
20	13	32	43	69	77	84	85
21		25	32	57	68		78
22	5	13	21	41	74		66
23	7	58	55		85	87	87
24	4	19	32		81	92	83
26	3		25	55	62	82	81
27	35	33	19	81		77	
28	21		42	81	65	75	
29		14	44		51	72	88
30	7	19	48	42	65	83	83
31		25	38	63	71	82	87
32	48	20	57	40	57	82	78
33	49		26	37	59	48	81
34	6	33	23	48	58	85	82
36	3			43	54		66
37		35	30		69		
38	8		47				
39	6	35	44	58	56	66	83
40	7	11	53		59	73	80
40E	7	11	28	22		37	93
42	13	27	45	69	81	77	77
43		36	45	61	74	77	93
44	7	32	59	61	62	64	97
45	18	8	24	53	44	80	82
47	3	26		49	70	69	87
48	10	28	43	57	74	77	84
51	8	23	33	63	64	80	106
53	13	33	42	62	77	84	100
54	5	19	39	58	61	57	117
55	5	34	47	58	72	82	84
56		27	55		62		93
57		3	53		71		85
58	12	28	58	65	76	87	89
59	26		73			83	87
60	7	30	46	51	76	67	85
62			44	64		69	76
63	4		46	38	76	66	83
64	6	14	47	57	47	87	87
65	6		69	51	67	79	82
66	3		36		57	65	86
68			49	49	79	70	
69	23	20	44		62	82	
71	3	10		31	69	77	88
72	3	24	27	42	85	84	97
73	3	21	57	51	55	73	
74	10	29	37	62	77	72	94
75	18		40	67	82		89
76	3		22	77	72	80	87
77	4	41	32	42	72	77	87
78	6	9	25	36	54	77	84
79	7	15	44	49	59	73	73
80	3	38	37	57	73	74	82
81			15	38		85	81
82	3	7	31	62	82		99
83	38	24	53	56	68	77	96
84	7	27	57	73	64	80	
85	8		37	60	77		84
86	8	30	35	58	72	83	85
87	19	61	40	53	62		77
88		12	21	48	60	85	88
89		27	53			88	83
90			41	42			102
91		8	57	37	57	87	
92			52	72	84	87	83
95	5	9	62	39	51	54	92
96	24			40		72	
97	15	20	57	55	71	68	77
98	9		27	56	62	68	89
100		3	53	53	91	86	78
101	3	20	23			70	90
103		53	46	57		74	94
104	13	15	44	67	76	86	88
105	12	7	50		18		
106	5	9	15		70	85	86
107	11	32	61	57			
108	5		54	61	57	87	97
109	20	11	28	48	57	75	87
110	6	10	29	60	57	87	87
111	8	16	63	53	39	75	82
112			25	46			84
113	3		48	40	68		96
114					73	78	81
116	3		51	44		80	
117			35		50	61	96
118		21	38	63	68	70	83
St.J.	15	35	48	65	69	75	86

In Figure XVIII is the graph for Grade 2. District 33 had a median of 49 which was the highest score in the group. District 32 had a score of 48 for second place. These two schools were more than 10 points higher than others in the group. The lowest median score in this grade was 3 which was the median for several districts. Only sixteen schools had medians that were equal to or above the norm of 14. The county median was 8. The median scores ranged from 49 to 3, or 46 points. Table 11 shows the quartile deviation was only 5.26. These measures indicate closely compact scores in the whole distribution.

The median scores for the third grade are shown in the graph in Figure XIX. In this grade there were three schools with medians at the top of the group: District 103 with a score of 53, District 23 with 58, and District 87 with the highest median of 61. Two of these extend above the graph. The low score was 3, made by Districts 57, 100, and 14. The norm for the grade was 30 and the county median was 26. The range in the grade was 58, from 61 to 3. The Q was 11.28 which was more than twice the Q in the preceding grade.

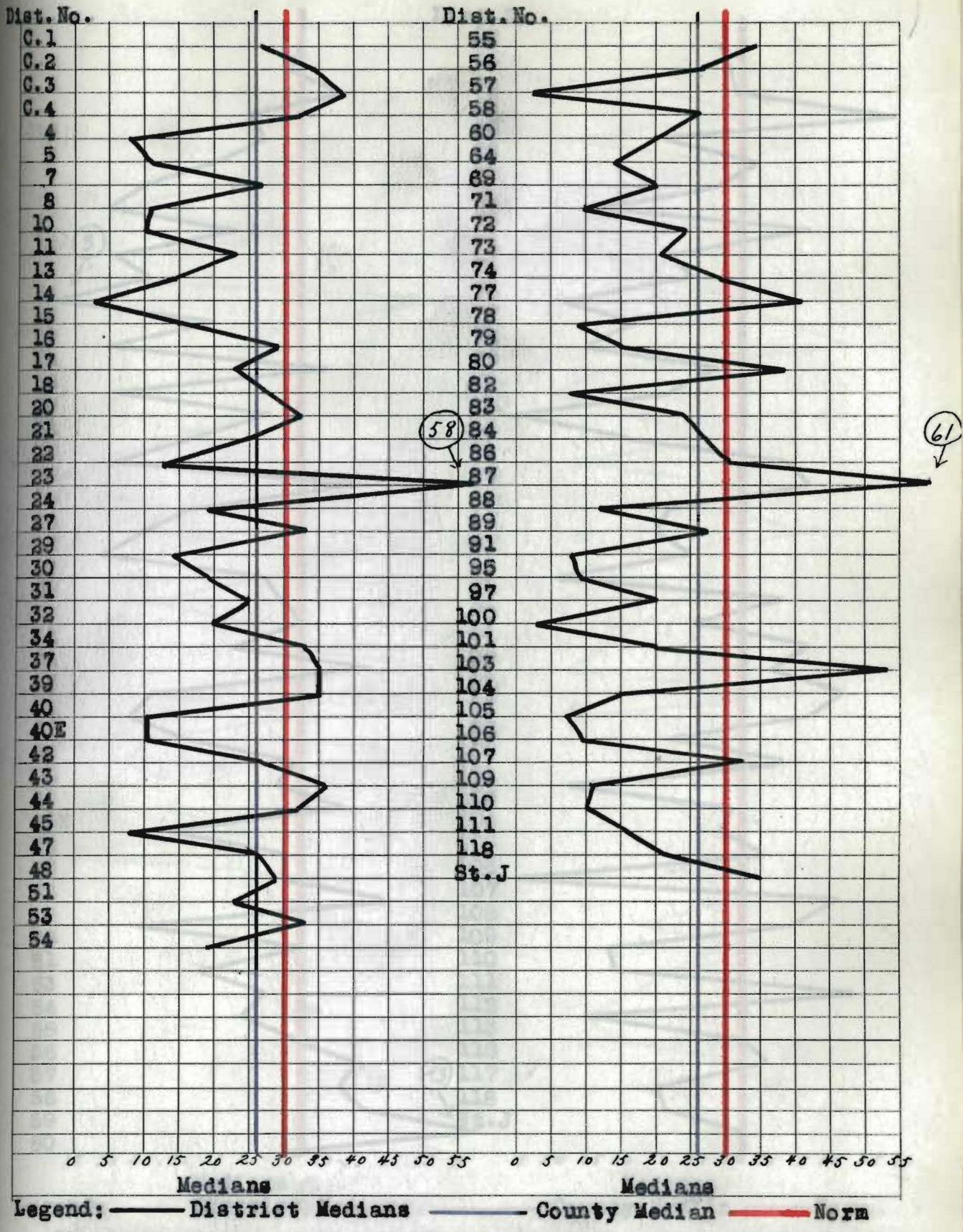
Grade 4 had medians as shown in Figure XX. The highest score, 73 for District 59, and the lowest score, 3 for District 14, were both too far removed from the others in the grade to show on the graph. District 65 had a median of 69 which was second from the top. Districts 81 and 106 had a median of 15 which was next to the lowest score. The range was 70 and the Q was 11.6 for the grade.

FIGURE XVIII

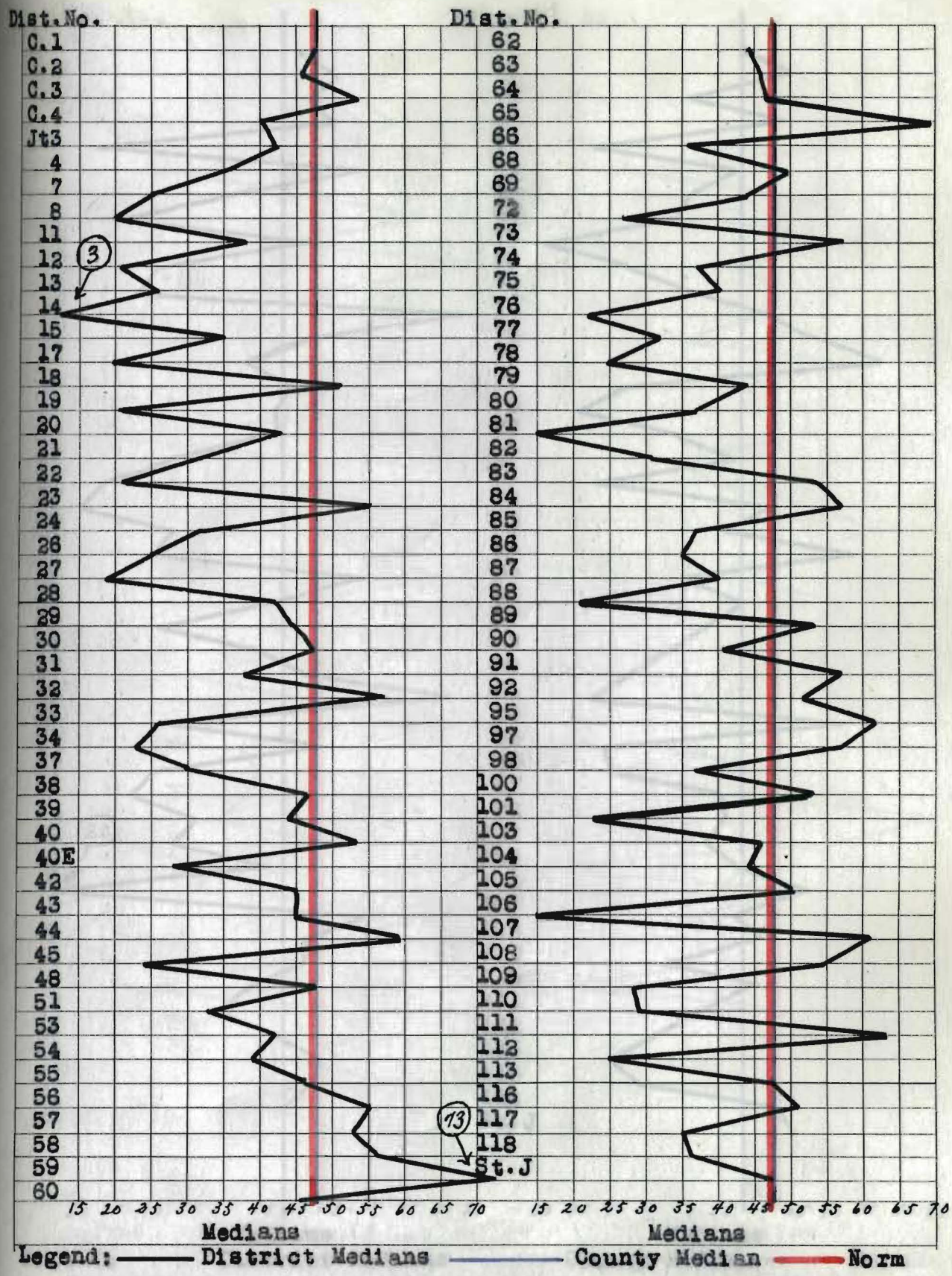


Showing medians of the second grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.3, Dictation Exercise, of the New Stanford Achievement Test.

FIGURE XIX

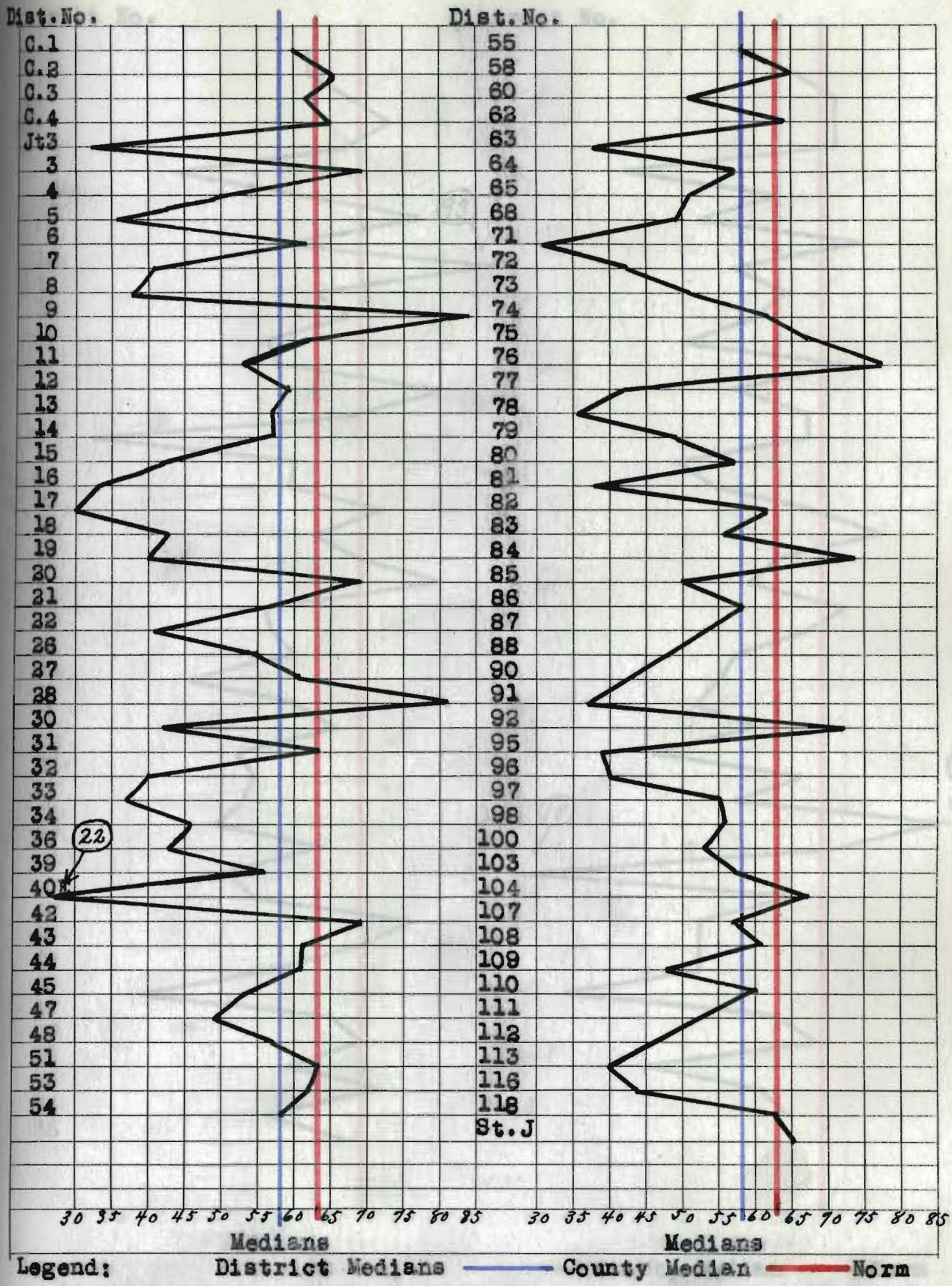


Showing medians of the third grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.3, Dictation Exercise, of the New Stanford Achievement Test.

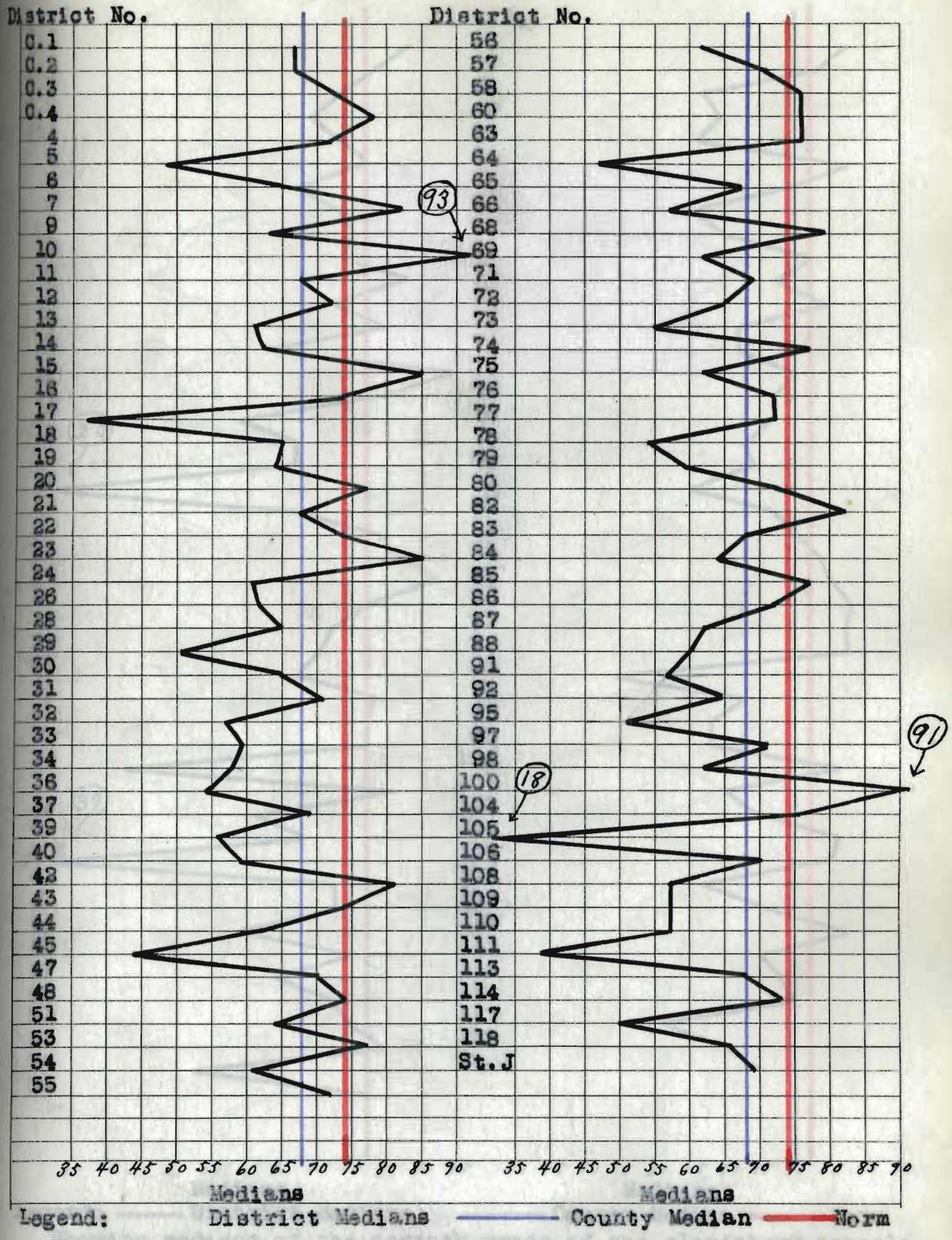


Showing medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.3, Dictation Exercise of the New Stanford Achievement Test.

FIGURE XXI

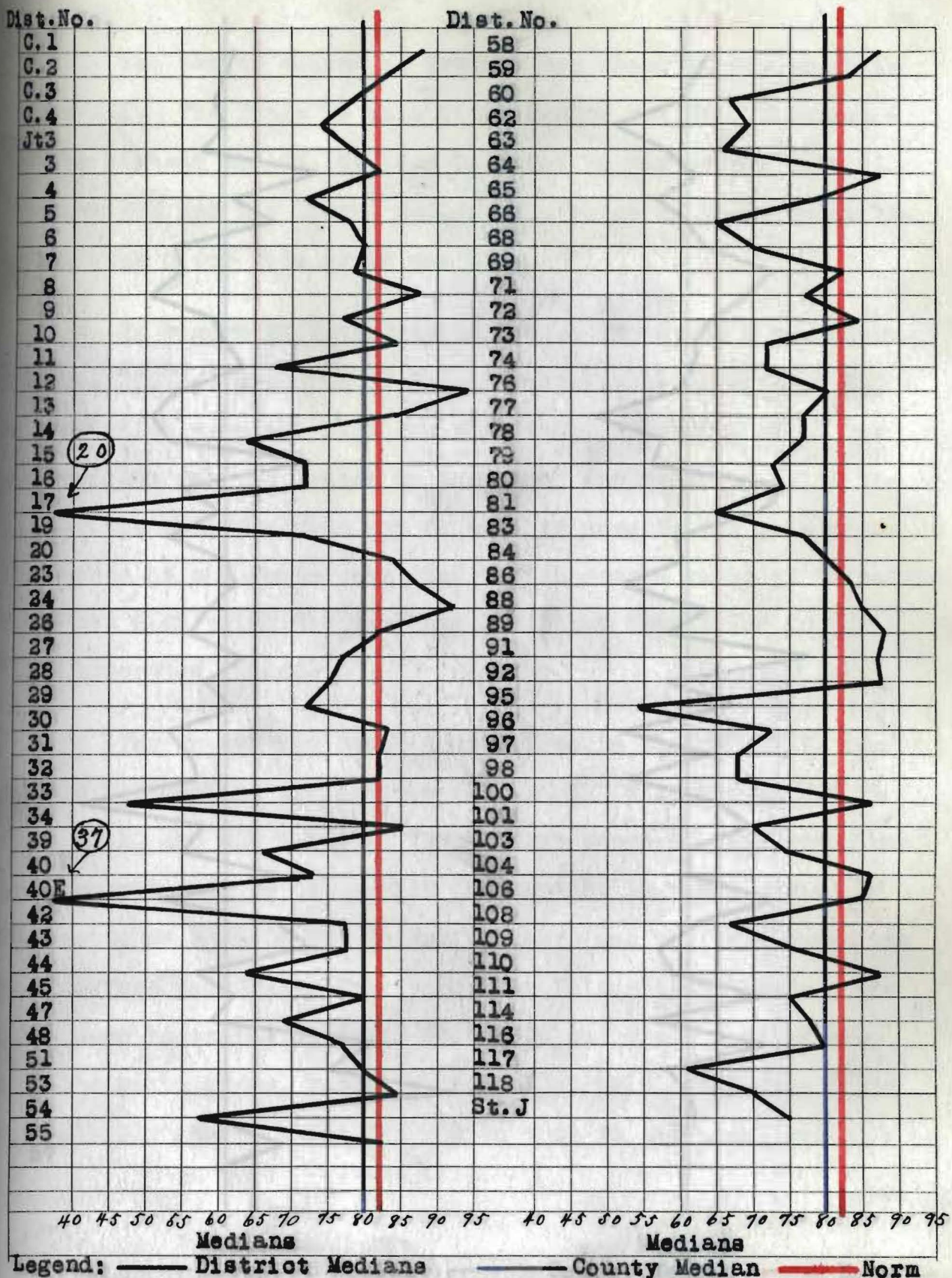


Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.3, Dictation Exercise, of the New Stanford Achievement Test.

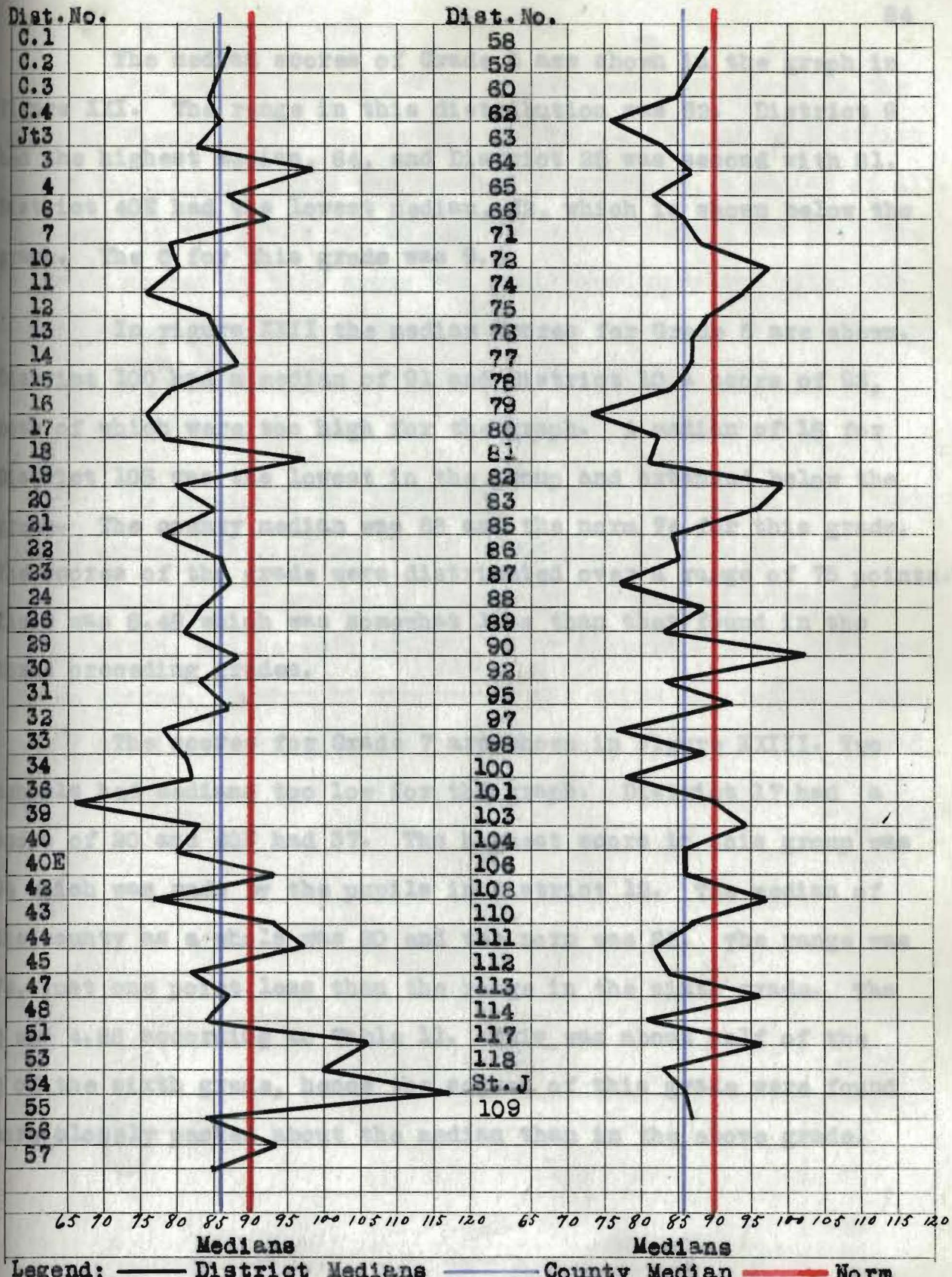


Showing medians for the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.3, Dictation Exercise, of the New Stanford Achievement Test.

FIGURE XXIII



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.3, Dictation Exercise, of the New Stanford Achievement Test.



Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.3, Dictation Exercise, of the New Stanford Achievement Test.

The median scores of Grade 5 are shown in the graph in Figure XXI. The range in this distribution was 62. District 9 had the highest median, 84, and District 28 was second with 81. District 40E had the lowest median, 22, which is shown below the graph. The Q for this grade was 9.8.

In figure XXII the median scores for Grade 6 are shown. District 100 had a median of 91 and District 10 a score of 93, both of which were too high for the graph. A median of 18 for District 105 was the lowest in the group and extended below the graph. The county median was 68 and the norm 74 for this grade. The scores of the grade were distributed over a range of 75 points. The Q was 8.48 which was somewhat less than that found in the three preceding grades.

The scores for Grade 7 are shown in Figure XXIII. Two schools had medians too low for the graph. District 17 had a score of 20 and 40E had 37. The highest score in this group was 94 which was made by the pupils in District 12. The median of the county as a whole was 80 and the norm was 82. The range was 74, just one point less than the range in the sixth grade. The Q was 4.88 according to Table 11. This was about half of the Q of the sixth grade, hence the scores of this grade were found more closely packed about the median than in the above grade.

The median scores of the eighth grade are shown in the graph in Figure XXIV. The lowest median was 66 made by District 36 and the highest score was that of District 54, a median of 117. The norm for the grade was 90 and the county median was 86. The range of scores in this group was small when compared with the other grades, 51 points. The Q was 6.08. Two grades, the second and the seventh, had smaller quartile deviations. The median scores for this grade were not widely scattered, however.

In examining the highest and lowest scores in this test, no one school district was found to be high in more than one grade. District 17 was among the lowest in three grades, the fifth, sixth, and seventh grades. Four districts were quite low in two grades. Number 14 was low in the third and fourth grades, Number 40E in the fifth and seventh, Number 36 in the second and eighth, and Number 71 in the second and the fifth grades.

TABLE 11

Showing the Quartiles and the Quartile Deviations of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.3, Dictation Exercises, of the New Stanford Achievement Test given in September, 1930.

	GRADE						
	2	3	4	5	6	7	8
Third Quartile	15.06	37.12	59.38	66.11	77.78	81.30	93.37
Median	8.26	25.91	47.94	57.69	68.40	79.62	86.34
First Quartile	4.53	14.35	35.17	46.91	60.83	71.53	81.20
Quartile Deviation	5.26	11.38	11.60	9.60	8.48	4.88	6.08

TABLE 12

Showing the Decile Ranking of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.3, Dictation Exercises, of the New Stanford Achievement Test.

	GRADE						
	2	3	4	5	6	7	8
9th Decile	23.89	47.23	62.30	73.98	84.95	91.08	99.75
8th Decile	18.57	39.91	61.94	68.24	80.07	87.06	95.17
7th Decile	13.36	34.58	56.00	64.11	75.50	84.98	91.60
6th Decile	10.00	30.43	52.00	60.60	71.93	82.35	88.71
5th Decile (Median)	8.26	25.91	47.94	57.69	68.40	79.62	86.34
4th Decile	6.91	21.03	43.12	54.78	64.83	76.08	84.14
3rd Decile	5.47	16.78	37.97	48.96	62.16	72.98	82.18
2nd Decile	3.82	12.71	32.70	44.67	59.18	70.08	80.21
1st Decile	2.91	8.71	27.65	34.40	54.50	66.37	78.17

INDIVIDUAL SCORES

As in the previous tests, the pupils whose scores were below the norm are the individuals who require attention. These pupils are the ones responsible for the low class medians and the low medians of the county.

An individual score, that of W.H. in the fifth grade in District 58 cited in the preceding tests, will serve as an illustration. His score in this spelling test was 51. When compared to the county median of 58 and the norm of 63, the score is found inferior. The median score for the fourth grade was 48 so that this pupil was almost a full year below standard. The Educational Profile Chart* shows 51 as the score equivalent to the performance of the first month in the fourth grade. The decile and quartile rankings of the scores of the several grades are given in Tables 11 and 12. Referring to these tables, the score of 51 is found between the first quartile and the median, above the third decile mark. Approximately 70% of the fifth grade pupils were better in spelling than was W.H.

Another score in the same grade in the same school might be cited. A.M. had a score of 82. This score was considerably higher than the county median and the norm. In fact, 82 was equal to the norm for the seventh grade, two grades in advance of the grade in which the pupil was located. Table 12 shows this score above the ninth decile, in the upper 10% of the pupils in the fifth grade in the county.

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* See test booklet, op.cit.

STANDING OF THE FIFTH GRADE OF SCHOOL DISTRICT 58

The scores of the pupils in the fifth grade in District 58, arranged in order from highest to lowest, on this test were as follows:

82	--Score of A.M.	63	
77		62	
76		61	
72	Third Quartile	61	First Quartile
71		58	
71		58	
69		51	-- Score of W.H.
68		48	
65	- Median		

Total 17

The median was located at 65 for the grade. When compared to the county median and the norm, the grade was found above these levels. On the Educational Profile Chart, the score of 65 is equivalent to the performance of the fifth grade in the second month which makes the grade advanced only slightly. The two scores at the bottom, 51 and 48, were retarded eight months and a full year respectively. The high score, 77 and 82, were one year and three months and two full years advanced. The third quartile mark was equal to the work of the eighth month of the fifth grade. This placed the upper fourth about a year in advance of their grade in spelling ability.

The difficulty of the task of giving instruction in a class of such widely varying abilities in spelling, or in any subject for that matter, is obvious. The spelling abilities of the pupils in this class cover a span of about four years, yet they are grouped together for spelling instruction.

In this spelling test the pupils of the county were below the average levels. The various grades in the school districts have been located in relation both to the county median and to the norm. The grades in which the work in spelling was inferior may be located by the table given in the chapter. By reference to the individual scores the pupils whose work was below standard may be found. To these pupils and to the classes with low medians, special help in spelling should be given. The teachers of these pupils may secure information on causes of incorrect spelling and some measures for improving the work of the pupils in any good book of methods of teaching. No remedial measure that will bring the scores to a higher level can be applied in all cases. The status of the individual class or the pupil will determine the need and the remedy. Indifference to methods of pupil learning, poor presentation of materials, and lack of gaining and holding interest and attention of the pupils might be suggested as contributing factors to poor teaching of spelling and to poor results.

If the teachers of the county were made aware of the fact that the results obtained in this test were below the average, perhaps special efforts would be made to raise the spelling level in the county.

Perhaps better results might be obtained if more stress were put on the teaching of spelling rather than merely testing the pupil's knowledge of spelling. In the past the teacher merely has checked on what the child should know in spelling.

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Perhaps better results might be obtained if more stress were put on the teaching of spelling rather than merely testing the pupil's knowledge of spelling. In the past the teacher merely has checked on what the child should know in spelling.

Emphasis should be placed on the study of spelling; in securing the attention of the child upon the associations to be formed and in securing sufficient repetition for learning. In the assignment the words of a spelling lesson might be spelled by the pupil. After this trial both the pupil and the teacher will know the words which should claim the attention in the study period. The words that already are known by the child may be set aside and the time and effort given to those which the child does not know. By such a procedure, errors in spelling may be seen, causes of misspelled words may be studied both by the teacher and the pupil, and then effort put forth by both to procure correct spelling.

CHAPTER V

TEST NO.4 -- LANGUAGE USAGE[1]

DESCRIPTION OF THE TEST

This test is designed to measure two phases of language usage: the choice of correct grammatical construction and the ability to discriminate between poor and good expressions of the same idea, both of which may be considered grammatically correct. One of the difficulties encountered in any such test is due to the disagreement among the authorities regarding many forms of usage. The authors of the test have avoided most of the controversial issues and have selected only those items upon which there is a fairly general agreement among the best authorities in this field. Items for the test were chosen also upon careful consideration of the results of the investigations which have been made of children's language errors.

The test consists of seventy-four statements. In each sentence the pupil is to choose the word or phrase for correct grammatical use or good expression. The test is a multiple-choice type examination which was described in Chapter II. The directions preceding the test are:

"Draw a line under the word or phrase that makes the better sentence."

Items from the test will show the nature of the test:

1. Jane is prettier / more prettier than Helen.

2. The man which / whom you see is John.

3. She laid / lay on the couch and slept.

---

[1] Test No.4 in the Primary Examination is Arithmetic Reasoning. This test will be discussed in Chapter X with the test in Arithmetic Reasoning for the Advanced Examination which is No.9.

4. I have often ate / eaten oranges.

5. Mary is the hero / heroine of the play.

The number of statements marked incorrectly is to be subtracted from the number marked correctly. The difference obtained is then given a value from the table of equivalent scores that is found at the end of the test. The value assigned is the score for the test. If the difference is zero or less the score is 20, if it is 7 the score is 49, it is 79 if the remainder is 24, and so forth. The table may be found in the test blank in the appendix.

THE MEASUREMENT OF LANGUAGE ABILITY

Language is the means of the communication of ideas. The choice and arrangement of words give language its form. Rules of grammar definitely prescribe many items of form; for example, certain words require capital letters; marks of punctuation follow fixed rules; verbs and subjects must agree in person and number; pronouns are inflected for person, number, gender, and case. The pupil's control of these items of language and grammatical forms must be made so habitual that the use of them will become more or less automatic. The child, then, will have an opportunity to give his attention, for the most part, to the ideas to be expressed. The pupil should be able to determine correct language forms from the rules of grammar when doubt arises. This requires a knowledge of these rules of grammar and the ability to apply them when the need appears. The problem of measuring language ability, then, is largely one of measuring specific habits. Many language tests, or separate parts of them, are limited to one particular field of language abilities. The

test may be built on the use of pronouns, verbs, or other phases of language forms. They are diagnostic in character and reveal the particular strength or weakness of the child.

These diagnostic tests are of practical value to the classroom teacher. They point out to her the factors with which each child is familiar and on which he needs no drill. They also point out the things the child does not know and so enable the teacher to apply remedial work so that the efforts of each child will be directed to skills not yet mastered. They have been based upon extensive research into the nature and number of errors made by children in language work.

In all language testing, however, the general recognized difference between a child's knowing correct language forms and using them adds to the problem of measurement.

RESULTS OF THE TEST

TABLE 13

Showing the Number of Pupils in Each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the Pupils of the County on Test No. 4, Language Usage.

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
IV	324	48	43
V	295	63	49
VI	283	74	63
VII	264	83	79
VIII	275	90	87

Total 1461

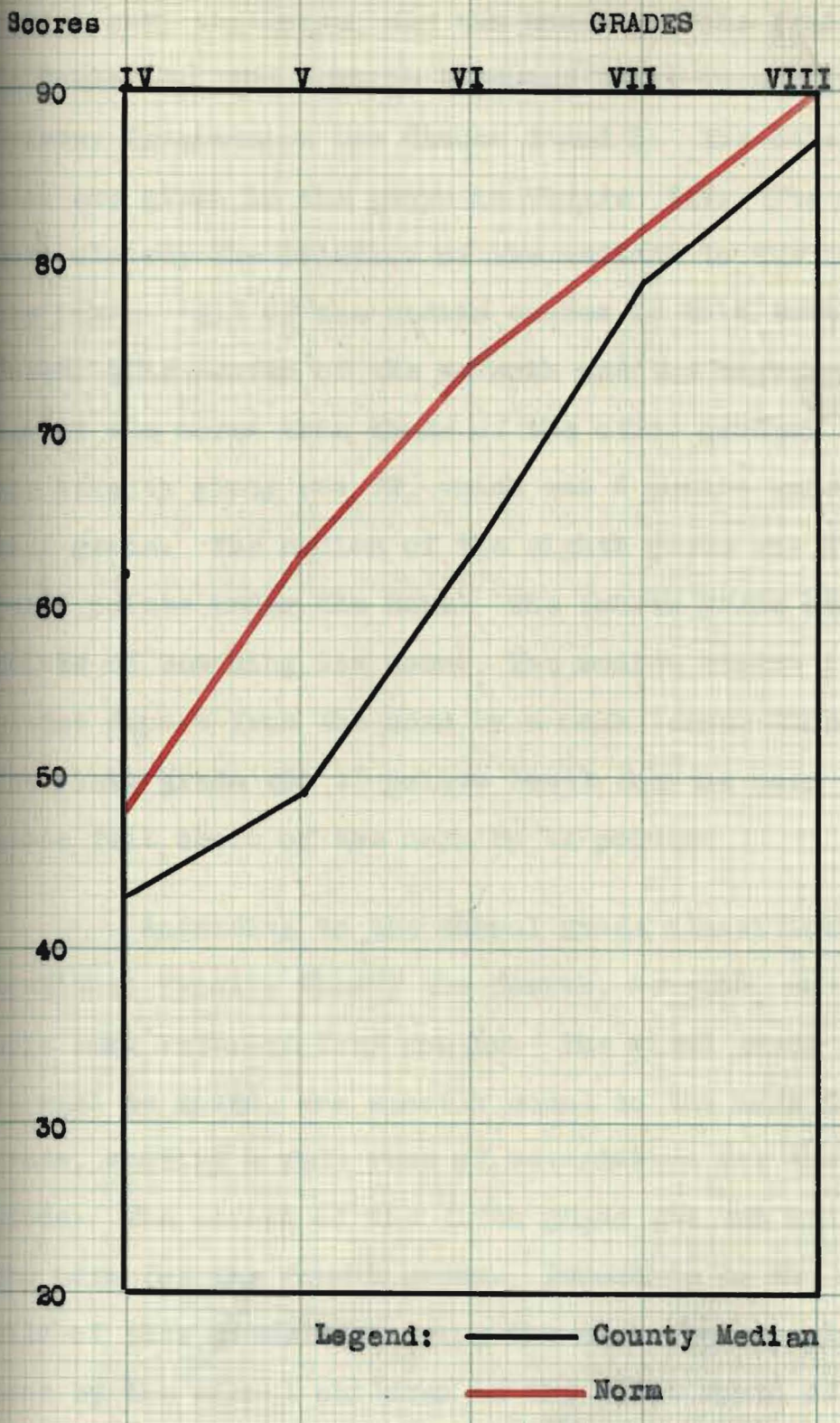


Figure XXV. Median scores of the grades of Lyon County, Kansas, for Test No. 4, Language Usage, of the New Stanford Achievement Test in comparison to the norm.

The median scores made by the pupils of the county in Grades 4-8, inclusive, and the norms for the grades are shown in Table 13. The test in Language Usage is not included in the Primary Examination for Grades 2 and 3. The data in the table also are given in the graph in Figure XXV. The graph shows more clearly the relation of the medians to the norms than does the table. All of the median scores in this test were below the norms. The scores of the seventh and the eighth grades were nearer the norms than those of the other grades. The median of the seventh grade was 79, which was 3 points under the norm for that grade. The median of the eighth grade was 87, which also was 3 points under the norm. The fourth grade median lacked 5 points of reaching its norm. The median scores of the other two grades depart from the norm by a much larger number of points. The sixth grade was 11 points lower than the norm and the fifth grade fell short of the norm by 14 points.

According to the school grade classification in the Educational Profile Chart* the fourth, seventh, and eighth grades were each retarded four months. The sixth grade county median, it will be noted, was exactly equal to the norm for the fifth grade, showing a full year of retardation for the pupils in that grade. The median of the fifth grade was but one point above the norm for the fourth grade. According to the chart, the pupils of this grade were doing the work that should normally be done by the school children in the first month of the fourth grade. The standings of these two grades, the fifth and the sixth, was so low that remedial work in language forms should be begun with these pupils at once. The pupils of these grades

* See test booklet, op.cit.

whose individual scores were inferior to the norm demand individual attention and special work in this field. In the school districts in which the whole class was low, group instruction of a remedial nature should be given. Diagnostic tests in language might be given to the pupils whose scores were below the norm so as to determine the specific weaknesses of the pupils. From these results, then, the teacher and the pupil may begin work in language usage that would be especially suited for the individual case.

The retardation of the several grades for this test, shown as in the previous tests, was as follows:

Grade 4 -- retarded 4 months
Grade 5 -- retarded 1 year
Grade 6 -- retarded 1 year
Grade 7 -- retarded 4 months
Grade 8 -- retarded 4 months

MEDIANS OF THE SCHOOL DISTRICTS

Table 14 contains the median scores of grades 4-8, inclusive, of the several school districts of the county. If no medians are given for a certain school that district had no pupils in that grade at the time the test was given. The medians also are shown in the graphs in Figures XXVI-XXX. In these graphs the standings of the various classes in relation to the county median and to the norm may be clearly seen. The median score of each grade in each school district in the county may be located as above, equal to, or below these standards. A separate graph is used for each grade. School districts not having a particular grade are omitted from the graph for that grade.

The median scores for Grade 4 of the various school districts are shown in the graph in Figure XXVI. The lowest median made by any of the group was 20. As can be noted in the table of equivalent values at the end of the test, the score of 20 was given if the remainder found by subtracting the incorrect responses from the correct ones was zero or less. It was the lowest possible score. Several schools had this score as a median for the fourth grade. The two highest scores on the test were 79 and 91, medians for Districts 51 and 107, respectively. These scores extend above the graph. The medians of the schools formed a very irregular line as may be noted in the graph. The range of scores in this grade was from 91 to 20, or 71 points. The quartile deviation which is given in Table 15 was 16.62 for this grade. This Q indicates a wide scattering of scores about the median since it was quite a large number.

Grade 5 had medians as given in Figure XXVII. The highest score, 85, made by District 107 was just above the graph. District 82 was second with 84, District 74 was next with 83, and District 28 followed with 81. The fifth grades in several schools had a median of 20 on this test. The range was 65 and the Q was 17.35. This deviation was even greater than that of the preceding grade.

In the sixth grade, in Figure XXVIII, the highest median was that of District 82, a score of 106. This was too far above the others to be shown in the graph. There were several schools that had medians of 20 in this grade too. These extreme scores show that the medians in the grade extend over a range of 86 points. The quartile deviation was 16.66 which was about the

TABLE 14

Showing the Medians of all the Grades in the School Districts of Lyon County, Kansas for Test No. 4, Language Usage, of the New Stanford Achievement Test.

Dist. No.	GRADE 4	5	6	7	8	Dist. No.	GRADE 4	5	6	7	8
C.1	48	62	75	92	98	58	54	60	82	89	93
C.2	54	57	67	84	87	59	42			62	67
C.3	56	52	80	81	92	60	42	58	37	56	24
C.4	46	62	72	65	92	62	20	20		84	52
Jt.3	20	54		66	62	63	30	44	85	58	84
3		46		73	95	64	42	42	22	92	82
4	46	62	73	69	95	65	62	62	56	89	41
5		40	20	83		66	42		20	64	42
6		37	72	70	97	68	66	20	77	56	
7	51	33	75	90	95	69	60		26	76	
8	40	20		89		71		60	75	70	77
9		71	55	55		72	42	43	60	79	102
10		56	20	90	90	73	51	51	49	76	
11	57	27	46	81	50	74	23	83	44	82	82
12	20	69	53	73	73	75	35	62	47		84
13	55	61	81	95	86	76	23	42	47	57	62
14	24	39	57	82	55	77	37	23	23	72	77
15	25	42	55	77	87	78	20	53	34	72	53
16		20	79	81	101	79	32	20	20	31	20
17	34	20	37	73	51	80	24	24	76	85	72
18	60	50	73		104	81	66	42		84	73
19	28	30	73	78	45	82	50	84	106		97
20	37	42	67	94	95	83	45	52	60	75	91
21	42	48	53		74	84	51	42	58	94	
22	20	49	70		87	85	42	55	74		77
23	71		91	93	87	86	43	46	72	100	77
24	34		79	99	76	87	32	44	51		89
26	48	49	46	84	86	88	20	46	70	98	91
27	20	60		51		89	54			82	100
28	46	81	64	48		90	33	42			99
29	34		62	59	76	91	47	23	57	62	
30	47	42	63	76	88	92	24	52	30	97	47
31	46	55	82	83	89	95	46	43	62	39	107
32	46	44	42	60	52	96		62		52	
33	42	73	65	66	73	97	56	20	69	51	20
34	20	40	42	85	87	98	52	48	28	64	79
36		63	64		73	100	61	40	83	70	66
37	34		80			101	20			62	89
38	35					103	34	60		60	104
39	37	52	48	51	72	104	53	78	86	89	89
40	48		55	46	80	105	66		44		
40E	37	51		61	108	106	33		77	81	87
42	37	48	62	80	87	107	91	85			
43	47	61	75	89	89	108	40	58	71	85	95
44	37	54	42	41	97	109	20	20	49	82	104
45	24	53	20	72	82	110	48	59	42	107	92
47		20	70	45	62	111	20	20	20	46	73
48	37	20	73	71	77	112	34	40			93
51	79	20	76	81	109	113	20	20	62		104
53	34	32	67	88	110	114			62	68	89
54	55	75	79	75	86	116	42	51		79	
55	50	50	54	77	102	117	20		54	49	89
56	20		62		98	118	20	56	68	66	53
57	46		59		75	St.J	42	60	61	80	95

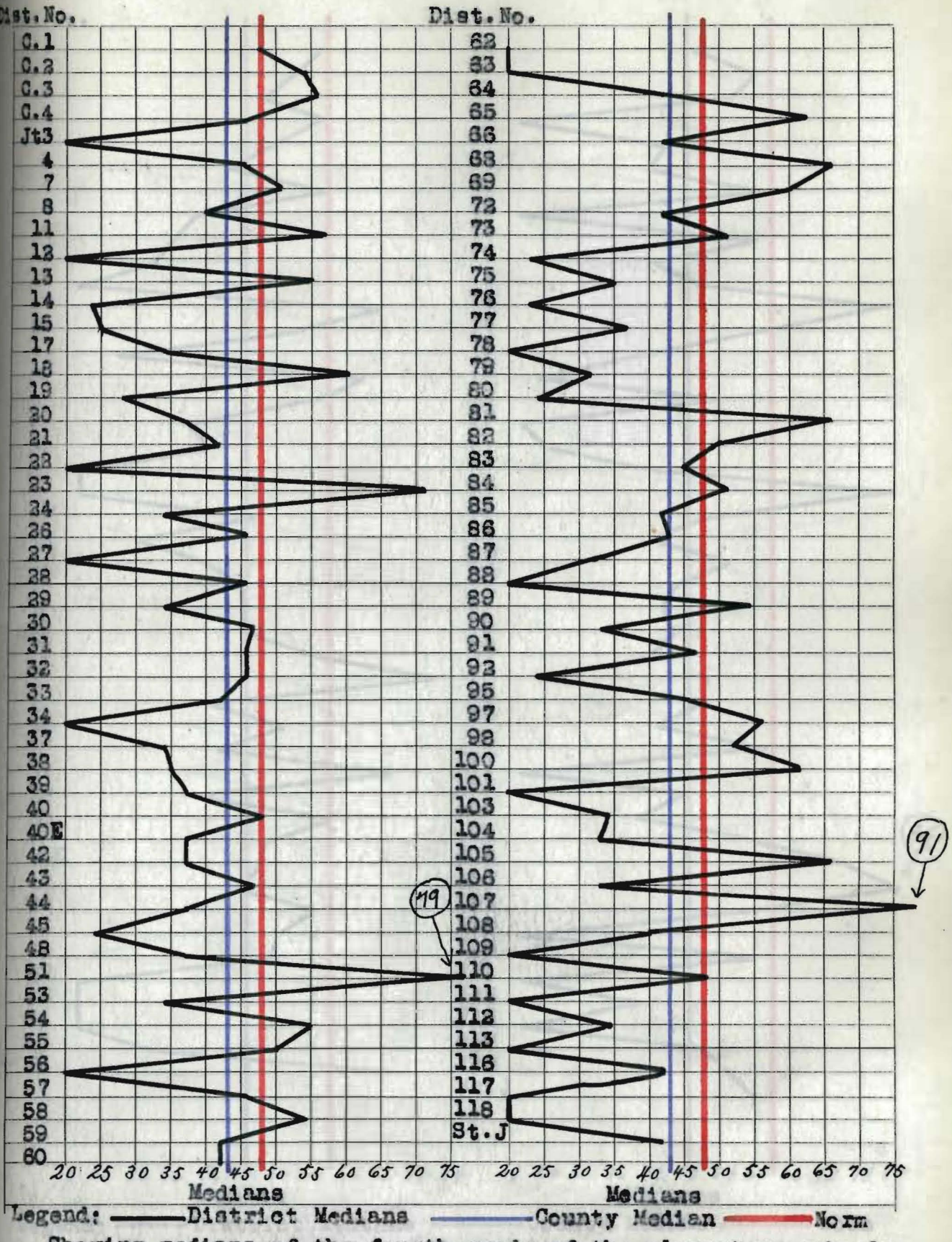
same as Grade 4.

The medians for Grade 7 are shown in Figure XXIX. They were all shown within the graph. The highest score was that of District 110 with 107 and District 86 was second with a score of 100. District 79 had the lowest score of the group with 31. The county median was 79 and the norm was 82. The medians had a range of 76 and the quartile deviation was 13.18 which was lower than the Q of the three preceding grades by three points.

Figure XXX contains the median scores for the eighth grade. The four highest scores were the medians of District 53 with a score of 110, District 51 with 109, District 40E with 108, and District 95 with 107. Several other schools had scores above 100 also. Two of the schools had medians of 20 which extended below the graph. These were Districts 79 and 97. The range was 90 which was larger than the range of the other grades. The Q was only 13.2, however, hence the scores about the central tendency were not as widely scattered as in the fourth, fifth, and sixth grades.

In this test District 107 had the highest median in two grades, the fourth and the fifth. Three other districts ranked high in two grades also, District 82 in the fifth and the sixth, and District 23 in the fourth and sixth, and District 51 in the fourth and eighth. Two schools had low medians in three different grades, District 79 was low in the fifth, sixth, and eighth grades and District 111 was low in the fourth, fifth, and sixth grades.

FIGURE XXVI



Showing medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 4, Language Usage, of the New Stanford Achievement Test.

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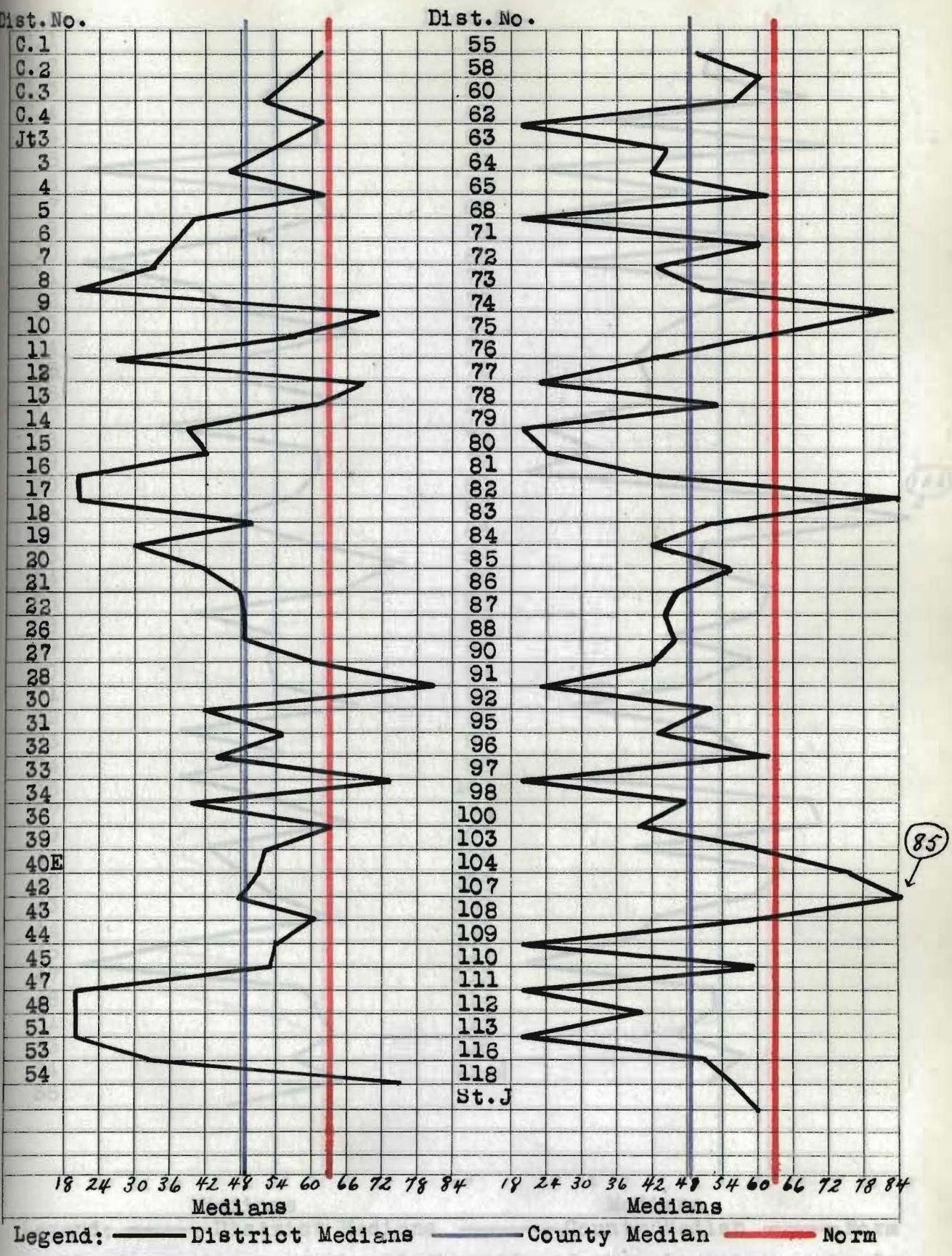
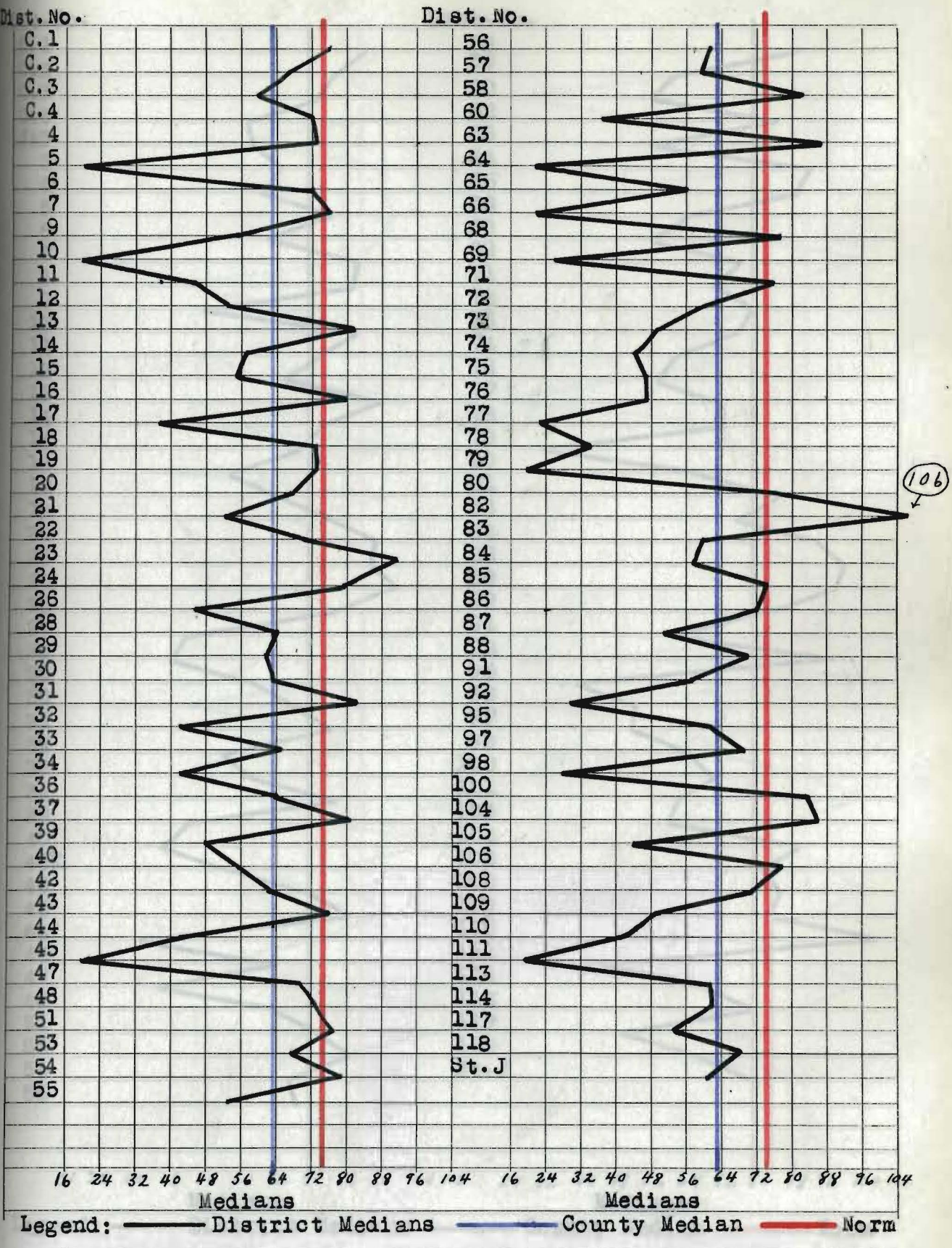
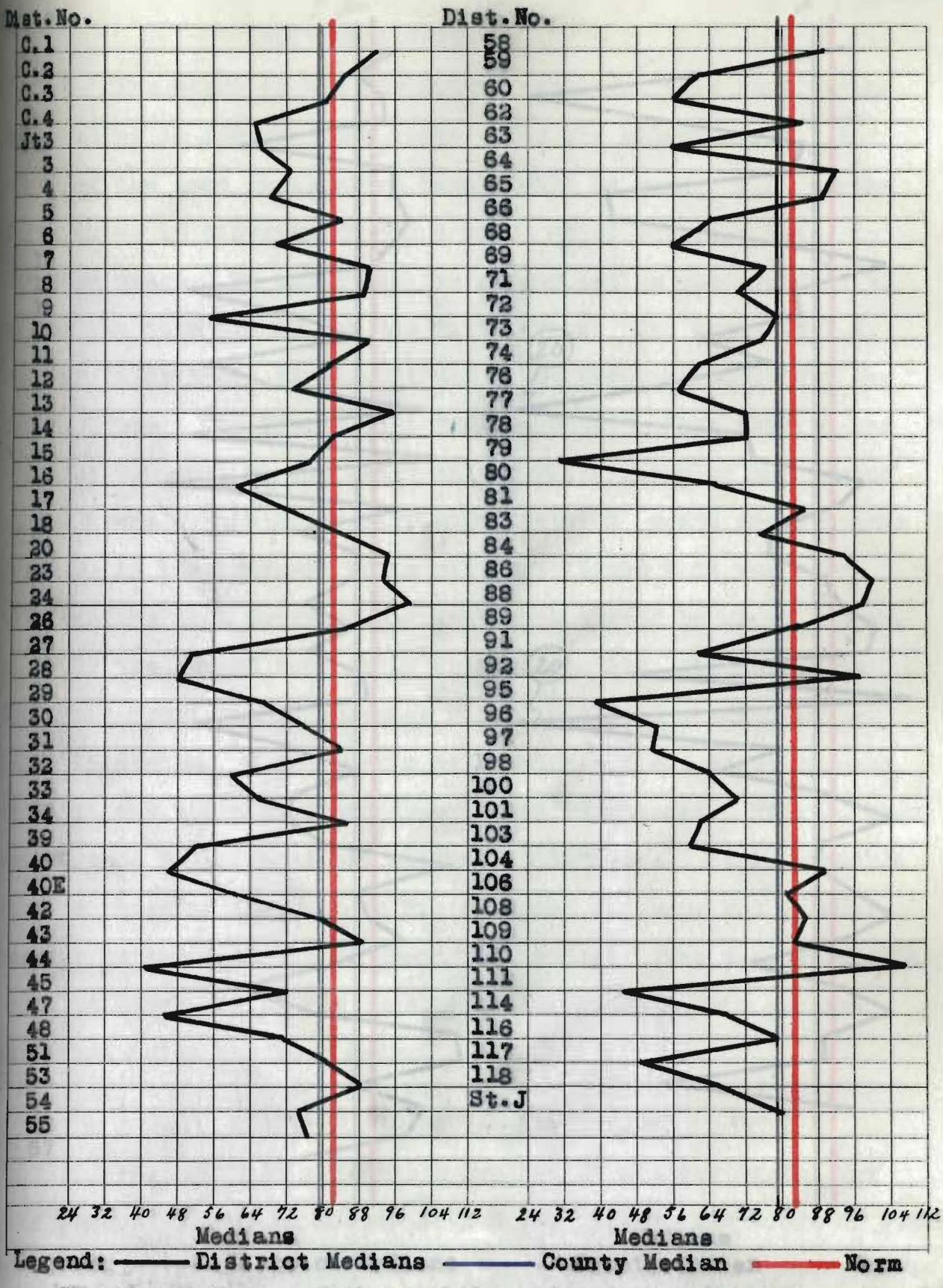


Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 4, Language Usage, of the New Stanford Achievement Test.

FIGURE XXVIII

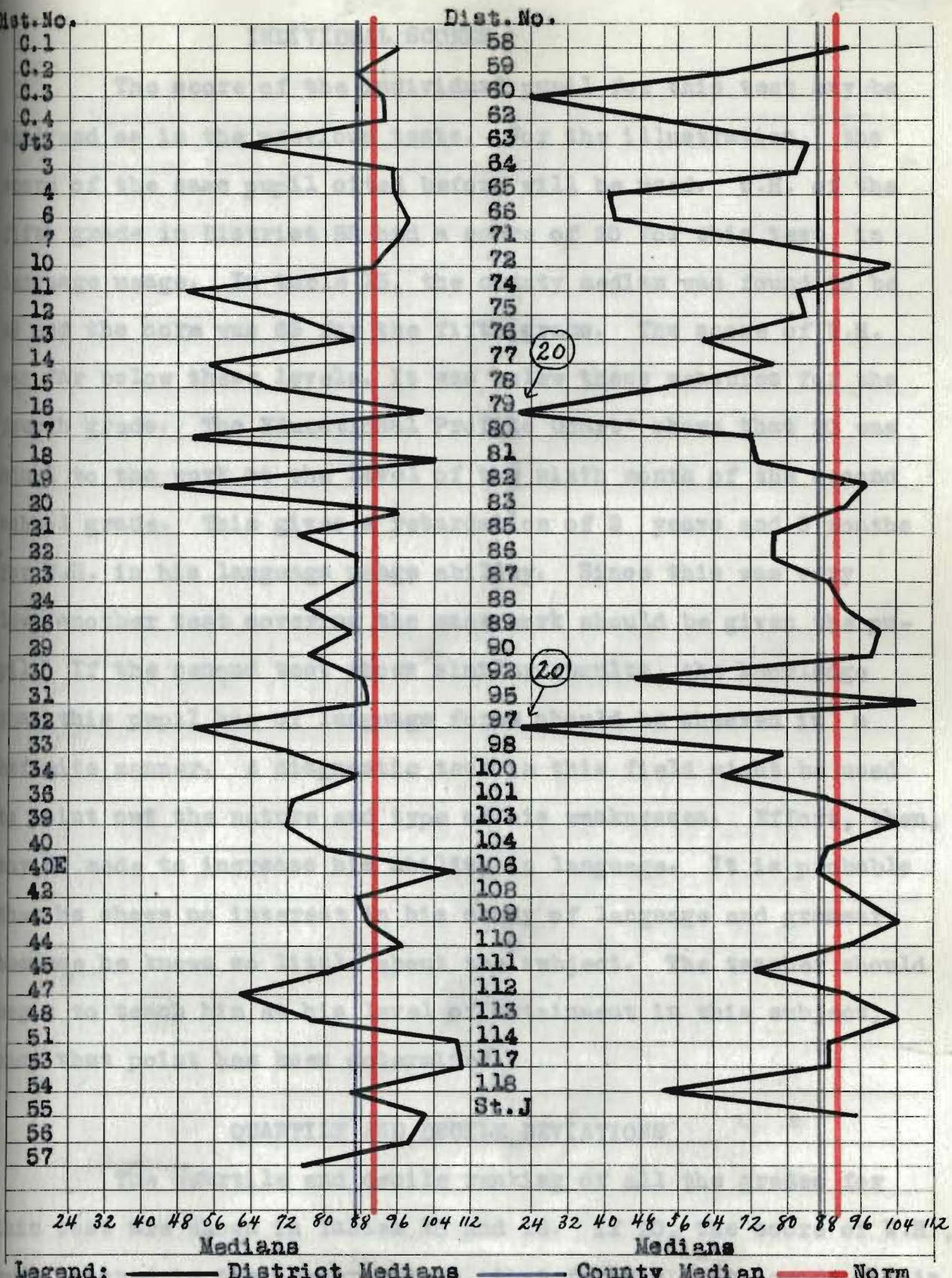


Showing medians of the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 4, Language Usage, of the New Stanford Achievement Test.



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 4, Language Usage, of the New Stanford Achievement Test.

FIGURE XXX



Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.4, Language Usage, of the New Stanford Achievement Test.

INDIVIDUAL SCORES

The score of the individual pupil for this test may be analyzed as in the previous tests. For the illustration, the score of the same pupil cited before will be used. W.H. of the fifth grade in District 58 had a score of 20 for this test in language usage. In table 13, the county median was found to be 49 and the norm was 63 for the fifth grade. The score of W.H. was far below these levels. It was below these measures for the fourth grade. The Educational Profile Chart* shows that 20 was equal to the work at the level of the sixth month of the second school grade. This gives a retardation of 2 years and 3 months for W.H. in his language usage ability. Since this was very low, another test covering the same work should be given the pupil. If the second test shows similar results, the knowledge that this pupil has of language forms should be checked in a definite manner. A diagnostic test in this field might be used to point out the nature and type of his weaknesses. Effort, then, may be made to increase his ability in language. It is probable that he shows no interest in his study of language and grammar because he knows so little about the subject. The teacher should begin to teach him at his level of attainment in this subject, once that point has been determined.

QUARTILE AND DECILE DEVIATIONS

The quartile and decile ranking of all the grades for this test are shown in Tables 15 and 16. If 20, the score of W.H., were located in the proper column, that for the fifth grade, it is found below the first quartile in Table 15 and below the first decile in Table 16, in the lowest tenth of his group. He is even

* See test booklet, op.cit.

TABLE 15

Showing the Quartiles and the Quartile Deviations of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.4, Language Usage, of the New Stanford Achievement Test given in September,1930

	GRADE				
	4	5	6	7	8
Third Quartile	57.34	65.08	78.51	89.32	98.08
Median	43.25	49.43	63.31	79.14	87.05
First Quartile	34.11	30.36	45.20	63.00	71.69
Quartile Deviation	16.62	17.35	16.66	13.16	13.20

TABLE 16

Showing the Decile Ranking of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.4, Language Usage, of the New Stanford Achievement Test.

	GRADE				
	4	5	6	7	8
9th Decile	66.66	78.50	89.03	98.81	104.72
8th Decile	59.88	69.69	81.52	92.71	99.76
7th Decile	54.73	63.09	75.79	87.41	96.40
6th Decile	48.07	57.86	71.10	83.44	92.04
5th Decile (Median)	43.25	49.43	63.31	79.14	87.05
4th Decile	37.87	43.57	57.71	74.12	81.52
3rd Decile	34.96	37.75	48.92	67.56	75.12
2nd Decile	33.35	34.04	41.08	58.39	65.62
1st Decile	31.55	32.02	33.29	43.36	52.95

found in the lowest tenth of the fourth grade distribution. There can be little doubt but that he is decidedly inferior in his knowledge of language usage.

The score of another pupil in the same grade of the same school may also be used as an example. The score of E.F. on this test was 81. Referring to Table 15, 81 is found above the third quartile level, in the upper fourth of the group. Table 16 shows the score above the ninth decile of its grade. E.F., then, was better than 90% of the pupils in the fifth grade in the county in this test. 81 was above the medians of the sixth and the seventh grades. In the Educational Profile Chart, it is shown equal to the work at the school grade level of the eighth month in the sixth year. This indicates E.F. was accelerated one year and seven months in language usage.

STANDING OF THE FIFTH GRADE OF SCHOOL DISTRICT 58

The scores of the pupils of the fifth grade of District 58, arranged from the highest to the lowest, on this test were as follows:

91		60	
84		51	
84		48	
81	Third Quartile-Score of E.F.	20	First Quartile
73		20	
70		20	-- Score of W.H.
70		20	
68		20	
60	-- Median		
		Total 17	

The median for this fifth grade was 60. Compared to the county median of 49, the grade was far above that level. It fell short of the norm for the fifth grade language usage of 63, however. It may be seen that all of the pupils in this school that were above the class median of 60 were also above the norm of 63. By reference to Table 15, it is noted that all of the pupils in this grade above the class median were above the third quartile mark of the county which was 65. These pupils also ranked above the county median for the sixth grade. This county median was 63, the same as the norm for the fifth grade. The upper fourth of the class, those pupils with scores above 81, ranked above the county median for the seventh grade. There were five scores in this group that were 20. This score placed them very low in the county group as well as their own class. These pupils should be tested again to determine definitely their standings and to discover, by the use of diagnostic tests, their exact weaknesses. Special and individual work should be given them to increase their knowledge of language forms and improve their language ability.

CONCLUSIONS AND SUMMARY

The pupils of the county made a decidedly poor showing in this language usage test. All grades were below the norms. The grades showed a retardation of from four months to a full year. This indicates the remedial measures should be applied in the districts of the county so as to improve this condition. The individual scores of the pupils should be ascertained so that those pupils most in need of remedial instruction may be singled out and given

work in language that fits their individual needs. Classes in which there are a number of pupils with low scores may profit from group instruction in language usage.

Emphasis must be placed on the difference between language usage and the knowledge of language forms. Specific language habits that involve more than mere knowledge must be formed. Laws of habit formation should be followed in fixing in the pupils the ability to use correct grammatical construction. Improvement of language usage must also include the problem of correct and clear expression in classes other than language and grammar. This language consciousness must function both in the school room and in conversation and communication outside the school.

CHAPTER VI

TEST NO.5 -- LITERATURE[1]

NATURE OF THE TEST

This test deals with the knowledge that the child has gathered in his reading. The items of the test are based on the results of the investigations which have been made of the reading interests and the reading practices of school children. In selecting the items, consideration was given to a reasonable distribution between American and foreign literature. The test includes fairy stories, travel, biography, science, popular fiction, and poetry. The difference in materials read by boys and by girls also was considered in the choice of items.

There are 80 items in the test. It is a multiple-choice type examination. The pupil is to choose one of the three given words or phrases to make the sentence correct. The directions given at the beginning of the test are:

" Draw a line under the word that makes the sentence true."

Some of the items included are:

1. One of Robin Hood's followers was
   DUKE OF YORK JOHN SILVER LITTLE JOHN

2. "Ben Hur" is famous for the
   CHARIOT RACE LONG SIEGE GREAT STORM

3. "The Lady of the Lake"was written by
   DRYDEN GRAY SCOTT

4. Daddy Long Legs was a
   DOLL MAN SPIDER

---

[1] Test No.5 in the Primary Examination is Arithmetic Computation. It will be discussed in Chapter XI, with the test in Arithmetic Computation in the Advanced Examination which is No.10.

5. "The Story of a Bad Boy" tells of setting fire to a
STAGECOACH HAYRACK HOUSE

6. Andromeda was rescued from the sea monster by
PERSEUS PYGMALION SIR CEDRIC

The score on the test is found by the formula R-W/2. The value of the test score was found in the table of equivalents at the end of the test as was done in previous tests. A maximum score for eighty correct responses is 142 and the minimum score for none or less is 20.

RESULTS OF THE TEST

TABLE 17
Showing the Number of Pupils in Each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the Pupils of the County on Test No.5, Literature.

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
IV	334	48	44
V	295	63	49
VI	283	74	54
VII	284	82	65
VIII	275	90	79
Total	1461		

The medians made by the pupils of the county and the norms for grade 4-8, inclusive, are shown in Table 17. The literature test was not given in the secon and third grades. The medians were computed to two decimal places and then given whole number values. One-half or more was counted as a whole number.

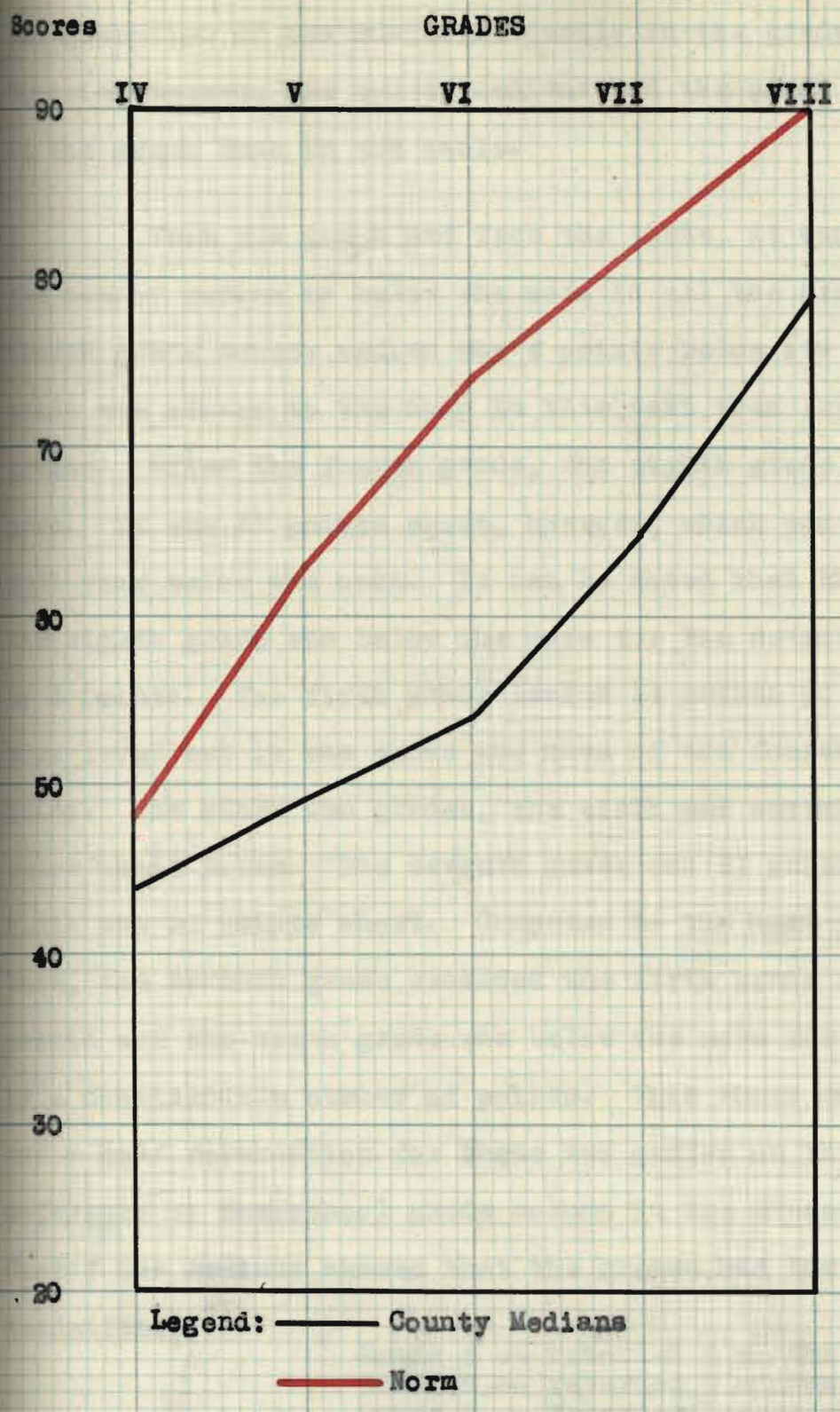


Figure XXXI. Median scores of the grades of Lyon County, Kansas, for Test No. 5, Literature, of the New Stanford Achievement Test in comparison to the norm.

The graph in Figure XXXI contains the data from Table 17, with the exception of the number of pupils in the grade. The distinction between the county medians and the norms is shown better in the graph than in the table.

From the graph and from the table, it can be seen that the county median is below the norm in all the grades. The fourth grade county median was 4 points below its norm. This grade was closer to the norm in this test than any of the other grades. After the fourth grade, the eighth grade was nearest its norm. It was 11 points short, however, which was more than a full year below the norm. It can be noted that the median for the eighth grade was below the norm for the seventh grade, lower by 3 points. The fifth grade lacked 14 points of reaching its norm level but it was above the norm of the fourth grade by 1 point. The other two grades, the sixth and seventh, were far below their norms. The seventh grade was 17 points short and the sixth was 20 points short. Compared to the norm for grades below them, the seventh grade exceeded the fifth grade norm by only 2 points and the sixth grade was below the norm for the fifth grade by a considerable number of points. This shows more than a year and a half retardation for these two grades on this test. By reference to the school grade column in the Educational Profile Chart* the medians showed that the grades had the following retardations:

Grade 4 -- retarded 2 months
Grade 5 -- retarded 9 months
Grade 6 -- retarded 1 year and 6 months
Grade 7 -- retarded 1 year and 7 months
Grade 8 -- retarded 1 year and 3 months

* See test booklet, op.cit.

The probable reasons for the low standings of all of the grades on this test will be discussed later in this chapter.

MEDIANS OF THE SCHOOL DISTRICTS

The medians of the various school districts of the county are shown in Table 18. When no median is given it indicates that there were no pupils in that grade in the school. The same date are shown in graphic form in Figures XXXII-XXXVI. Only one grade is shown in a graph. If the school had no class in a particular grade, it is omitted entirely from the graph. The median of the school district may be readily located in relation both to the county median and the norm by the use of the graphs.

The medians of the school districts for Grade 4 are given in the graph in Figure XXXII. The highest median was 86, made by the pupils in District 33. District 8 was second with a score of 69. The lowest median in the group was 20. Several schools had this score as a median. The medians of the schools covered a range from 86 to 20, or 66 points. The quartile deviation, according to Table 19, was 8.98. The norm for the grade was 48 and the county median was 44.

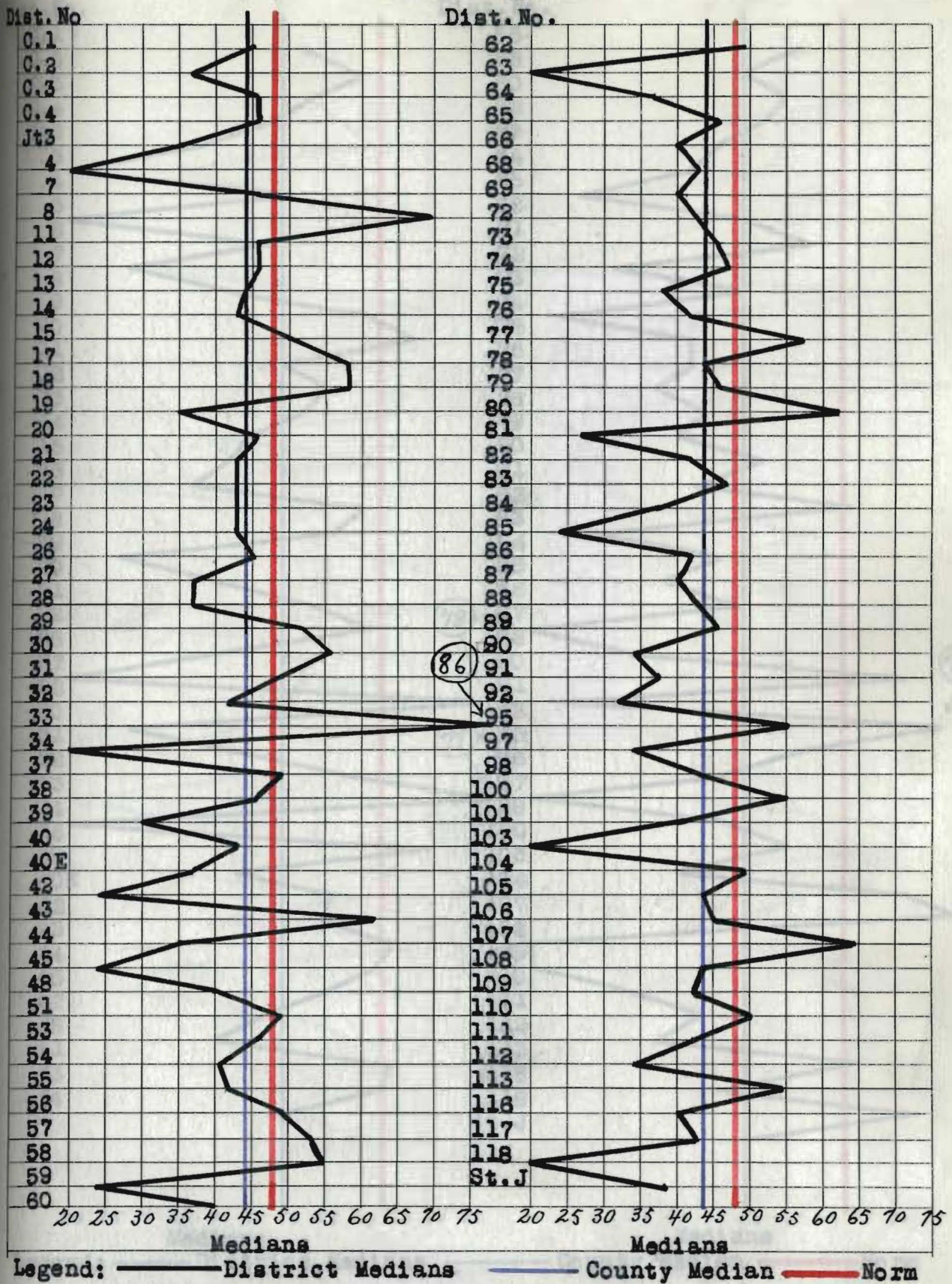
In Figure XXXIII, the median scores for Grade 5 are shown. The norm for this grade was 53 and the county median was 49. Four districts had medians too high to be shown in the graph: District 107 was highest with 85, District 33 second with 79, District 28 followed with 78, and District 92 was next with 77. Other schools with medians close to these four were District 118 with 73 and District 90 with a score of 72. The lowest median was 20. It was found in several districts. A larger number of schools fell to

TABLE 18

Showing the Medians of all the Grades in the School Districts of Lyon County, Kansas for Test No.5, Literature, of the New Stanford Achievement Test.

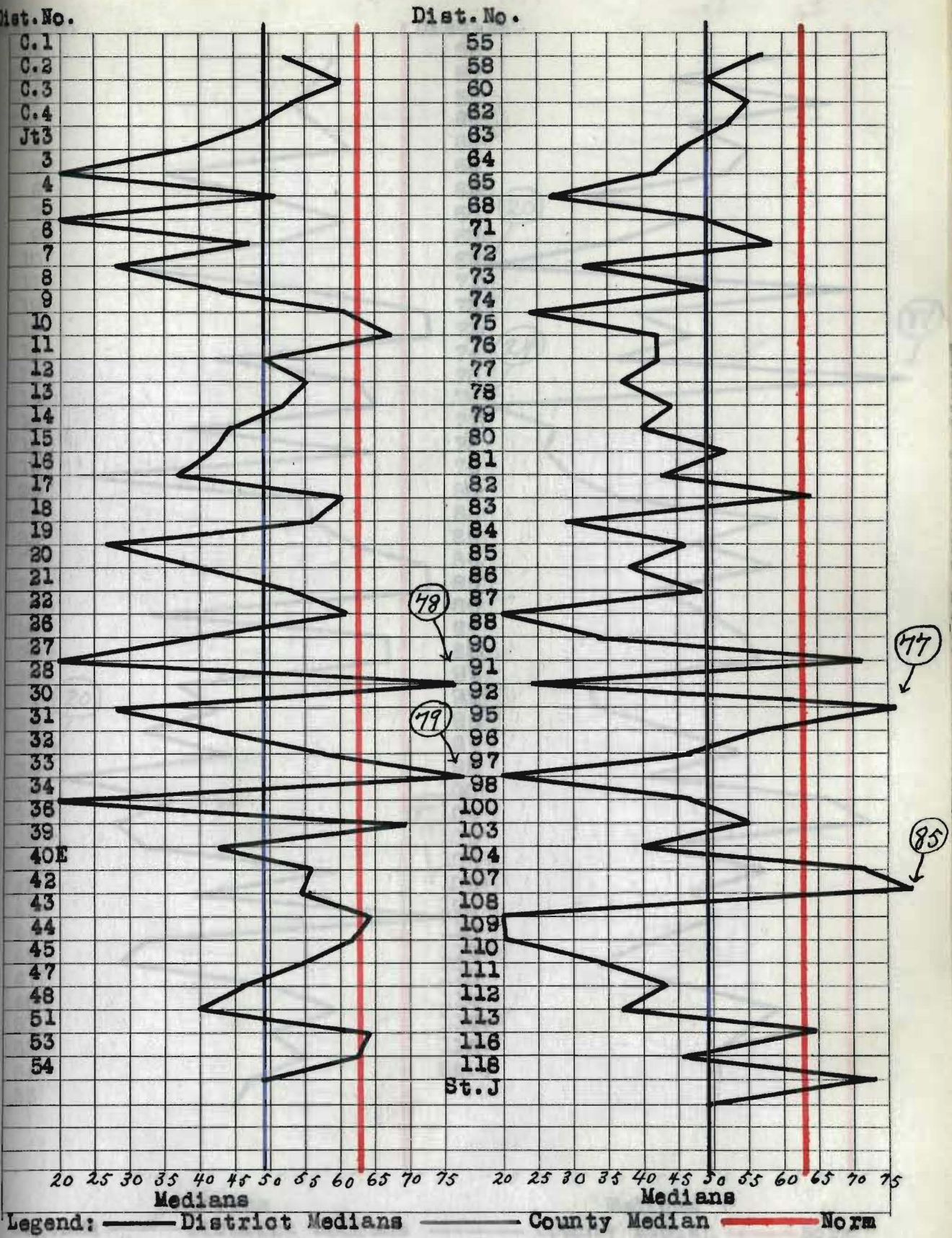
Dist. NO.	GRADE 4	5	6	7	8	Dist. NO.	GRADE 4	5	6	7	8
C.1	45	52	64	68	79	58	55	49	72	67	85
C.2	37	60	62	55	82	59	34			72	56
C.3	48	53	58	82	85	60	40	55	52	39	43
C.4	46	48	62	69	86	62	49	52		72	56
Jt.3	35	38		77	91	63	20	46	60	37	67
3		20		20	78	64	37	42	57	67	83
4	20	51	66	80	82	65	46	27	37	75	56
5		20	40	55		66	40		52	72	82
6		47	54	74	92	68	43	49	40	68	
7	46	28	65	46	86	69	40		20	76	
8	68	43		69		71		58	75	69	69
9		61	56	62		72	43	32	44	79	67
10		67	34	55	81	73	46	49	52	68	
11	46	49	60	58	56	74	47	24	42	62	78
12	46	55	77	72	58	75	38	42	87		62
13	44	52	77	89	82	76	42	42	24	72	67
14	43	44	47	47	60	77	57	37	33	42	82
15	50	42	67	58	70	78	44	44	31	60	61
16		37	70	52	78	79	46	40	34	56	37
17	58	60	43	34	67	80	62	52	42	60	77
18	58	56	69		78	81	27	43		20	75
19	35	27	28	52	20	82	42	64	84		91
20	46	40	60	78	78	83	47	34	52	84	93
21	43	53	61		57	84	37	46	63	83	
22	43	61	67		72	85	24	38	47		55
23	43		77	67	80	86	42	48	54	87	82
24	43		77	67	80	87	40	20	59		78
26	45	40	38	69	78	88	43	34	61	92	82
27	37	20		40		89	46			84	65
28	37	78	72	64		90	34	72			81
29	52		72	72	84	91	37	24	37	33	
30	56	28	42	82	87	92	32	77	38	37	72
31	49	42	47	65	84	95	55	57	49	33	94
32	42	58	37	67	52	96		47		52	
33	66	79	49	20	46	97	34	20	58	20	20
34	20	20	20	55	75	98	44	47	46	55	83
36		69	41		20	100	55	55	72	20	52
37	49		33			101	40			49	72
38	46					103	20	40		64	88
39	30	43	37	52	59	104	49	72	77	82	88
40	44		64	81	82	105	44		46		
40E	37	56		56	97	106	45		62	93	90
42	24	54	44	52	87	107	64	85			
43	62	64	67	75	80	108	44	20	52	72	77
44	35	62	37	35	67	109	43	20	55	56	81
45	24	55	34	66	62	110	50	34	47	47	77
47		46	55	47	87	111	43	43	38	46	58
48	40	40	64	57	67	112	34	37			87
51	49	64	55	62	91	113	54	64	52		89
53	48	63	60	82	100	114			64	40	58
54	41	49	52	55	75	116	40	46		60	
55	42	57	50	82	92	117	43		59	49	87
56	49		66		58	118	20	73	55	55	50
57	53		49		86	St.J	38	49	56	61	72

FIGURE XXXII



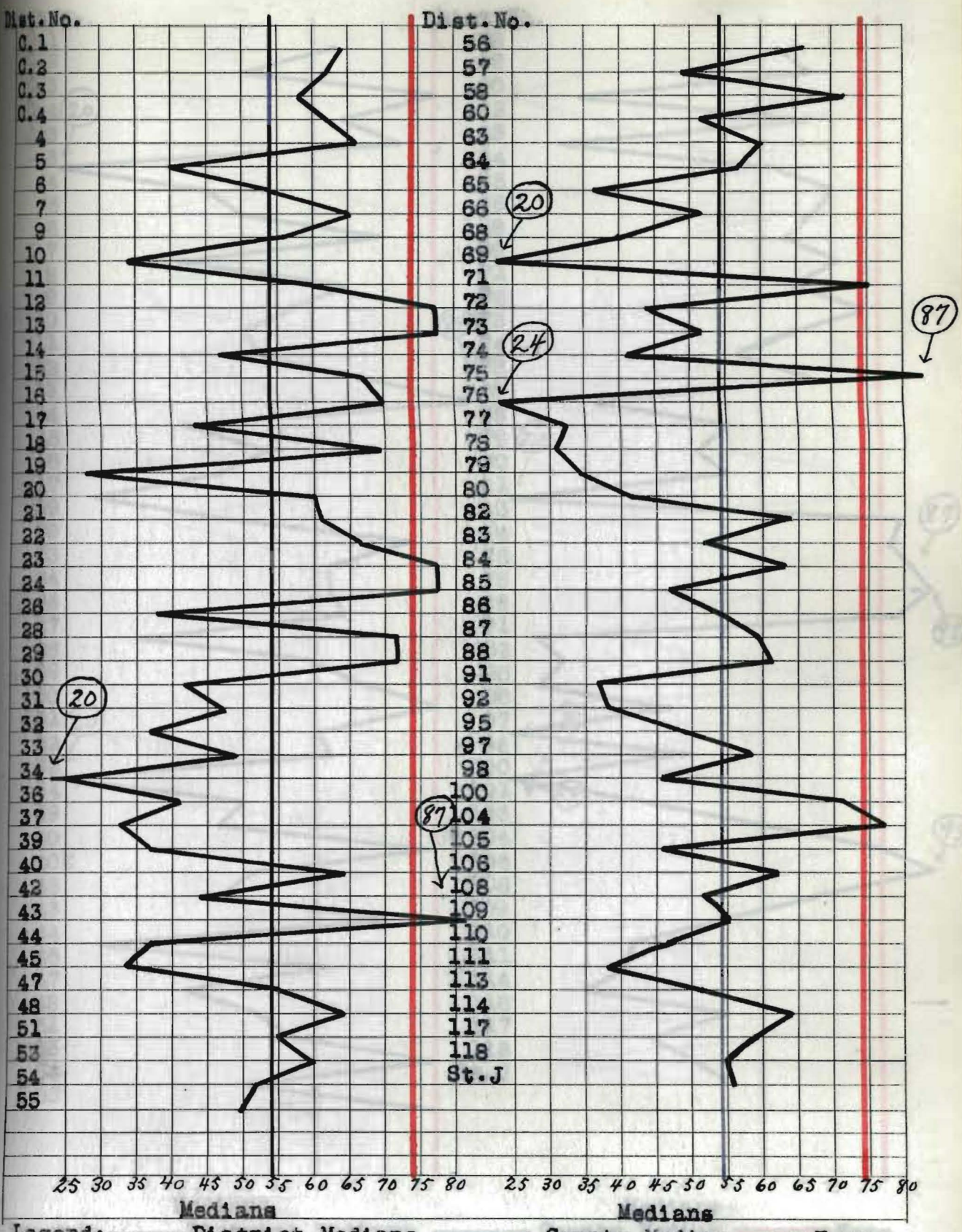
Showing the medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 5, Literature, of the New Stanford Achievement Test.

FIGURE XXXIII



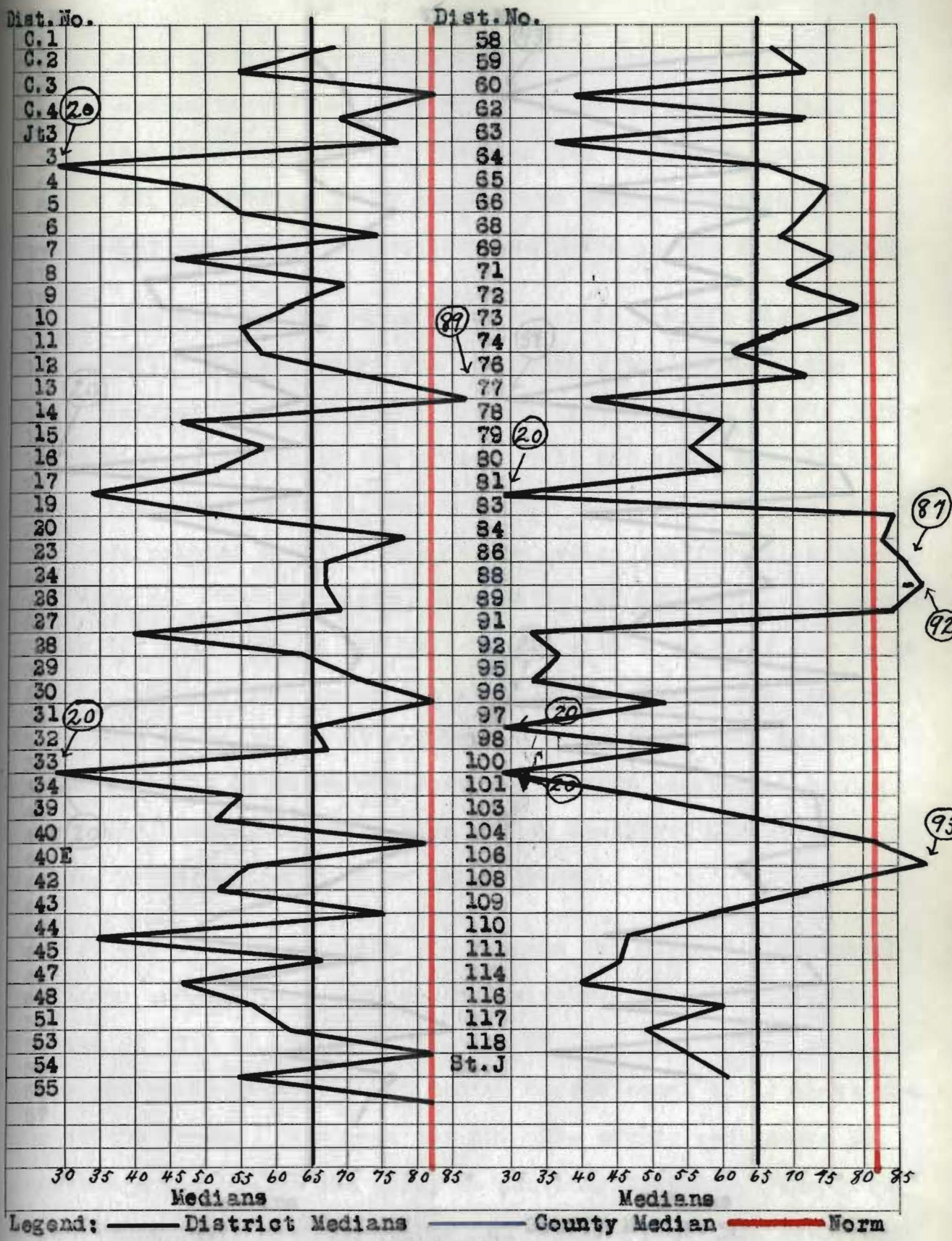
Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 5, Literature, of the New Stanford Achievement Test.

FIGURE XXXIV



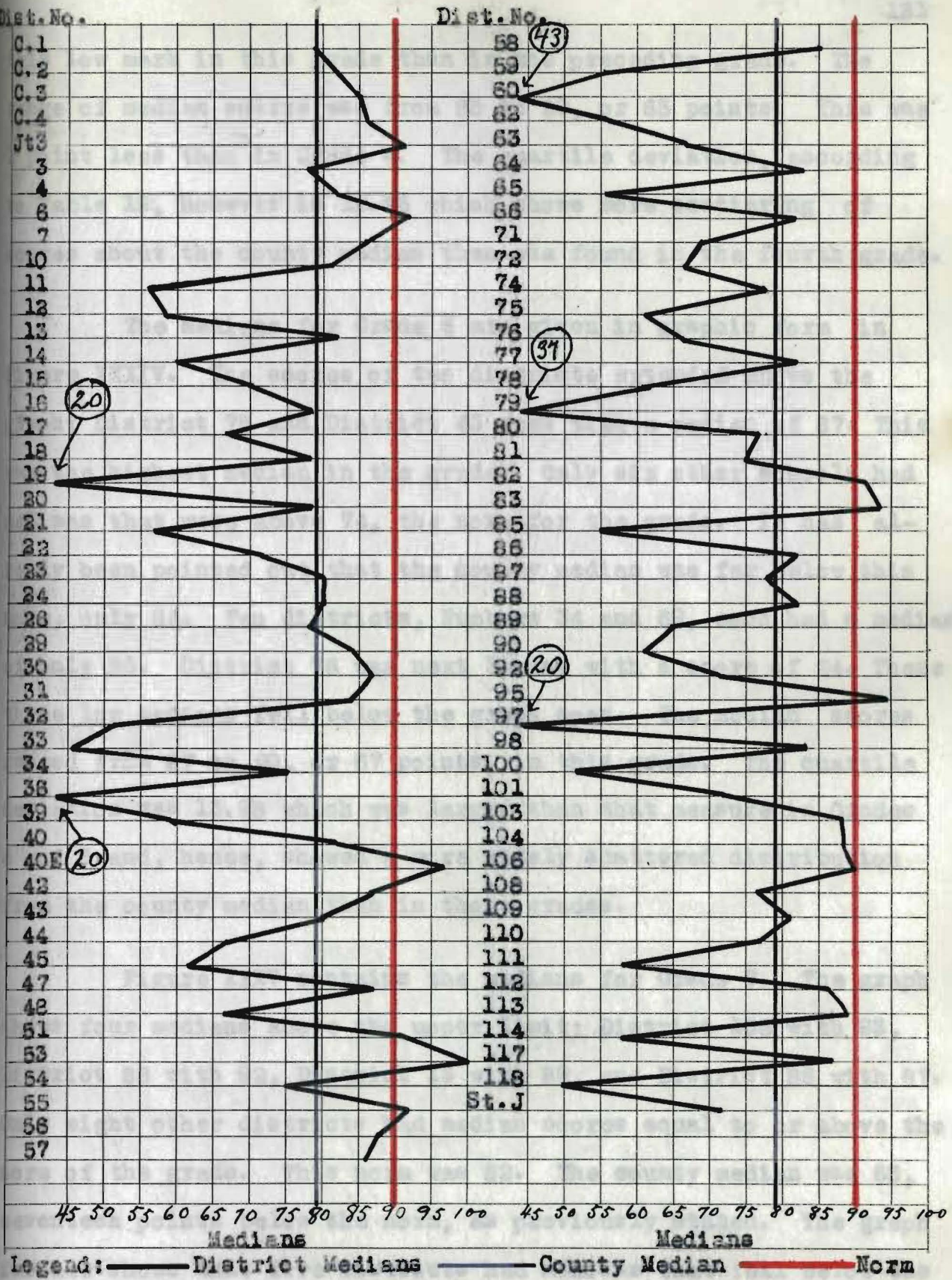
Showing medians of the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 5, Literature, of the New Stanford Achievement Test.

FIGURE XXXV



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 5, Literature, of the New Stanford Achievement Test.

FIGURE XXXVI



Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 5, Literature, of the New Stanford Achievement Test.

this low mark in this grade than in the preceding grade. The range of median scores was from 85 to 20, or 65 points. This was 1 point less than in Grade 4. The quartile deviation, according to Table 19, however is 13.25 which shows more scattering of scores about the county median than was found in the fourth grade.

The medians for Grade 6 are given in graphic form in Figure XXXIV. The scores of two districts extended above the graph; District 75 and District 43 each with a median of 87. This was the highest median in the grade. Only six other schools had medians that were above 74, the norm for the grade. It has already been pointed out that the county median was far below this norm, only 54. Two districts, Numbers 34 and 69, each had a median of only 20. District 76 was next lowest with a score of 24. These three low medians fell below the graph span. The median scores ranged from 87 to 20, or 67 points, in this grade. The quartile deviation was 13.98 which was larger than that measure in Grades 4 and 5 and, hence, showed a more widely scattered distribution from the county median than in those grades.

Figure XXXV contains the medians for Grade 7. The graph shows four medians above the upper limit; District 106 with 93, District 88 with 92, District 13 with 89, and District 86 with 87. Only eight other districts had median scores equal to or above the norm of the grade. This norm was 82. The county median was 65, seventeen points below the norm, as previously stated. The graph further shows that five districts had medians that fell below the lower limit of the graph. These schools were: Numbers 3, 33, 81, 97, and 100, each had a score of 20. The range covered 73 points.

Table 19 gives the quartile deviation for this grade as 14.82. This is even larger than the Q of the preceding grade which shows a still wider scattering of scores than previously.

The medians of Grade 8 are shown in the graph in Figure XXXVI. The norm of 90 was equalled or exceeded by but ten schools. District 53 had a median of 100 and District 40E had 97. These were the highest scores of the group. The low scores were those of Districts 19, 36, and 97, each with a median of 20, District 79 with 37, and District 80 with 43. All of these low medians fell below the lower limit of the graph. The range in this group was from 100 to 20, or 80 points. Although this is a larger range than that in the other grades on this test, the distribution of the scores about the county median was less widely scattered than in the other grades. Table 19 shows the quartile deviation for Grade 8 as 13.1.

From the graphs in Figures XXXII-XXXVI, it is found that the medians for District 107 and District 33 were found the highest in two grades, the fourth and the fifth. District 43 had high rank both in the fourth and the sixth grades. District 3 was among the lowest in the group in the fifth and the seventh grades. District 97 was low in three different grades, the fifth, the seventh, and the eighth grades. District 34 was low in three grades also, the fourth, the fifth, and the sixth.

TABLE 19

Showing the Quartiles and the Quartile Deviations of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.5, Literature, of the New Stanford Achievement Test given in september,1930

	GRADE				
	4	5	6	7	8
Third Quartile	52.08	62.21	69.79	79.07	87.89
Median	44.11	48.51	54.08	64.57	78.64
First Quartile	34.13	37.71	41.82	49.44	61.69
Quartile Deviation	8.98	12.25	13.98	14.82	13.10

TABLE 20

Showing the Decile Ranking of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.5, Literature, of the New Stanford Achievement Test.

	GRADE				
	4	5	6	7	8
9th Decile	63.25	75.13	87.90	93.24	93.85
8th Decile	56.77	64.67	75.33	81.92	89.38
7th Decile	49.08	59.79	65.86	76.44	86.44
6th Decile	46.62	55.69	60.80	69.89	82.81
5th Decile (Median)	44.11	48.51	54.06	64.57	78.64
4th Decile	41.21	45.00	48.40	58.58	73.89
3rd Decile	37.06	40.90	44.77	52.77	65.13
2nd Decile	24.90	32.92	36.50	45.50	57.94
1st Decile	22.33	23.84	24.72	33.86	43.61

INDIVIDUAL SCORES

In the preceding tests, the score of W.H. of the fifth grade in District 68 was used to illustrate the method of comparing and evaluating individual scores. His score will be used in this test. He had a score of 49 in the test. According to Table 17, the county median for the fifth grade was 49 and the norm was 63. This places W.H. exactly at the level of the county median but retarded when compared to the norm. As previously stated in this chapter, the score of 49 for the fifth grade showed a retardation of 9 months. W.H., then, was equal to the median when compared with other fifth graders in the county but was nine school months below the standard for his grade in relation to the norm for this test.

QUARTILE AND DECILE DEVIATION

Since the score of W.H. was exactly at the county median, when the median is considered as a whole number, the quartile and decile deviations need not be considered for his score. The score of another pupil will be taken from the same group. A.M. had a score of 72 in this test. According to Table 18, a score of 72 is found above the third quartile mark for the fifth grade. This means that there were at least 75% of the group whose scores were lower than that made by A.M. or that this pupil was in the upper one fourth of the distribution of the grade in the county. Table 20 shows the distribution divided into deciles. In the column for this grade 72 is found above the eighth decile mark and below the ninth decile. It is nearer the ninth than the eighth perhaps. This shows, then, that A.M. had a score that was better than 80%

of the group, that less than 20% of the pupils in the fifth grade in the county had a better score than did this pupil.

When compared to the norm of 63 for this grade, 72 is found above the norm level. It was only two points less than the norm for the sixth grade which was 74. By the use of the Educational Profile Chart in the test booklet, 72 is found equivalent to the work of the pupil in the eighth month of the fifth school year. This shows A.M. was advanced seven months in his work in literature.

The scores of the entire fifth grade of District 58 were as follows:

77	46
72--score of A.M.	46
72	46
67 Third Quartile	46 First Quartile
64	43
64	37
61	20
58	20
49 -- Median - Score of W.H.	Total 17

By reference to Table 17, the scores of this grade may be compared to the norm for the grade, 63, and the county median, 49. The median of the grade was 49, exactly equal to the county median. This score of 49 was that of W.H. who was mentioned above. If the median score is used as a basis for this group, the grade was inferior to the norm for fifth grades. Table 19 gives the third quartile for grade five as 63.31 and the first quartile as 37.71. Both the first and third quartiles of this fifth grade are above the corresponding levels of the county as a whole. As a class this fifth grade, then, was somewhat above

the average class when compared to others in the county but was below the norm for a standard fifth grade.

CONCLUSIONS

The medians of all of the grades in the county were below the norms for this test. All except one grade, the fourth, were decidedly lower than the standard. As stated earlier in the chapter, the pupils in these other grades, the fifth to the eighth inclusive, show a retardation in literature of a year to more than a year and a half. In Chapters II and III, the reading ability and word knowledge of the pupils of the county were found below normal, according to this battery of tests. This fact probably accounts, in part, for the limited knowledge of the pupils in literature. If a pupil cannot read with comprehension and does not have the vocabulary he should have, it follows that his literary achievement will be inferior.

It would be to the point here to make a comprehensive study of the library facilities of the school of the county and compare the scores made in this literature test with these findings. Such a study should include the number of books available in each school district for each grade in the school, the character of these books, and the extent of the actual use of the books by the teachers and the pupils. The "library Law" enacted in our state a few years ago is a step in the right direction to provide more books for school children. The law requires each school to purchase annually, from an approved list, at least five dollars worth of books per teacher for the school library.

The number of books available to the school children is not the most important phase of the situation, however. The proper use of a limited amount of reading materials will give marked results. The teacher, through suggestions and motivation of school work, may do much to enhance the pupils desire to read. Many pupils read nothing except that which is required by the teacher. Some pupils complete the elementary schools without voluntarily having read any books or stories. The book a child reads of his own accord is the one which gives him the most enjoyment and in which he is the most interested. Required reading lacks spontaneity. It may have some virtue in arousing the child's interest in reading. The door to the world of literature may be opened through the reading of one good book. The teacher not only has the opportunity but also the responsibility to encourage the child to read.

THE PROBLEM OF MEASUREMENT IN HISTORY AND CIVICS

Objective tests in the social science field need not be limited to fact questions. Older tests confined themselves largely to that type of testing procedure and met only the difficulty of determination of a minimum essential list of such facts. Attitudes, perspective, and ideals could not be ascertained merely by measuring the number of memorized facts that an individual might know. Studies in the social science field aim to give the pupil materials that may function in situations that he may meet in present day circumstances, in interpreting current history, events, and governmental situations.

Newer and better tests in social studies contain materials calling for historical judgment and ability to think regarding historical and civic matters. Attempts have been made to include materials in the tests that will measure the attributes mentioned above: the ideals, attitudes, and perspectives that should be acquired by the pupils through social studies. They usually measure information, judgment, and problems in these fields.

Tests in history and civics tend to measure the general attainment in these subjects. Sub-tests on definite periods or on special types of matter such as dates, vocabulary, persons, and the like permit a rough diagnosis of the areas of the sub - jects in which a class or an individual pupil may be weak. Some tests also may furnish materials for practice exercises in drill work on factual matter. Other tests should aid the pupil to develop skill in solving problems in the social study field.

RESULTS OF THE TEST

TABLE 21

Showing the Number of Pupils in Each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the Pupils of the County on Test No. 6, History and Civics.

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
IV	324	48	37
V	295	63	46
VI	283	74	61
VII	284	82	75
VIII	275	90	86

Total 1461

The median scores of the pupils of the county in Grades 4 - 8 inclusive are shown in Table 21, together with the number of pupils in each grade and the norms for the grades. This test was not given in the third or second grades. The medians and the norms are shown also in the graph in Figure XXXVII. In the graph the relation of the medians to the norms may readily be seen. No grade reached the norm in the test. The eighth grade was near to its norm than any other grade. It lacked 4 points of the norm. According to the Educational Profile Chart in the test booklet, the grade was retarded 5 months in its work in history and civics. The seventh grade was 7 points below its norm. This was only one point above the norm for the sixth grade which showed a retardation of almost a full year. Grade 4 was short of the norm 11 points. It was 7 school months below the average fourth grade level. Both of the remaining grades,

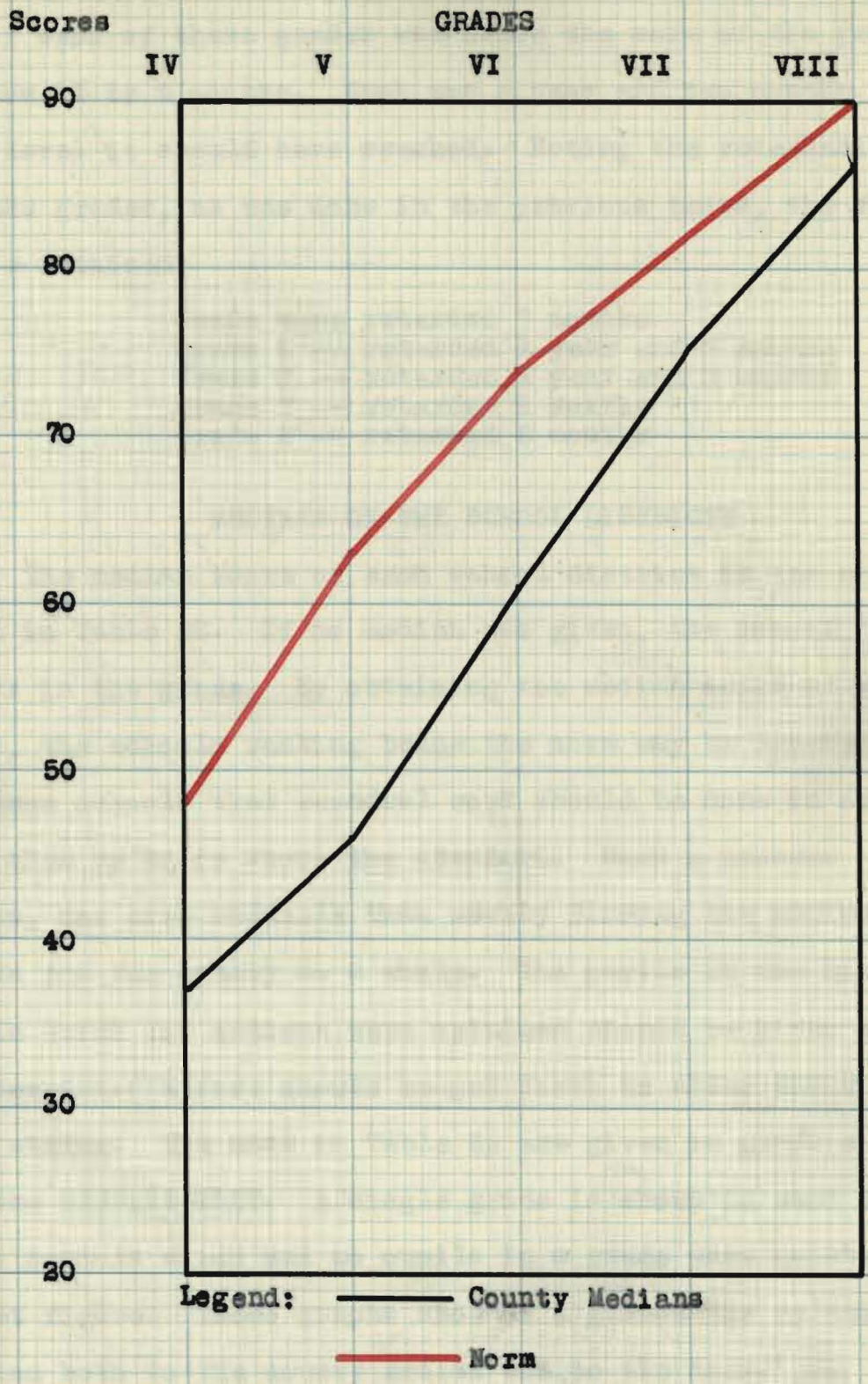


Figure XXXVII. Median scores of the grades of Lyon County, Kansas, for Test No. 6, History and Civics, of the New Stanford Achievement Test in comparison to the norm.

the fifth and the sixth, were more than a year retarded. The median of each of these grades was below the norm of the grade just below it by 2 points. Each was a year and two months below the level it should have reached. Noting the retardations of all the grades, as was done in the previous tests, the following is obtained:

Grade 4 -- retarded 7 months
Grade 5 -- retarded 1 year and 2 months
Grade 6 -- retarded 1 year and 2 months
Grade 7 -- retarded 9 months
Grade 8 -- retarded 5 months

MEDIANS OF THE SCHOOL DISTRICTS

The median score of each school district in the county is shown in Table 22. If no median was given, the school had no pupils in the grade. By obtaining the median score of each district, the schools ranking below the norm may be located. It is in these schools that remedial work should be done in order to bring them up to or above the standard. Such a process is, of course, far more valuable than merely finding the median of any grade for the county as a whole. The pupils in the districts in which low medians were obtained should be given special attention. Effort should be put forth to alter their present status. The data in Table 22 are given in graphic form in Figures XXXVIII-XLII. A single grade is shown in each figure. District schools which had no pupils in a grade were omitted from that figure. These graphs show at a glance the relation of the median both to the county median and to the norm.

TABLE 22

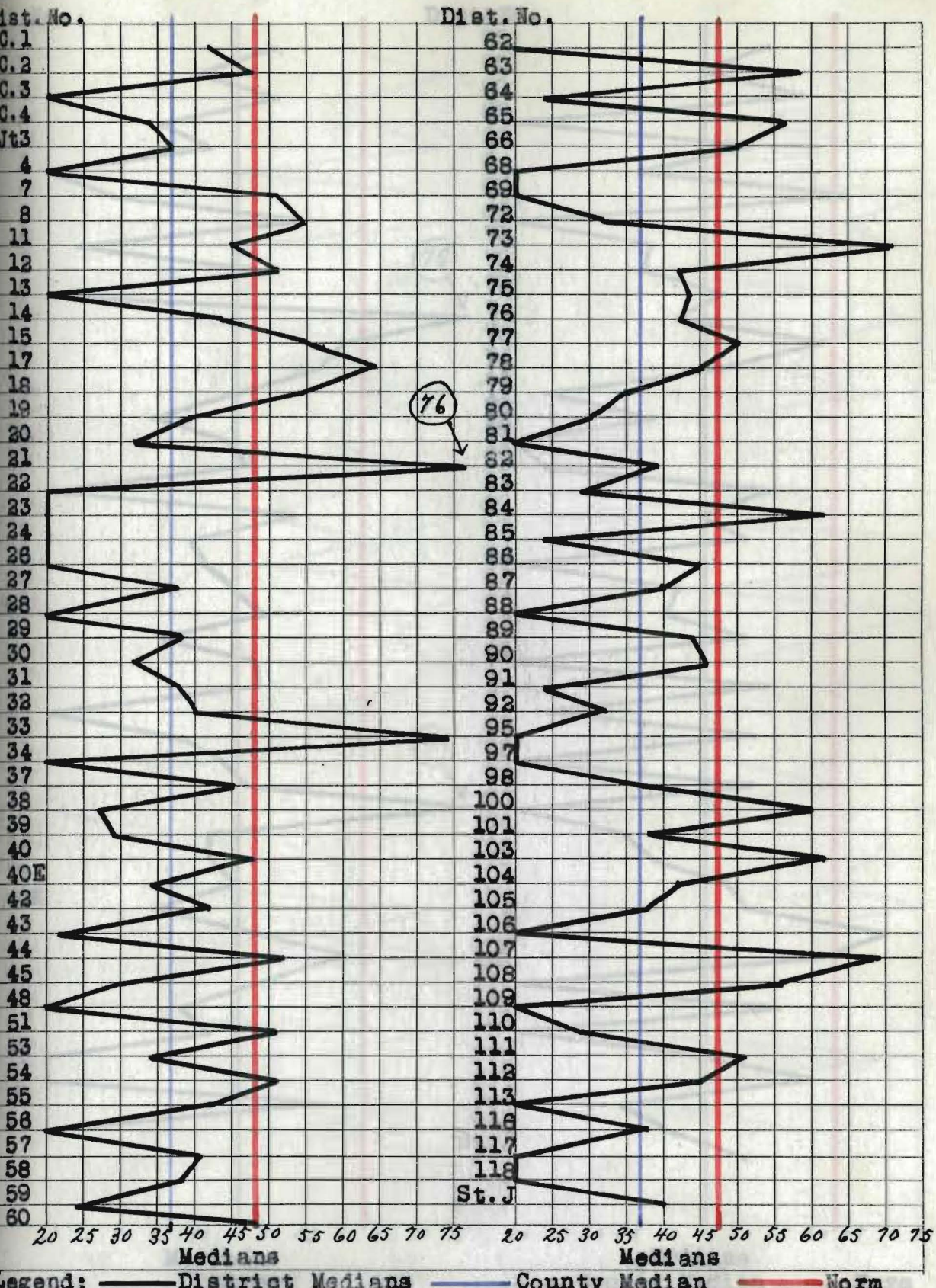
Showing the Medians of all the Grades in the School Districts of Lyon County, Kansas for Test No.6, History and Civics, of the New Stanford Achievement Test.

Dist. No.	GRADE 4	5	6	7	8	Dist. No.	GRADE 4	5	6	7	8
C.1	42	51	60	82	82	58	38	45	65	90	103
C.2	47	40	73	72	93	59	24			67	93
C.3	20	51	62	77	67	60	48	58	51	48	64
C.4	34	35	63	72	88	62	20	20		57	79
Jt.3	37	42		70	96	63	58	53	68	77	75
3		20		88	92	64	24	37	37	32	92
4	20	29	73	57	103	65	58	65	77	95	75
5		54	45	68		66	50		64	75	72
6		24	74	95	93	68	20	20	71	65	
7	51	49	84	55	82	69	20		35	82	
8	54	20		90		71		38	68	64	80
9		78	48	79		72	32	37	72	73	87
10		60	51	57	82	73	71	48	60	60	
11	45	57	44	86	71	74	42	42	57	62	63
12	51	46	38	60	91	75	43	62	67		77
13	20	34	66	88	71	76	42	47	47	92	92
14	43	44	52	67	75	77	50	24	24	62	67
15	55	47	75	72	70	78	45	36	27	63	73
16		20	61	57	90	79	35	20	62	39	69
17	64	53	57	88	77	80	30	24	24	77	87
18	54	39	69		81	81	20	54		81	85
19	39	41	80	87	87	82	39	45	82		87
20	32	45	48	80	87	83	29	51	71	73	93
21	76	49	64		75	84	62	20	42	72	
22	20	35	48		88	85	24	42	77		67
23	20		85	80	87	86	45	40	62	87	83
24	20		71	71	94	87	40	51	48		54
26	20	48	87	77	88	88	20	20	20	92	87
27	38	48		57		89	44			66	74
28	20	20	73	58		90	48	54			97
29	38		68	69	87	91	24	24	53	77	
30	32	38	56	77	96	92	32	52	35	92	83
31	38	44	63	79	86	95	20	20	48	38	96
32	40	47	42	77	57	96		52		57	
33	74	79	20	48	34	97	20	20	63	70	91
34	20	42	20	65	81	98	37	34	42	63	96
36		42	42		64	100	60	38	70	74	85
37	45		47			101	38			76	91
38	27					103	62	48		69	101
39	29	45	37	48	76	104	42	51	68	85	87
40	48		73	69	93	105	38		62		
40E	34	34		75	99	106	20		75	70	99
42	42	48	56	77	82	107	69	70			
43	22	60	81	89	90	108	56	61	51	20	83
44	52	48	57	48	92	109	20	20	48	80	81
45	30	38	20	80	67	110	29	55	24	34	62
47		42	71	70	97	111	51	20	42	71	80
48	20	20	54	58	82	112	45	42			89
51	51	20	57	74	110	113	20	80	34		88
53	34	58	68	82	110	114			73	54	89
54	51	20	54	73	83	116	38	34		72	
55	42	54	83	70	82	117	20		44	34	93
56	20		65		103	118	20	40	42	54	60
57	41		62		94	St.J	40	51	58	78	81

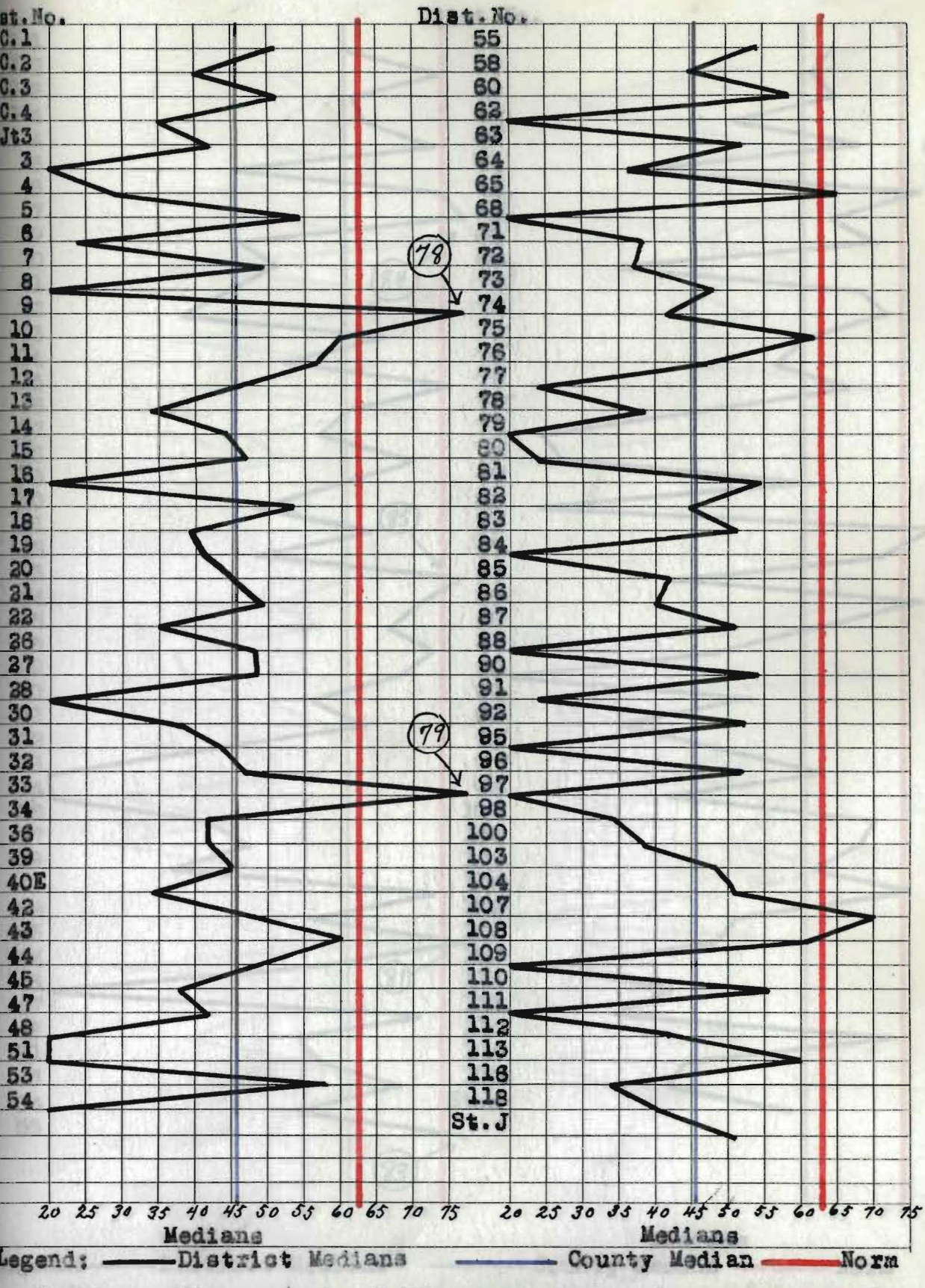
Figure XXXVIII contains the median scores for the fourth grade. The school that made the highest score was District 31 with 76. This score extended above the range of the graph. District 33 was second with 74, District 73 followed with 71, and District 107 was next with 69. At the other extreme there were several schools that made 20 which, as previously stated, was the lowest possible score. The range of medians, then, was 56 points, from 76 to 20. By reference to Table 23, the quartile deviation for this grade was 13.04. The county median was 37 and the norm was 48.

The medians for Grade 5 are given in Figure XXXIX. District 33 was highest in this group with a score of 79. District 9 was second with 78. Both of these medians were beyond the upper limit of the graph. Diatirct 107 was third with 70, and District 65 was fourth with 65. These four schools were the only ones in the group with medians above the norm which was 63 for this grade. The county median was 46. A large number of schools in the group dropped to a median of 20. The range was 59; the quartile deviation was 16.16. The distribution of the scores was more widely scattered than in Grade 4.

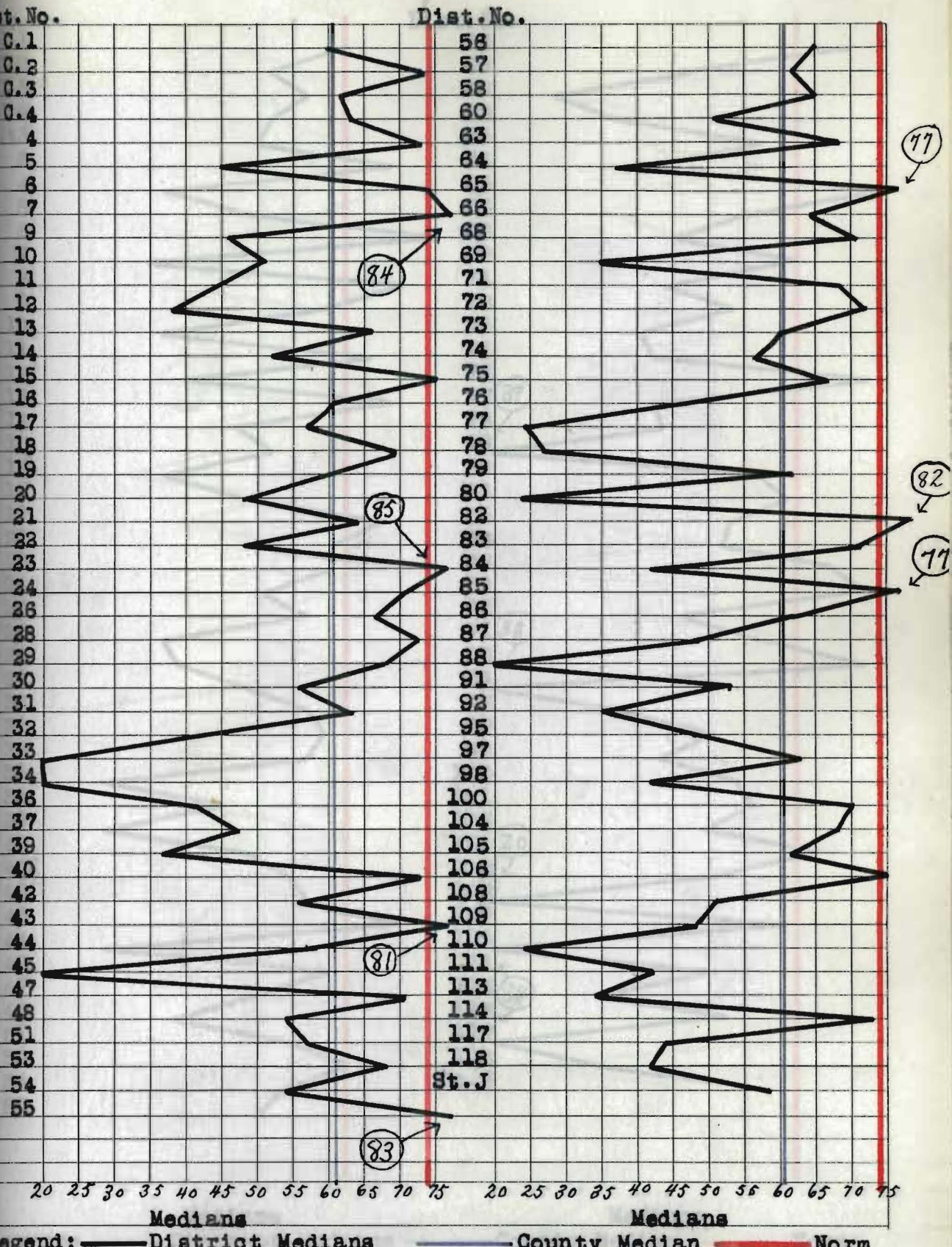
Grade 6 had medians as shown in Figure XL. The scores covered a larger range than either the fourth or fifth grades. from 85 to 20, or 65 points. Table 23 gives the quartile deviation as 12.67, which was smaller than the two preceding grades. This shows that the middle 50% of the scores was more closely packed about the median than was the case in the other two grades. Seven districts are shown with medians above the



Showing medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 6, History and Civics, of the New Stanford Achievement Test.

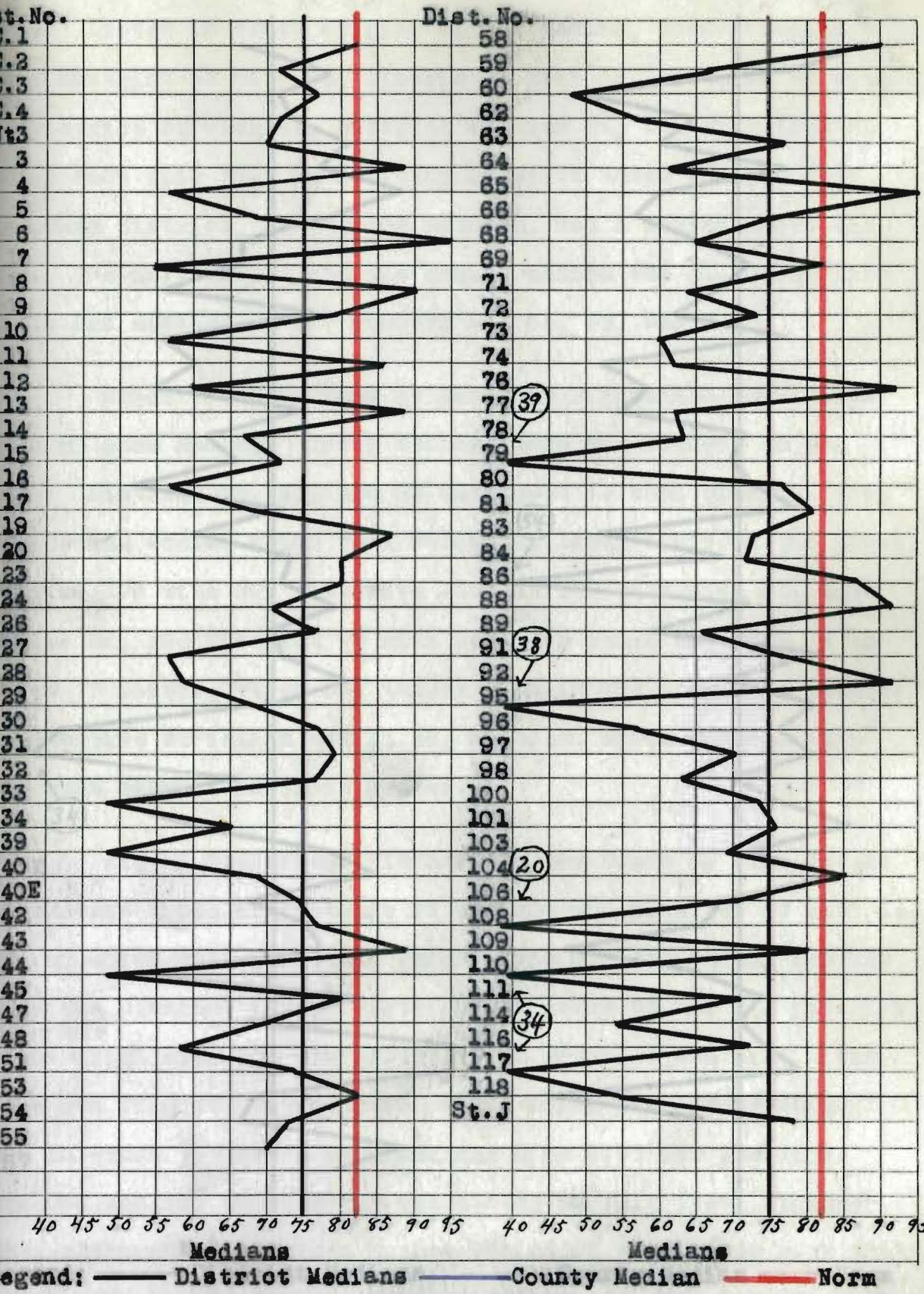


Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 6, History and Civics, of the New Stanford Achievement Test.

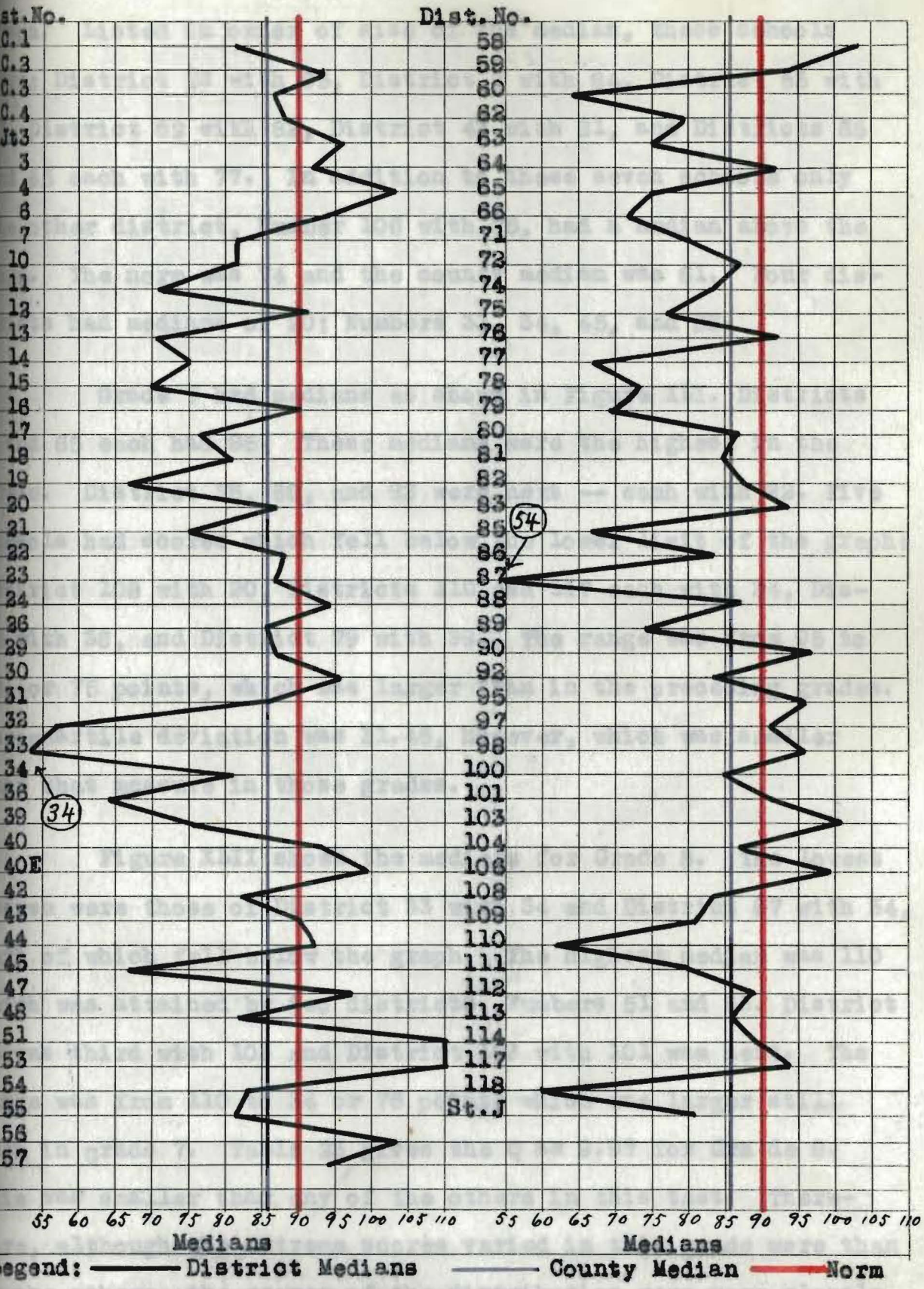


Showing medians of the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.6, History and Civics, of the New Stanford Achievement Test.

FIGURE XLI



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 6, History and Civics, of the New Stanford Achievement Test.



Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 6, History and Civics, of the New Stanford Achievement Test.

graph. Listed in order of size of the median, these schools were: District 23 with 85, District 7 with 84, District 55 with 83, District 82 with 82, District 43 with 81, and Districts 65 and 85 each with 77. In addition to these seven schools only one other district, Number 106 with 75, had a median above the norm. The norm was 74 and the county median was 61. Four districts had medians of 20: Numbers 33, 34, 45, and 88.

Grade 7 had medians as shown in Figure XLI. Districts 6 and 65 each had 95. These mediand were the highest in the grade. District 76, 88, and 92 were next -- each with 93. Five schools had scores which fell below the lower limit of the graph: District 108 with 80, Districts 110 and 117 each with 34, Dis- 95 with 38, and District 79 with 39. The range was from 95 to 30, or 75 points, which was larger than in the preceding grades. The quartile deviation was 11.46, however, which was smaller than that measure in those grades.

Figure XLII shows the medians for Grade 8. The lowest scores were those of District 33 with 34 and District 87 with 54, both of which fell below the graph. The highest median was 110 which was attained by two districts, Numbers 51 and 53. District 58 was third with 103 and District 103 with 101 was next. The range was from 110 to 34 or 76 points which was larger still than in grade 7. Table 23 gives the Q as 9.97 for Gra de 8. This was smaller than any of the others in this test. Therefore, although the extreme scores varied in this grade more than in the others, the scores of the distribution were more closely packed about the median than in the other grades.

In comparing the districts with scores at the extremes, through all the grades, District 33 was found high in grades 4 and 5, but low in 6, 7, and 8. District 65 was high in four grades, the fourth, fifth, sixth, and seventh, but was rather low in the eighth. District 107 was high in the grades in which it had classes, the fourth and fifth. District 88 was low in three grades: the fourth, fifth, and sixth, was high in the seventh, and about average in the eighth. Other districts may be traced through all the grades on this test for a tendency toward persistent ranking in all grades, whether above, equal to, or below the norm or the county median. By the use of Tables 23 and 24, the decile and quartile ranking of the medians of any district may be determined for persistence tendency in any part of the distribution.

INDIVIDUAL SCORES

Analysis of relationships and rankings of scores need not stop with class medians but should be carefully carried on with the scores of individuals. Using the same pupil as in previous tests, W.H. of the fifth grade of District 58, individual analysis will be illustrated. In history and civics W.H. had a score of 20. This was the score given to a pupil who had 0 as a remainder when one-half of the number of wrong responses were subtracted from the number of responses right. It was the lowest score possible on the test. Using Table 23, the score of 20 is found below the first quartile for his grade, the fifth. In Table 24, it is found below the first decile mark. This places the pupil in the lowest tenth of the

group of pupils in the fifth grade in the county. His rank in these subjects, history and civics, was about the same as in the test in language usage. Tests that would roughly diagnose his weaknesses in the field of social studies might aid in establishing his present status and in acquainting the teacher with a basis for remedial work.

STANDING OF A CLASS OF A SCHOOL DISTRICT

Analysis may be carried further by examining a whole grade of a school and then locating individuals in the class group and to the grade as a whole in the county. The same class as used before will be cited, the fifth grade of District 58. The scores of the class, arranged in order, were as follows:

82	38
77	38
71	38
62 Third Quartile	34 First Quartile
54	20
54	20
51	20 --Score of W.H.
48	20
45 --median	
	Total 17

The median of the class was 45. According to Table 23, the county median for this grade was 45.64, the third quartile was 58.55, and the first quartile was 34.24. This places the class about at the level of the county median. As before mentioned, however, the county median shows a retardation from the norm of more than a full year. The norm was 63. Only the upper one fourth of this class equalled or exceeded this standard. The three highest scores compare favorably with the norm for the sixth grade. The top score, 82, was equal to the norm for the

seventh grade. Four pupils in the class had a score of 30 on this test. This was a decidedly inferior mark. One-half of this group in this school district had scores that indicate the pupils should be given remedial work in history and civics.

CONCLUSIONS

According to this test, the pupils of the county have an inferior ranking in all grades in history and civics. The pupils are retarded from a half year to a little more than a full year. Schools in which a grade or more than a grade have medians below the norm should seek remedies for present situations. Remedial work with individuals of all schools whose scores were below standard would give better results still. This test largely measures factual materials in the social studies field. As was pointed out at the beginning of the chapter a knowledge of facts is not the ultimate end of instruction in these subjects. However, if the factual materials are not learned, the foundation for acquiring the attitudes and ideals previously discussed will be lacking.

CHAPTER VIII

TEST NO.7 — GEOGRAPHY

NATURE OF THE TEST

This test contains items pertaining to the field of geography. As many of the other tests in the battery, it is a multiple-choice type. The pupil is asked to choose one of the three given words that accompany each sentence which will make a true statement. The directions at the beginning of the test are:

" Draw a line under the word which makes the sentence true."

A few of the statements in the test are:

1. The zone nearest the poles is the
   frigid temperate torrid

2. A city noted for the manufacturing of automobiles is
   Cincinnati Chicago Detroit

3. A principal crop of Russia is
   sugar cane wheat rice

4. Water power is chiefly an aid to
   navigation irrigation manufacturing

5. Much African terrotory is controlled by
   Italy Enland Turkey

There are eighty sentences in the test. The score is found as in the previous test: the use of the formula R-W/3 and the evaluation by the use of the table of equivalents at the end of the test. A score of 24 is given for a result of zero or less.

In selecting the materials for the test, the authors made a careful analysis both of textbooks and tests in geography to secure items for use and to determine the relative emphasis to give each phase of the subject. A wide range of geographic information is used. Various continents and countries are empha-

sized in proportion to their importance. Only information of the greatest social significance was included in the test.

OTHER TESTS IN GEOGRAPHY

Most tests in geography aim to show primarily the general measure of attainment in the subject. Separate tests or parts of a test may cover one continent; the cities, natural features, natural resources, products, industries, and the like. Through the use of tests, then, the teacher and the pupil may discover points which need attention, emphasis, and discussion. Some tests may stress judgment and reasoning rather than facts or in addition to factual information. These tests include the measuring of the ability of the child to use the facts he knows. They involve comparison, evaluation, and organization of facts. The character of tests in geography and the problems encountered in their construction, use, and interpretation have much in common with the tests in history and civics that were discussed in the previous chapter.

RESULTS OF THE TEST

TABLE 25

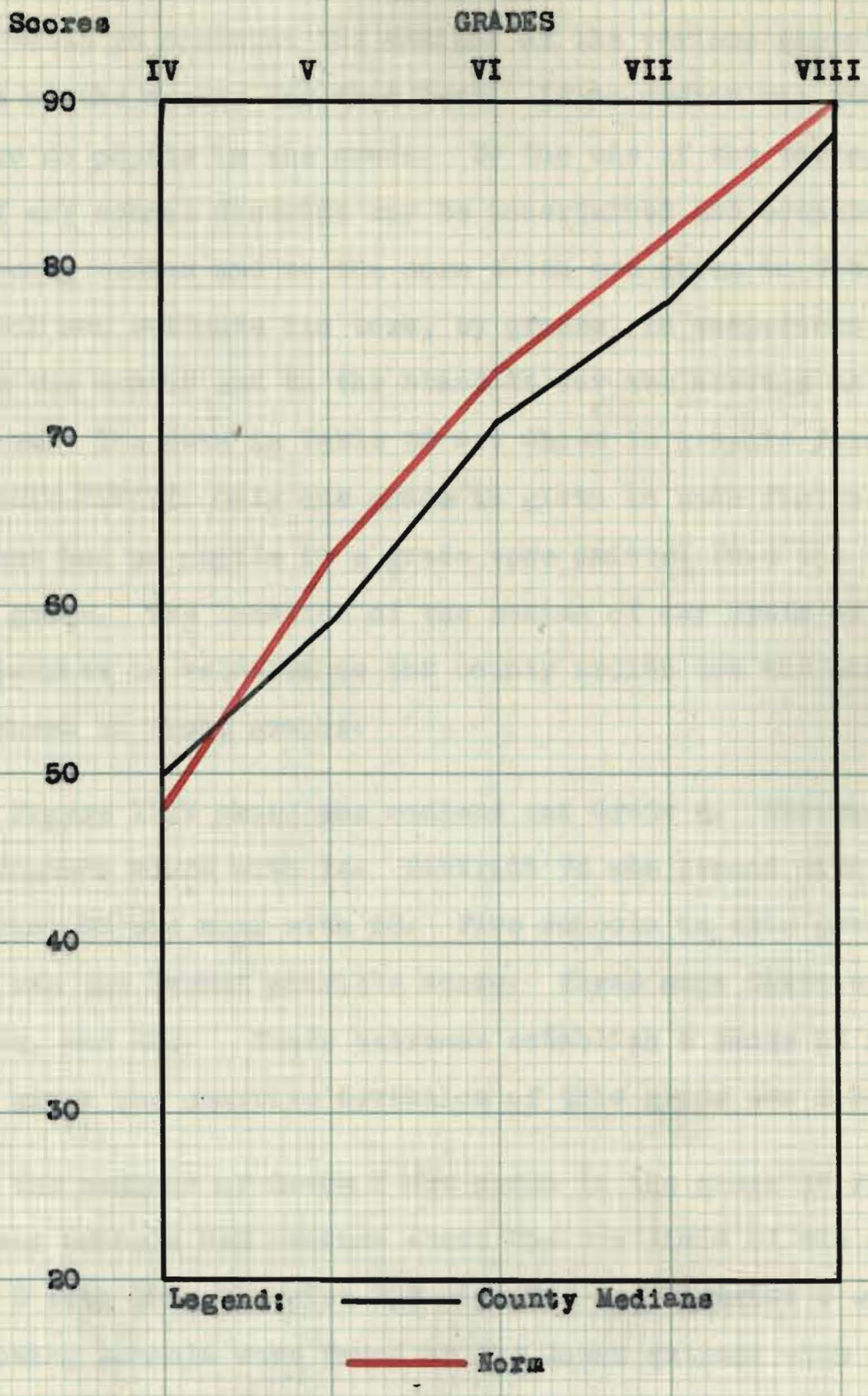
Showing the Number of Pupils in Each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the Pupils of the county on Test No.7, Geography

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
IV	324	48	50
V	295	63	59
VI	283	74	71
VII	284	82	78
VIII	275	90	88

Total 1461

The median scores of the pupils of the county in grades 4-8, inclusive, are shown in Table 25. The number of pupils in each grade and the norm for the grade are given also. The test is not given below the fourth grade. The median scores and the norms are shown also in Figure XLIII. In the graph in this figure, the relation of the county median to the norm is clearly presented. The fourth grade median was above the norm 3 points. According to the Educational Profile Chart in the test booklet, the acceleration of this grade was 1 month. The eighth grade median was 2 points below the norm. The chart shows this to be a retardation of 2 months. Grade 6 was 3 points below the norm or 3 months below the standard school grade. Grade 5 was 4 points short or 4 months below standard. Grade 7 was 4 points below the norm also but was further from the normal school grade than was the fifth grade, or in fact than any of the other grades. The chart shows a retardation of 6 months for Grade 7. Arranged as to the departure from the standard school grade, according to the norm and the educational chart, the grades were as follows:

Grade 4 -- accelerated 1 month
Grade 5 -- retarded 4 months
Grade 6 -- retarded 3 months
Grade 7 -- retarded 6 months
Grade 8 -- retarded 2 months



FigureXLIII. Median scores of the grades of Lyon County, Kansas, for Test No. 7, Geography, of the New Stanford Achievement Test in comparison to the norm.

MEDIANS OF THE SCHOOL DISTRICTS

Table 26 contains the medians of the various school distri cts of the county for this test. If no median was given there were no pupils in the grade. By the use of the table, the median of any school district may be ascertained and compared to the county median and to the norm which are given in Table 25. Each school can evaluate its work, by grades, in comparison to others in the county and to the standard for the average as shown by the norm. The data in Table 26 are shown in graphic form in Figures XLIV-XLVIII. Only one grade is given in each figure. Districts that had no pupils in a grade were omitted from the figure for that grade. The location of the median of any grade of any school district in relation to the county median and the norm is clearly shown by these graphs.

Figure XLIV shows the medians for Grade 4. District 107 had the highest score with 74. District 74 was second with 67, and District 63 was next with 66. Five schools in this group had 24 which was the lowest possible score. These were Districts 8, 26, 91, 92, and 106. These extremes establish a range of 50. Table 27 gives the quartile deviation of this grade was 8.34

The medians of Grade 5 are given in the graph in Figure XLV. Three schools had medians above the top limit of the graph: District 9 with 100, District 107 with 78, and District 6 with 77. The following schools were found at the lower extreme with a median score of 24: Districts Jt.3, 63, 68, and 95. The range was from 100 to 24 or 76. The Q which was 7.91 was about the same as in Grade 4.

TABLE 26

Showing the Medians of all the Grades in the School Districts of Lyon County, Kansas for Test No. 7, Geography, of the New Stanford Achievement Test

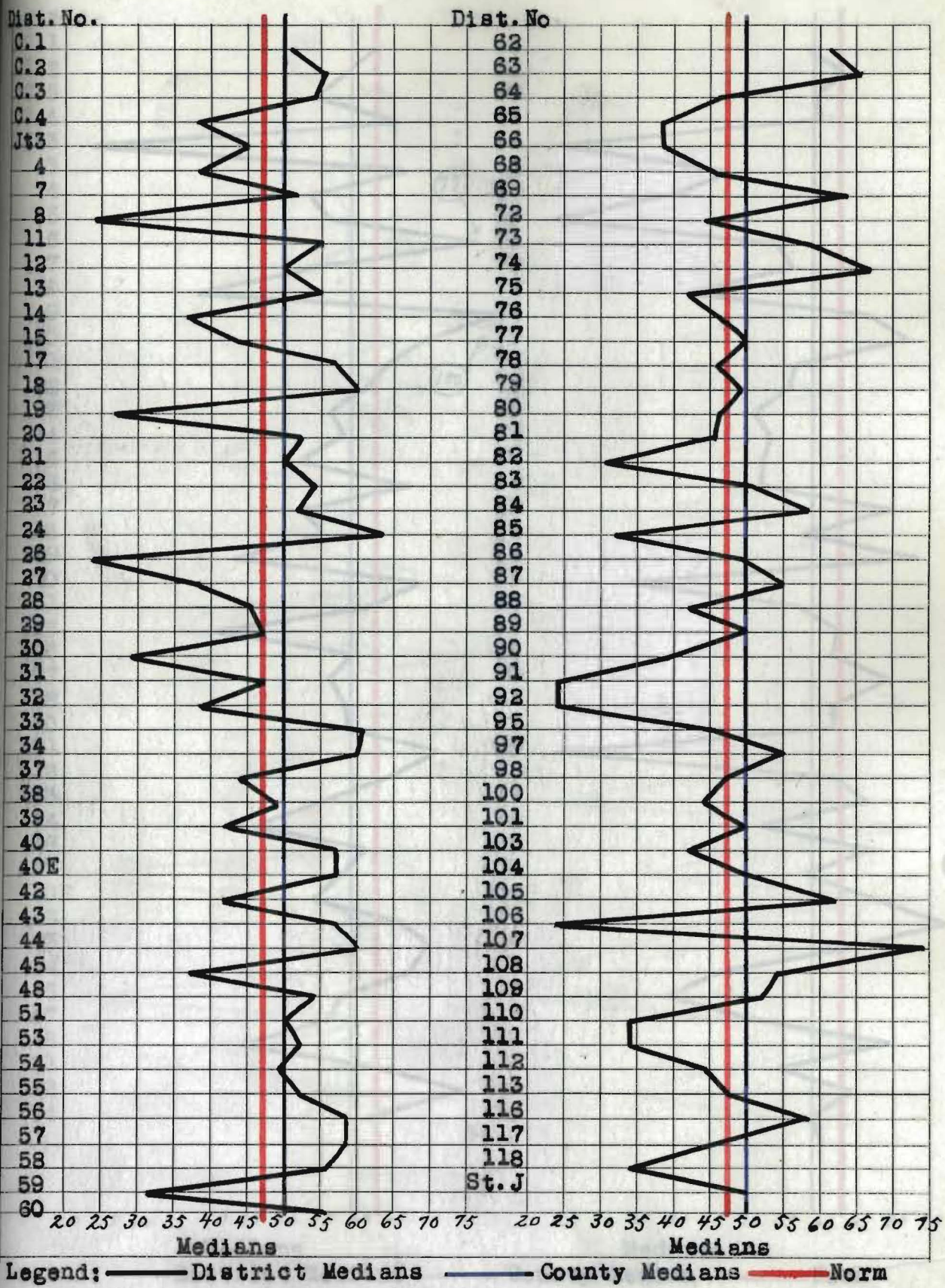
Dist. No.	GRADE 4	5	6	7	8
C.1	51	63	69	87	87
C.2	56	58	72	72	88
C.3	54	64	77	87	98
C.4	38	65	77	78	87
Jt.3	45	24		86	95
3		66		98	101
4	38	53	85	74	107
5		56	76	81	
6		77	77	100	97
7	52	53	78	77	89
8	24	38		104	
9		100	78	89	
10		69	72	70	93
11	55	64	68	92	78
12	50	61	86	64	80
13	55	56	85	112	86
14	37	58	72	72	77
15	43	52	90	72	68
16		67	73	75	91
17	57	52	67	24	85
18	60	55	80		76
19	27	43	78	101	71
20	52	68	80	98	96
21	50	62	68		80
22	54	41	78		85
23	52		95	81	105
24	63		60	83	91
26	24	59	56	87	89
27	38	56		58	
28	46	58	106	72	
29	48		70	69	88
30	29	59	64	78	116
31	48	71	79	82	87
32	38	64	72	88	92
33	61	55	64	44	76
34	60	46	62	72	89
36		61	64		92
37	44		78		
38	49				
39	42	58	38	50	88
40	57		74	76	93
40E	56	54		72	105
42	42	66	81	85	82
43	57	69	81	92	95
44	60	67	73	81	92
45	37	58	24	81	72
47		56	62	76	102
48	54	44	67	70	81
51	50	63	64	74	135
53	52	74	80	92	120
54	49	62	71	71	85
55	52	58	77	87	88
56	58		91		103
57	58		68		95

Dist. No.	GRADE 4	5	6	7	8
58	56	63	74	92	105
59	32			77	89
60	56	59	83	75	78
62	62	60		75	83
63	66	24	85	71	68
64	47	47	47	77	97
65	38	39	42	89	77
66	38		24	64	77
68	46	24	76	63	
69	63		62	79	
71		54	76	67	73
72	44	56	72	88	82
73	58	42	58	89	
74	67	67	58	57	74
75	42	72	82		93
76	47	57	67	92	87
77	50	58	62	72	67
78	46	51	67	69	73
79	49	53	71	62	72
80	47	52	57	85	93
81	46	52		72	76
82	31	70	89		110
83	51	58	63	81	91
84	58	73	61	75	
85	32	34	67		72
86	50	57	74	92	92
87	55	63	62		78
88	42	62	67	102	96
89	50			74	81
90	39	69			89
91	24	62	64	72	
92	24	62	63	102	82
95	46	24	69	62	109
96		62		77	
97	55	66	64	67	98
98	48	52	41	64	98
100	44	67	93	95	91
101	50			67	81
103	42	58		76	110
104	50	67	69	91	101
105	62		56		
106	24		91	83	88
107	74	78			
108	54	64	63	76	79
109	52	46	52	72	76
110	34	39	42	57	77
111	34	50	24	77	78
112	44	69			90
113	48	54	71		81
114			85	60	89
116	58	64		78	
117	46		65	38	105
118	34	59	54	78	68
St. J	50	60	72	67	89

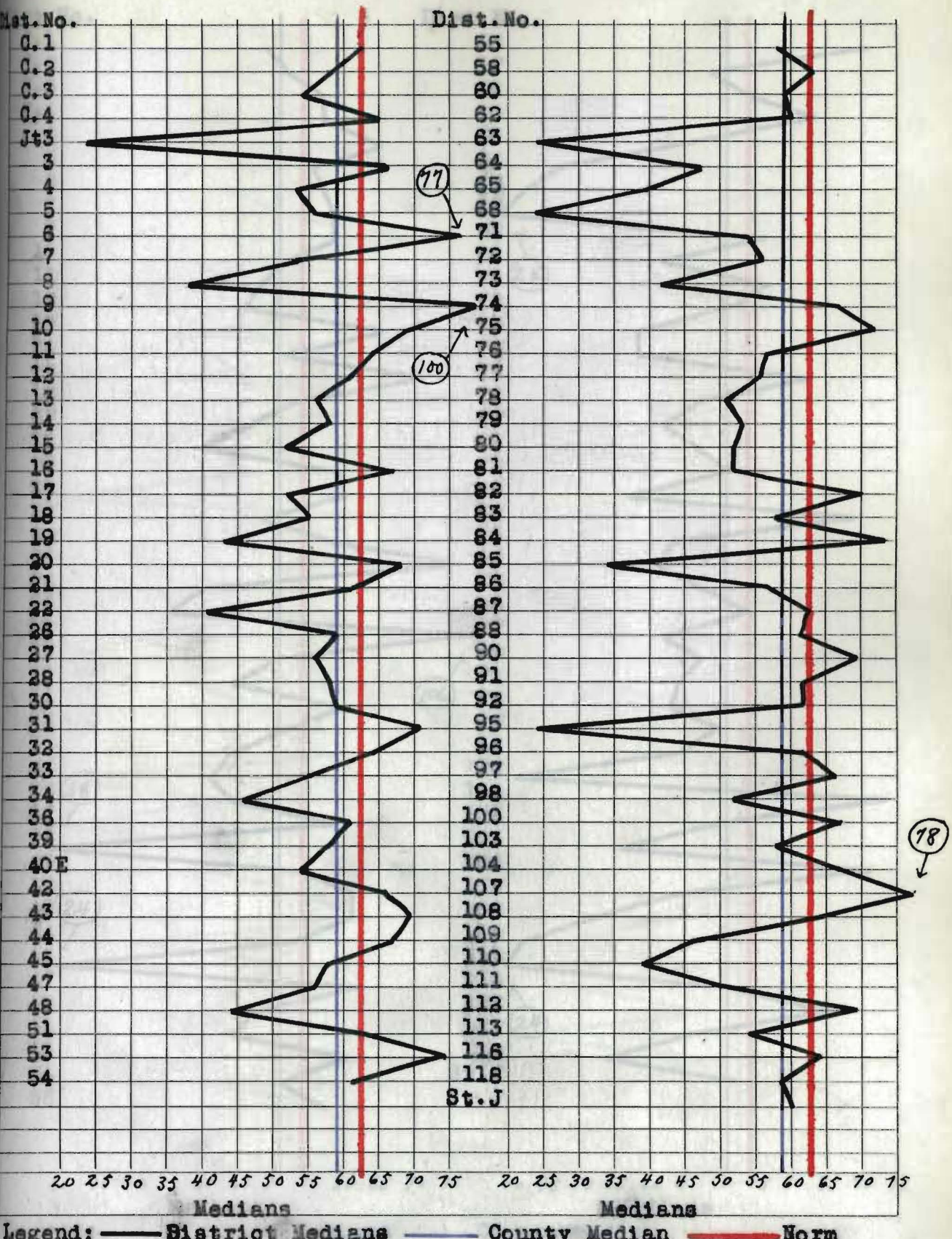
The graph in Figure XLVI contains the medians of Grade 6. Districts 46, 66, and 111 each had 24 which was the lowest median in the grade. District 39 had 38 which was the next lowest. These four scores extended below the limit of the graph. One median was above the graph, District 28 with 108. It was followed by Districts 100, 56, 106, and 82 with medians of 93, 91, 91, and 89, respectively. The range was 82 and the Q was 8.86. The range was larger but the Q was about the same as in Grades 4 and 5.

The medians for Grade 7 are shown in Figure XLVII. District 13 was highest with 112 which was above the graph. It was followed by District 8 with 104 and District 6 with 100. District 17 was lowest with 24. Number 117 had 38 and Number 33 had 44. These three low scores were below the lower limit of the graph. The range was 88 points, from 112 to 24. The Q was 13.16 according to Table 27. Both of these measures were higher forthis grade than in any of the other grades, showing more variability in this distribution of scores.

Figure XLVIII shows the medians for Grade 8. District 51 was highest in this grade with 125 and District 53 was next with 120. District 30 was third with 116. The median of 125 was above the graph. The lowest median was that of District 77 which was 67. Districts 15, 63, and 118 each had 68 which was next to the lowest. The range was 58. The quartile deviation was 10.98 which was the secondhighest on this test. It was but little lower than the Q of Grade 7.



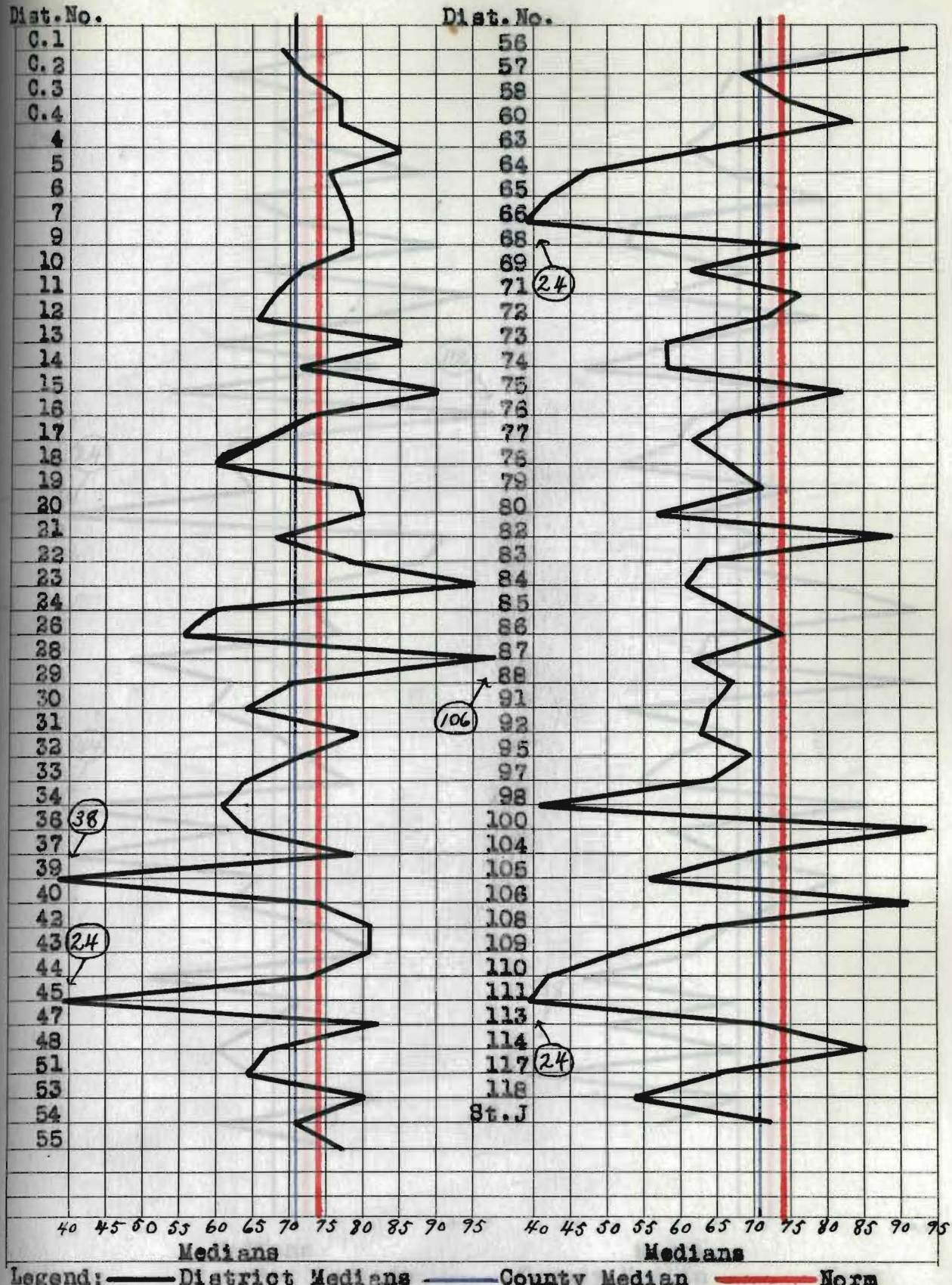
Showing medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 7, Geography, of the New Stanford Achievement Test.



Legend: District Medians — County Median — Norm

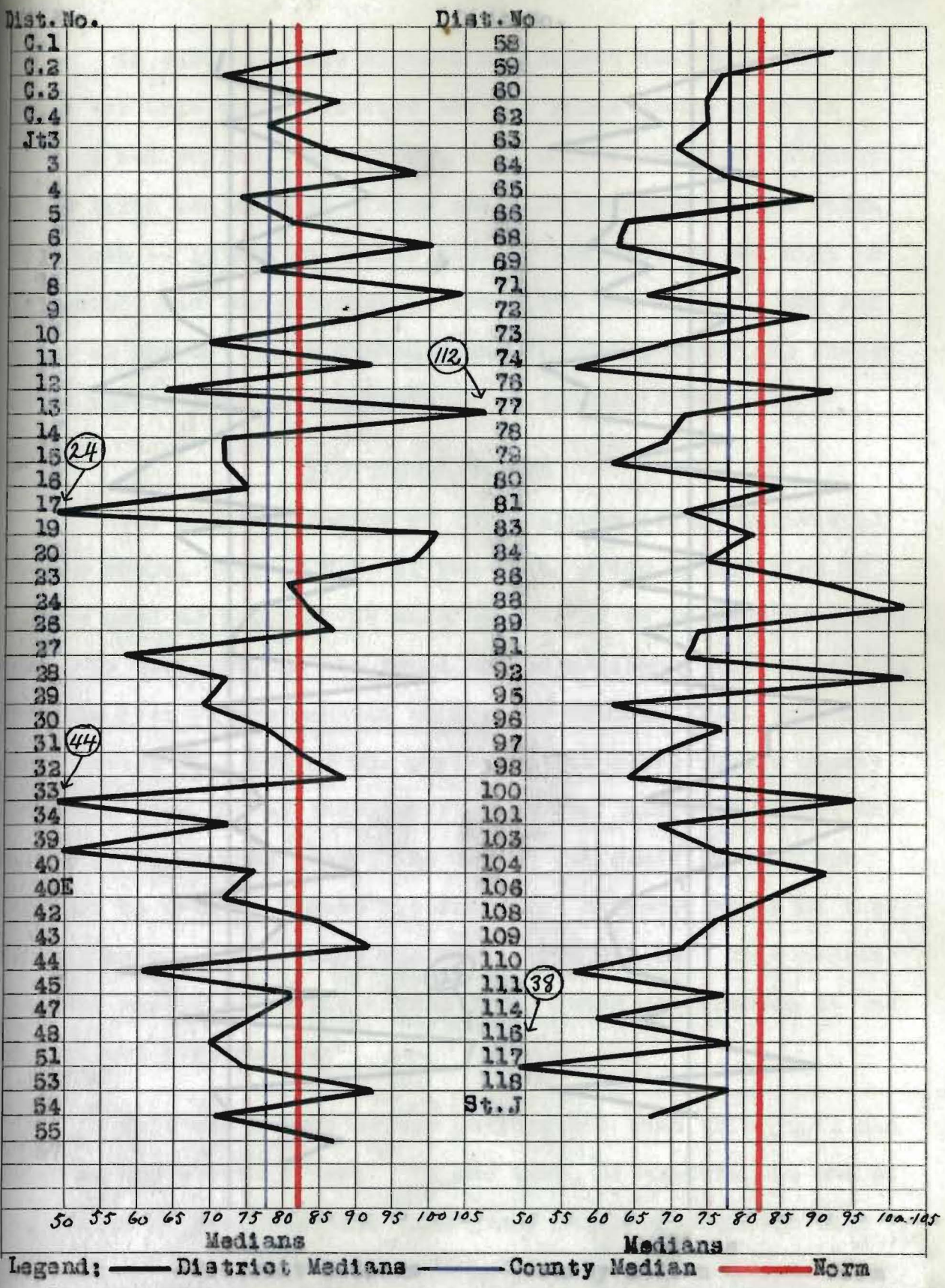
Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 7, Geography, of the New Stanford Achievement Test.

FIGURE XLVI



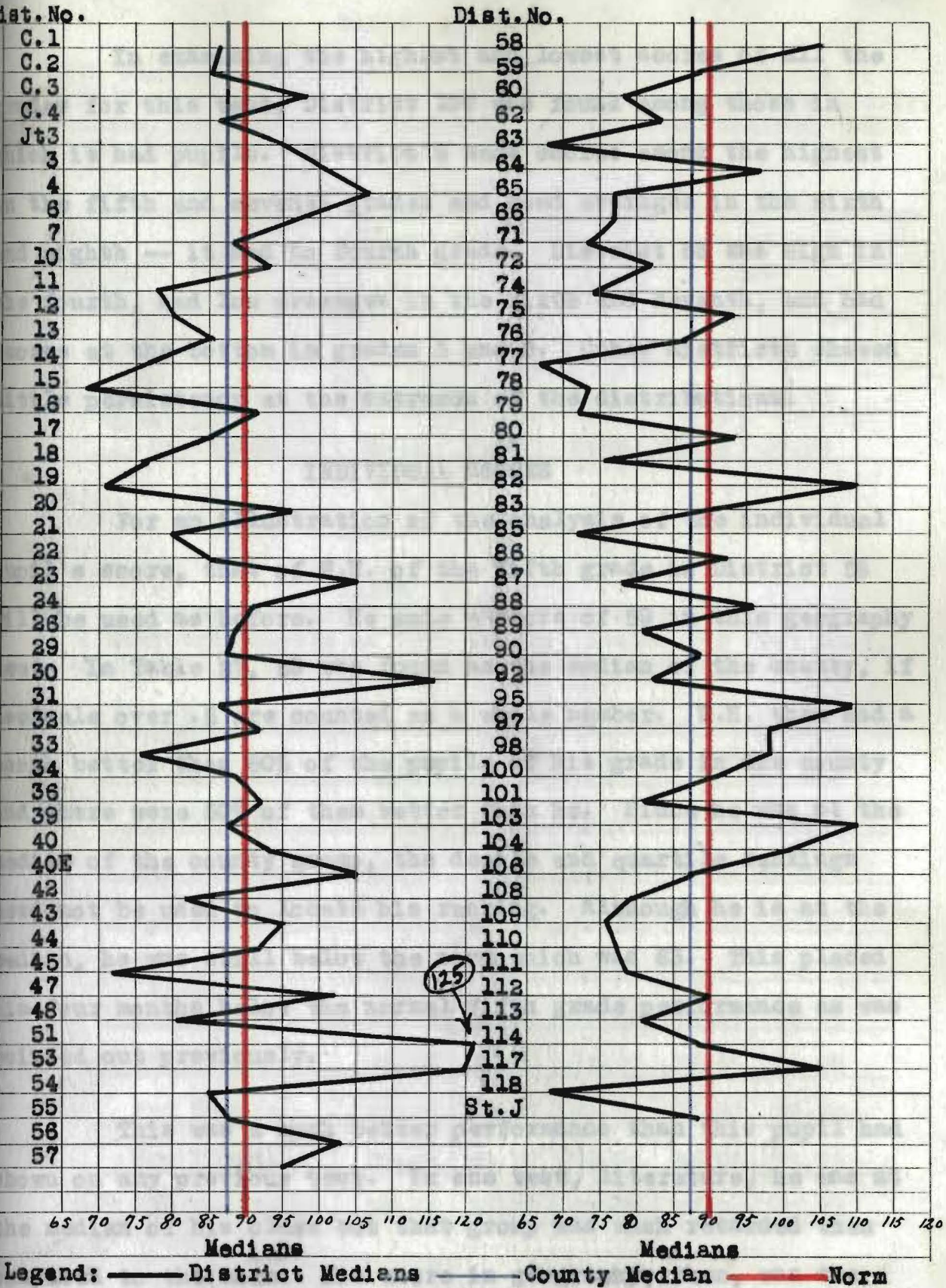
Showing medians of the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 7, Geography, of the New Stanford Achievement Test.

FIGURE XLVII



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 7, Geography, of the New Stanford Achievement Test.

FIGURE XLVIII



Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 7, Geography, of the New Stanford Achievement Test.

In examining the highest and lowest scores of all the grades for this test, District 107 was found among those in which it had pupils. District 6 made scores among the highest in the fifth and seventh grades and good averages in the sixth and eighth -- it had no fourth grade. District 63 was high in the fourth, had low averages in the sixth and seventh, and had scores at the bottom in grades 5 and 8. Other districts showed little persistency at the extremes of the distributions.

INDIVIDUAL SCORES

For an illustration of the analysis of the individual pupil's score, that of W.H. of the fifth grade in District 58 will be used as before. He made a score of 59 in this geography test. In Table 27, 59 was found as the median of the county, if decimals over .5 are counted as a whole number. W.H. then had a score better than 50% of the pupils of his grade in the county and there were 50% of them better than he. Since he was at the median of the county group, the decile and quartile rankings need not be used to locate his ranking. Although he is at the median, he was still below the norm which was 63. This placed him four months below the normal fifth grade performance as was pointed out previously.

This was a much better performance than this pupil had shown on any previous test. In one test, literature, he was at the median of his class but that group was much retarded when compared to the norm. His score in geography, then, was the best he has done in the battery thus far. He did better in Arithmetic Reasoning in Test 9, however, than on this test.

TABLE 27

Showing the Quartiles and the Quartile Deviations of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.7, Geography, of the New Stanford Achievement Test given in September, 1930

	GRADE				
	4	5	6	7	8
Third Quartile	56.94	67.98	79.40	90.00	99.70
Median	49.79	59.28	70.82	78.24	88.36
First Quartile	40.27	52.16	61.68	65.67	77.73
Quartile Deviation	8.34	7.91	8.86	12.16	10.98

TABLE 28

Showing the Decile Ranking of the Various Grade of the Elementary Schools of Lyon County, Kansas for Test No.7, Geography, of the New Stanford Achievement Test

	GRADE				
	4	5	6	7	8
9th Decile	61.89	74.77	98.08	99.71	111.35
8th Decile	58.24	70.16	83.17	93.55	103.33
7th Decile	55.63	65.81	77.11	86.45	97.33
6th Decile	52.76	62.33	73.54	81.58	92.74
(Median) 5th Decile	49.79	59.28	70.82	78.24	88.36
4th Decile	46.42	56.78	67.17	75.45	84.00
3rd Decile	42.48	53.96	63.40	71.60	79.54
2nd Decile	38.45	50.37	59.92	64.50	75.92
1st Decile	23.64	41.59	53.88	57.85	70.34

THE FIFTH GRADE OF DISTRICT 58

The scores of the pupils of the fifth grade of District 58, for this test, were as follows:

92		63	
91		59	
90		59	---Score of W.H.
83	Third Quartile	58	First Quartile
77		57	
74		56	
69		50	
67		24	
63	-Median		

Total 17

The median of this class was 63, exactly equal to the norm for the fifth grade. The county median was 59, the third quartile was 68 and the first quartile was 52. These measures, when compared to the corresponding ones in the above distribution, show that this grade was considerably above the county as a whole. The score of W.H. was found above the first quartile of his class. This was better than his ranking in the tests previously discussed, excepting the test in literature. One of the scores in the class above was very low. The four scores at the top rank high when compared to the county medians both of the sixth and the seventh grades. The geography work of this grade as measured by this test was satisfactory.

CONCLUSIONS

The attainment of the pupils of the county in all grades in geography was nearer to the norm than in other tests in this battery that have been discussed previously. The fourth grade was above the norm. The other grades were below the norm, retarded from two to six school months.

In Kansas the elementary work in geography is completed at the end of the seventh year. An eighth grader makes no formal study of geography. He has "finished" his geography study. The pupil in the eighth grade should do well in a test over the subject. He has "passed" a "county examination" in geography. The eighth grade in the county was two points below the norm. This was about an average performance then. The direct emphasis placed on the study of geography in the school curriculum in all the grades here reported may give this test an advantage over some in the battery that are not so included, e.g. physiology and civics.

CHAPTER IX

TEST NO. 8 -- PHYSIOLOGY AND HYGIENE

DESCRIPTION OF THE TEST

This test consists of 80 statements from the field of physiology and hygiene. The test is the same type as the three preceding tests in the series, a multiple-choice type examination. The directions at the beginning of the test are:

"Draw a line under the word or phrase which makes the sentence true."

Three words or phrases accompany each sentence from which the pupil may choose one to complete the statement. Examples from the test follow:

1. The lungs take from the air
   carbon dioxide nitrogen oxygen

2. Malaria is carried by
   pork flies mosquitoes

3. Inflamed eyes are often relieved by
   boric acid weak vinegar carbolic acid

4. The chief function of the spinal cord is
   conduction sensation thinking

5. A food which contains most of the vitamins is
   tomatoes butter polished rice

The score for the test is found as in many of the preceding tests; the difference found by subtracting one-half of the number of wrong responses from the number right is given a value from the table of equivalents that accompanies the test. A score of 24 is given if the difference was zero or less.

The authors have stressed the principles of hygiene in this test. Informational facts from the field of anatomy and physiology that have a direct relationship to hygiene were included. Many facts and principles of hygiene are found in the test, including facts relating to the proper care of the body, to foods, to prevention and treatment of disease, to first-aid, and to clothing. Controversial items and those having no scientific foundation were carefully avoided. The test is designed to measure the basic structural and functional information needed for an intelligent understanding of health rules.

RESULTS OF THE TEST

The median scores of the pupils of the county taking this test are given in Table 29. The number of pupils and the norm for each grade also are included in the table. In the interpretation of the data given here, the Educational Profile Chart found in the test booklet will be used. The fourth grade was 3 points above the norm or 1 month advanced as measured by school grade. The fifth and the sixth grades each were 5 points below the norm or 4 months retarded from the standard. The seventh grade was 4 points below the norm or the school grade was 6 months below the average. The eighth grade was 4 points above the norm, showing an advancement of 7 months for that grade. The acceleration and retardation of the grades in these subjects as shown by this test were as follows:

Grade 4 -- accelerated 1 month
Grade 5 -- retarded 4 months
Grade 6 -- retarded 4 months
Grade 7 -- retarded 6 months
Grade 8 -- accelerated 7 months

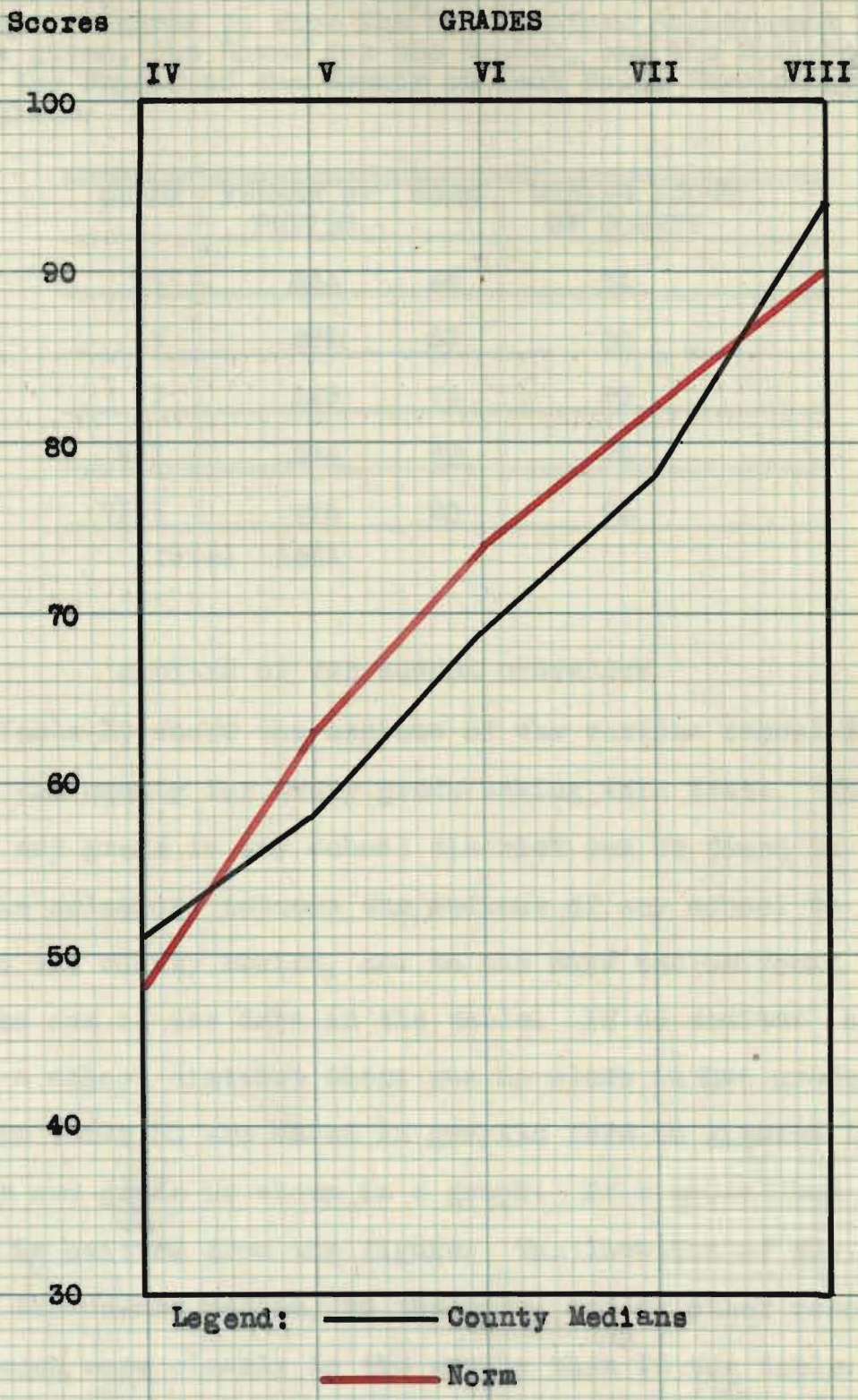


Figure XLIX. Median scores of the grades of Lyon County, Kansas, for Test No. 8, Physiology and Hygiene, of the New Stanford Achievement Test in comparison to the norm.

TABLE 29

Showing the Number of Pupils in Each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the Pupils of the County on Test No.8, Physiology and Hygiene.

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
IV	324	48	51
V	295	63	58
VI	283	74	69
VII	284	82	78
VIII	275	90	94
Total	1461		

MEDIANS OF THE SCHOOL DISTRICTS

Table 30 shows the medians of the various school districts of the county for every grade taking this test. The median of any grade in any school district can be found in the table. The relations between the medians of any school to all others, to the county median, and to the norm can be found through the use of the data in the table. If no medians are given for a school district there was no class in that grade. The data in Table 30 are shown in graphic form in Figures L-LIV. Only one grade is shown in a graph. If a school had no grade, it is omitted from the figure. The location of the school to the county median, to the norm, and to other schools is shown much more clearly in the graphs than in the table.

TABLE 30

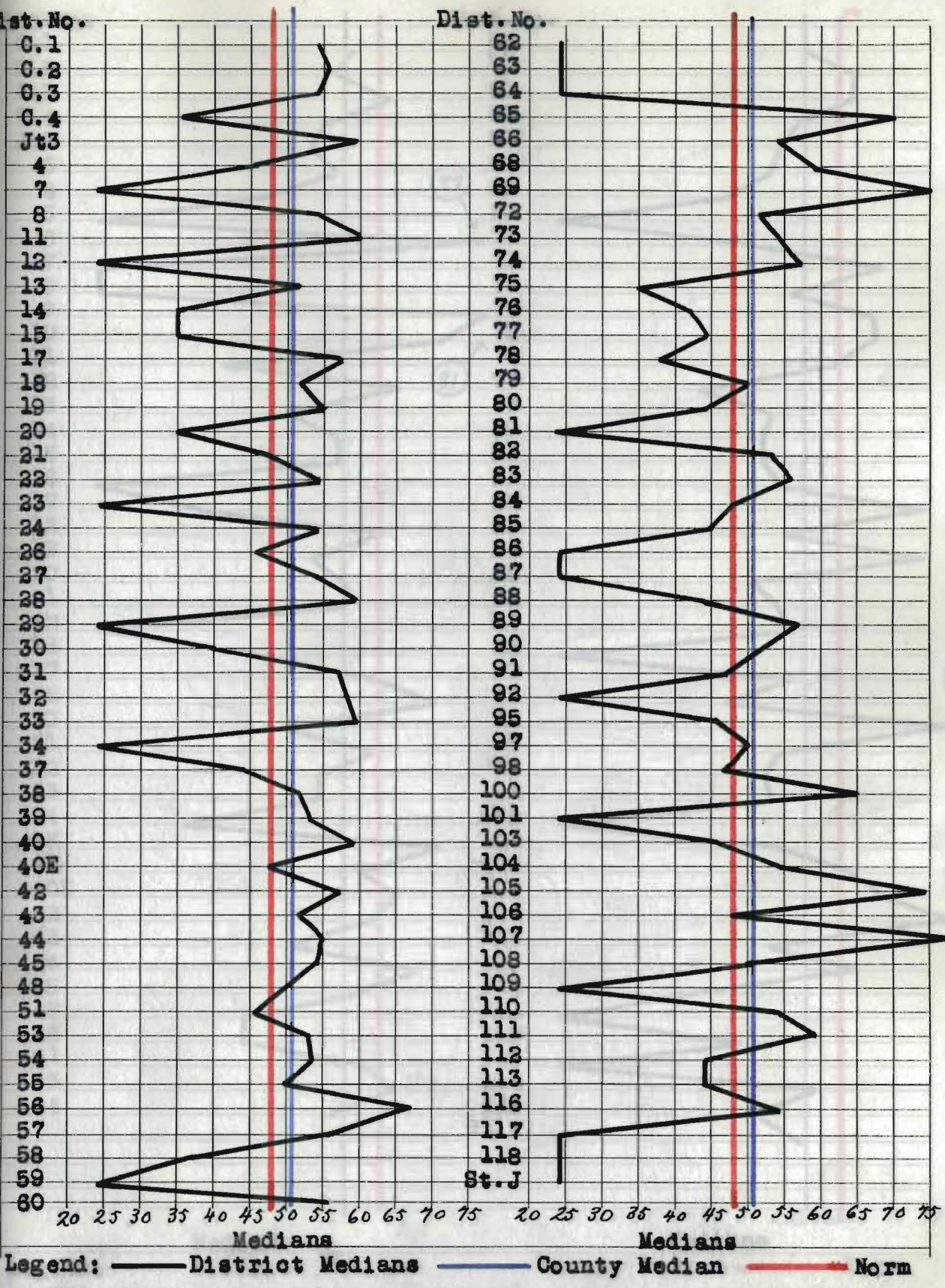
Showing the Medians of all the Grades in the School districts of Lyon County, Kansas for Test No.8, Physiology and Hygiene, of the New Stanford Achievement Test.

Dist. No.	GRADE 4	5	6	7	8	Dist. No.	GRADE 4	5	6	7	8
C.1	54	59	67	83	94	58	37	65	75	88	102
C.2	56	57	77	72	97	59	24			76	93
C.3	54	64	77	77	95	60	56	64	86	87	77
C.4	36	55	82	78	92	62	24	57		73	87
Jt.3	59	53		73	87	63	24	54	66	84	78
3		57		92	113	64	24	53	57	76	97
4	46	47	53	66	107	65	70	47	61	90	71
5		24	77	75		66	54		52	83	100
6		77	75	97	97	68	59	24	85	89	
7	24	24	74	76	94	69	75		63	70	
8	54	24		65		71		50		76	79
9		81	84	76		72	52	68	85	88	82
10		71	85	61	80	73	54	56	57	77	
11	60	42	64	65	87	74	57	67	57	82	84
12	24	65	87	77	82	75	35	67	72		99
13	52	50	62	91	105	76	42	62	72	77	92
14	35	57	72	50	88	77	44	43	52	87	90
15	35	57	75	67	87	78	38	53	61	72	85
16		24	89	56	91	79	50	52	67	67	78
17	57	38	57	75	103	80	44	52	62	80	97
18	52	63	77		96	81	24	54		81	92
19	55	53	64	83	87	82	53	74	78		104
20	35	58	77	78	94	83	56	55	67	84	96
21	48	58	50		98	84	48	74	51	86	
22	54	24	88		92	85	45	50	57		82
23	24		96	81	85	86	24	54	68	90	102
24	54		46	87	91	87	24	56	48		85
26	46	46	59	87	93	88	44	24	24	94	98
27	54	62		75		89	57			79	92
28	59	70	75	75		90	52	56			98
29	24		58	70	101	91	47	47	68	77	
30	40	49	58	81	81	92	24	77	50	97	87
31	57	62	79	84	97	95	46	54	24	87	102
32	58	54	62	73	77	96		52		57	
33	59	54	56	46	81	97	50	53	67	68	61
34	24	38	48	71	94	98	47	24	39	58	99
36		71	62		97	100	65	54	95	93	95
37	44		52			101	24			64	96
38	52					103	46	64		73	113
39	53	60	56	57	86	104	54	68	80	83	102
40	59		89	84	96	105	74		62		
40E	48	65		75	94	106	48		78	88	98
42	57	62	74	88	97	107	78	77			
43	52	50	74	85	100	108	50	53	59	85	94
44	55	68	65	59	92	109	34	65	64	70	85
45	54	59	61	93	87	110	54	42	52	77	92
47		44	67	70	92	111	59	24	35	59	92
48	52	44	68	80	84	112	44	48			100
51	46	61	73	79	121	113	44	24	67		100
53	53	64	70	82	95	114			85	71	89
54	53	56	81	78	100	116	54	59		75	
55	50	58	85	78	90	117	24		58	67	105
56	67		73		89	118	24	51	67	81	81
57	56		69		98	St.J	24	57	68	74	95

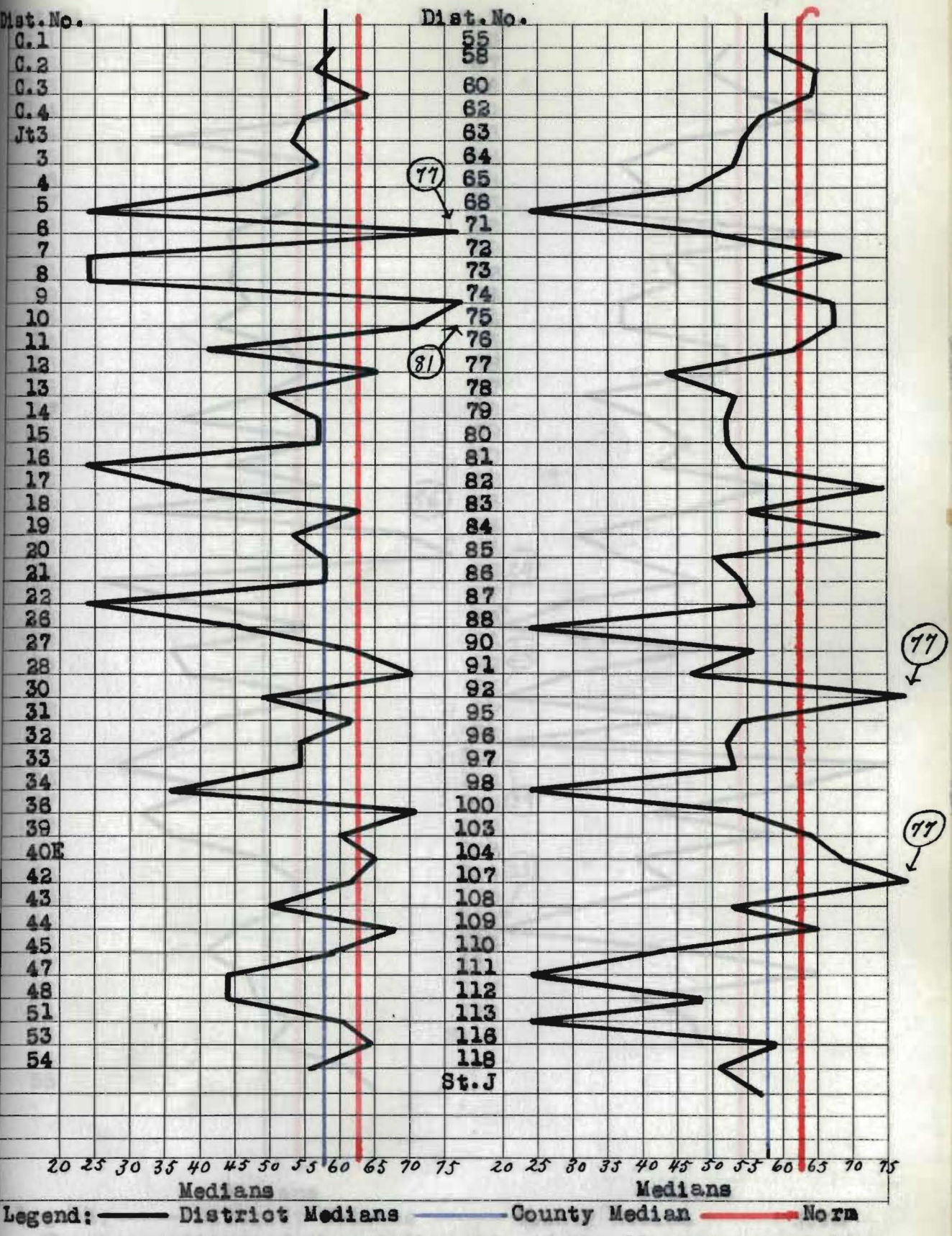
Figure L contains the medians of Grade 4. A large number of schools, 18, had a median of 24. The highest median extended above the graph, the 78 attained by District 107. District 69 was second with 75 and District 105 was third with 74. District 65 followed with 70. The range of scores was 54. Table 31 shows the quartile deviation was 16.36. This is a large deviation which shows a widely scattered distribution.

The medians of the fifth grade are given in Figure LI. Four medians are above the graph; District 9 with 81 and Districts 6, 93, and 107 each with 77. A large number of schools had 24 as a median in this grade also. The range was 57 and the Q was 10.66 which was much less than the quartile deviation of the fourth grade.

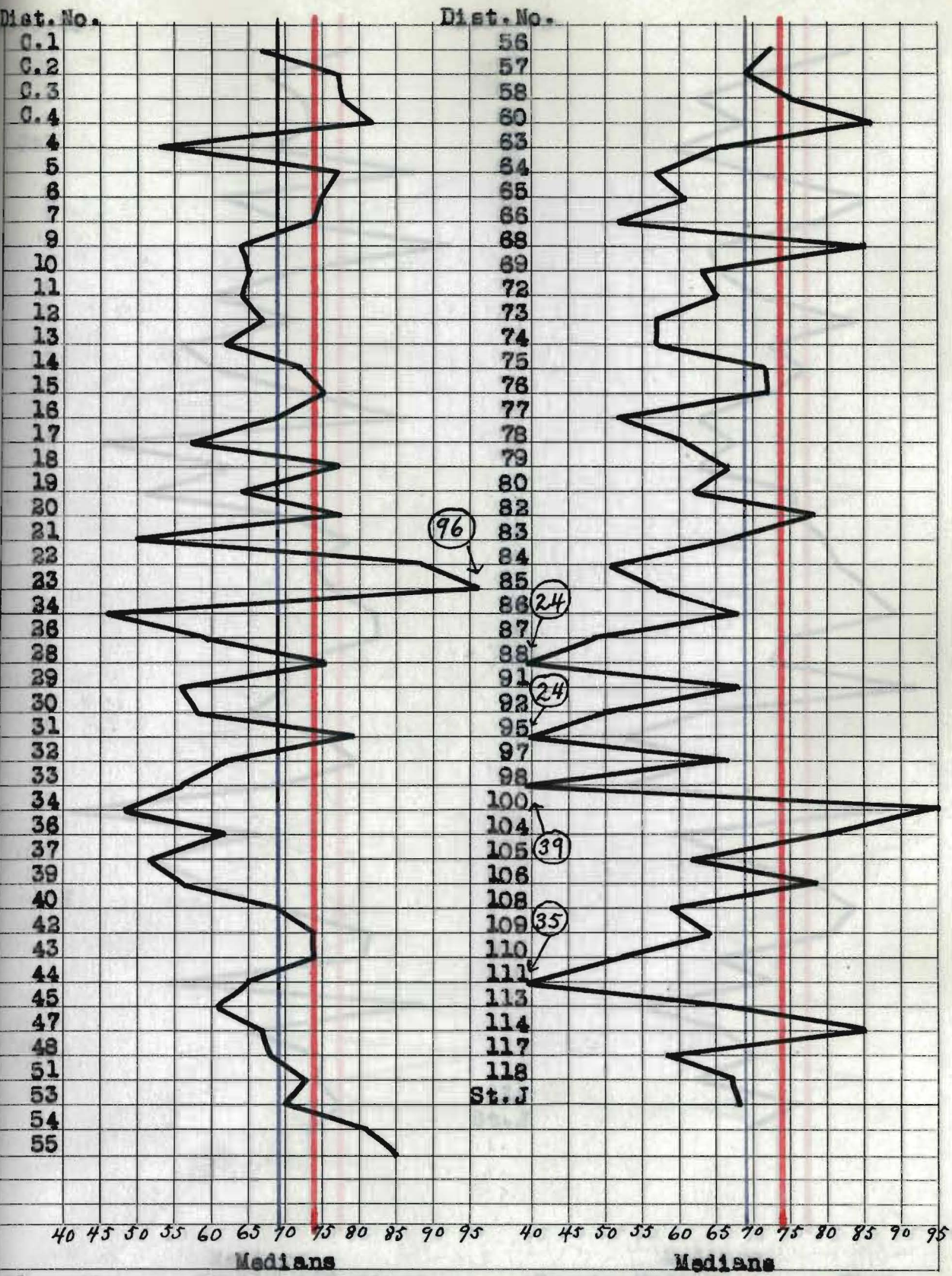
The graph in Figure LII shows the medians for Grade 6. District 23 had a median of 96 which lies above the graph. It was the highest in the group. District 100 was second with 95. At the lower extreme two districts, Numbers 88 and 95, each had 24, District 111 had 35, and District 98 had 39. These four school were too low to be shown on the graph. The range was 72 and the quartile deviation was 10.10. The range was larger than in the two preceding grades but the Q was about the same at that for Grade 5.



Showing medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 8, Physiology and Hygiene, of the New Stanford Achievement Test.

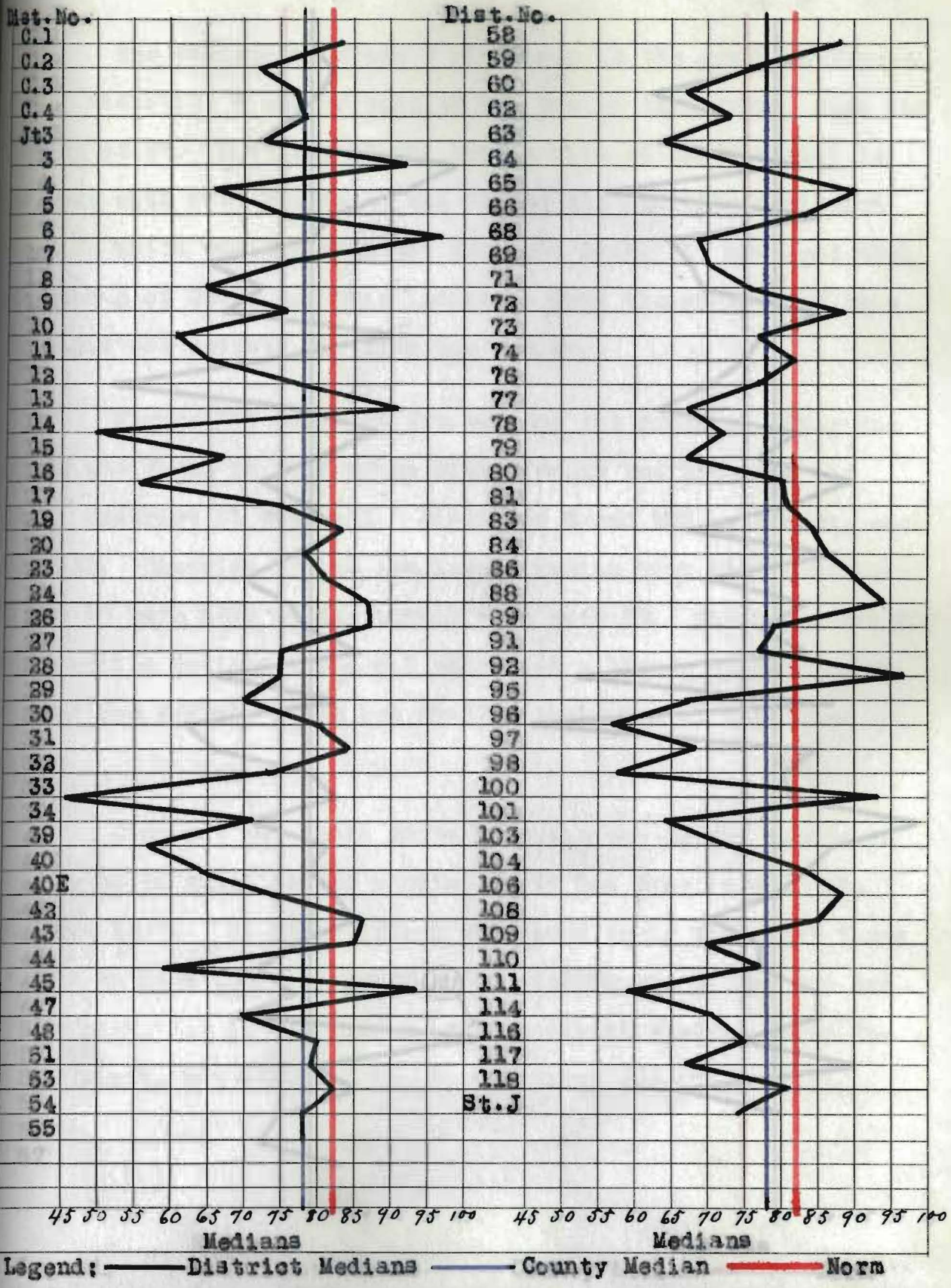


Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 8, Physiology and Hygiene, of the New Stanford Achievement Test.

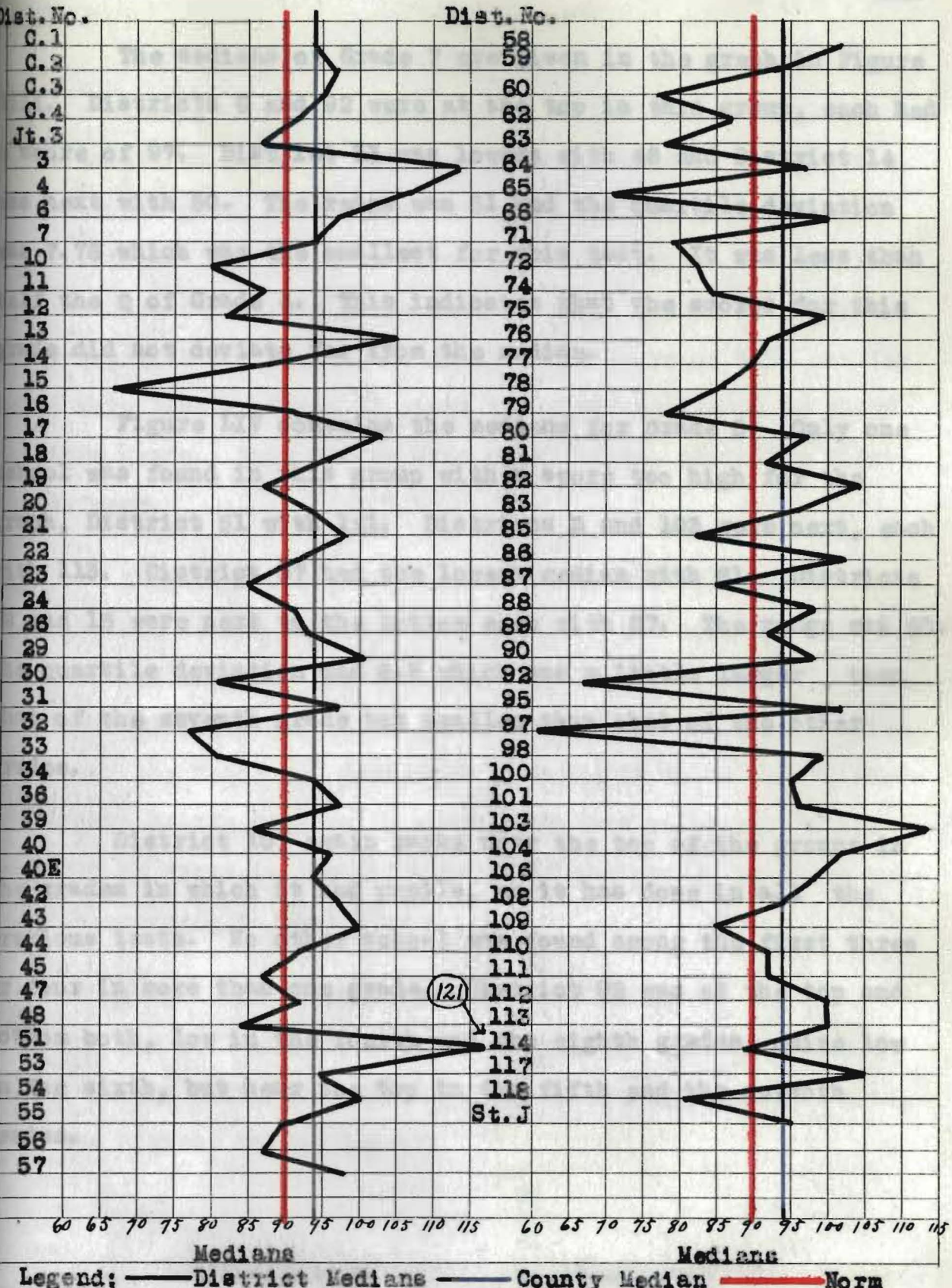


Legend: ——— District Medians ——— County Median ——— Norm

Showing medians of the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 8, Physiology and Hygiene, of the New Stanford Achievement Test.



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 8, Physiology and Hygiene, of the New Stanford Achievement Test.



Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 8, Physiology and Hygiene, of the New Stanford Achievement Test.

The medians of Grade 7 are given in the graph in Figure LIII. Districts 6 and 92 were at the top in this group, each had a score of 97. District 33 was lowest with 46 and District 14 was next with 50. The range was 51 and the quartile deviation was 7.78 which was the smallest for this test. It was less than half the Q of Grade 4. This indicates that the scores for this grade did not deviate far from the median.

Figure LIV contains the medians for Grade 8. Only one school was found in this group with a score too high for the graph, District 51 with 121. Districts 3 and 103 were next, each with 113. District 97 had the lowest median with 61. Districts 92 and 15 were next to the bottom each with 67. The range was 60. The quartile deviation was 8.3 which was a little larger than that of the seventh grade but smaller than that of the other grades.

District 107 again ranks near the top of the groups in the grades in which it had pupils, as it has done in all the previous tests. No other school was found among the first three or four in more than one grade. District 92 was at the top and bottom both, low in the fourth and the eighth grades, quite low in the sixth, but near the top in the fifth and the seventh grades.

SCORES OF INDIVIDUAL PUPILS

The comparative relations of an individual pupil's score should be found as was done in the preceding tests. W.H. of the fifth grade of District 58 again will be used for an illustration. His score in Physiology and Hygiene was 24. This was the lowest possible score on this test. Table 31 gives the first quartile for Grade 5 as 46.25. The score of W.H. was far below this level. Table 32 shows the first decile to be 32.59 for this grade. This places this pupil, then, above the first decile mark.

Another score from the same class will illustrate the quartile and decile rankings much better. The score of F.J. may be used, for example, for this purpose. His score was 71. Table 31 places 71 above the third quartile level in the county distribution for Grade 5. Reference to Table 32 shows the 71 above the eighth decile mark which shows that this pupil was better than 80% of those in the fifth grade in the county in these subjects, according to this test.

THE FIFTH GRADE OF DISTRICT 58

The following is obtained if all the scores of the pupils in the fifth grade of District 58 are arranged in order, from the highest to the lowest:

81	63
80	61
77	61
75 Third Quartile	61 First Quartile
74	57
74	56
71 — Score of F.J.	54
71	24 —Score of W.H.
65 —Median	

Total 17

TABLE 31

Showing the Quartiles and the Quartile Deviations of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No. 8, Physiology and Hygiene, of the New Stanford Achievement Test given in September, 1930

	GRADE				
	4	5	6	7	8
Third Quartile	57.50	67.56	78.28	84.56	101.57
Median	50.76	57.50	68.69	78.21	93.75
First Quartile	24.78	46.25	58.09	69.00	84.96
Quartile Deviation	16.36	10.66	10.10	7.78	8.30

TABLE 32

Showing the Decile Ranking of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.8, Physiology and Hygiene, of the New Stanford Achievement Test.

	GRADE				
	4	5	6	7	8
9th Decile	64.40	74.93	86.03	93.86	108.45
8th Decile	58.81	70.69	80.27	88.84	103.33
7th Decile	56.19	64.57	76.36	83.32	99.83
6th necile	53.51	60.98	72.47	80.82	96.70
5th Decile (Median)	50.76	57.50	68.69	78.21	93.75
4th Decile	46.92	53.95	65.15	75.53	91.00
3rd Decile	43.00	50.07	60.33	71.55	87.18
2nd Decile	33.68	40.00	55.88	65.45	82.50
1st Decile	31.47	32.59	47.35	56.59	76.93

As pointed out in the tabulation, the median of this class was 65. The county median for this grade was 58 which indicates that this class was superior to the average in the county. The norm for the grade was 63 so that places them above that level also. The scores of the two pupils of the group who were mentioned above are pointed out so that their standing in the class group may be seen. W.H. was found far below the others in the class. His case should be examined further and an effort should be made for his improvement. He was the only one in the class whose score was so far below the norm that it indicates a serious situation. Those above the norm of the class are also above the norm of the sixth grade. Those in the upper fourth compare favorably with the norm of the seventh grade.

CONCLUSIONS

Two of the grades in the county were above the norms in this test, the fourth and the eighth grades. The fifth and sixth grades each were below the norm for the grade, showing a retardation of four school months. The seventh grade was six months below its norm.

As was the case in the test discussed in the previous chapter, the formal study of physiology and hygiene in the elementary schools of Kansas is finished at the end of the seventh grade. The eighth grade, then, should attain the norm for this test readily. As already shown the eighth grade in the county was above the norm 4 points, or 7 school months above their standard. As a whole the results of this test were not far below the average.

CHAPTER X

TEST NO. 9 -- ARITHMETIC REASONING[1]

NATURE OF THE TEST

The test consists of 40 problems in arithmetic in the Advanced Examination and 20 problems in the Primary Examination. The Primary Examination is the first half of the Advanced. The problems involve a process of reasoning for the solutions. They are arranged in order of difficulty, beginning with those that demand a single, simple arithmetical operation and discrimination of method to those of an increasing number of steps and increasing difficulty.

The authors were guided by the following principles in the selection of problems for the test: that the problems should be worth while, that they should require real interpretative ability and not be made difficult through mere computation, and that they should be so clearly stated that the test would measure ability to think in quantitative terms. Arithmetical ability was the element to be determined and not comprehensive reading ability.

The pupils are directed to find the answers to the problems as quickly as possible and write them on the dotted line following the problems. Examples from the test are:

1. Oranges cost five cents each. At that rate, what will a half dozen cost?

ANSWER ----------

2. At a sale, five cent candy bars were sold at the rate of 3 for a dime. How many should Maude get for 30 cents?

ANSWER ----------

---

[1] The Arithmetic Reasoning Test in the Primary Examination is Test No. 4, but as noted in Chapter V, the test and the results will be discussed in this chapter with the Advanced Examination.

3. Frances sold $156 worth of books. She received a commission of 40%. How much did she earn?

ANSWER ----------

4. A man's automobile will go 110 miles on 10 gallons of gasoline. If gasoline costs 22 cents a gallon, what is the cost of the gasoline per mile?

ANSWER ----------

5. A certain house was assessed at $5,000. The tax on it was $125. What was the tax rate?

ANSWER ----------

The score for this test is obtained by evaluating the number of problems solved correctly by the use of the table of equivalents at the end of the test. A score of 3 is given when no problems are correctly solved.

MEASUREMENTS IN ARITHMETIC

The problems of measurement in arithmetic are relatively simple because work in the subject involves an answer. This answer is either right or wrong so no doubt can exist as to the result obtained. Methods of measurement in this subject have developed further than in many other fields.

The tests in arithmetic may be divided into four general classes, depending upon the scope of the material contained. If the tests include work in the fundamental arithmetical operations, in addition, subtraction, multiplication, and division, with exercises in fractions and decimals perhaps, they are general in nature and indicate the general capacity of pupils in handling number combinations rapidly and accurately.

Tests of another type are those that cover only one fundamental operation or those of a series, each of which covers an important type of difficulty in each operation. These tests tend to point out the specific difficulties of the child. They are diagnostic tests that break up the total ability into its elements and then test each oneof the elements. They reveal the weaknesses of the pupil and serve merely as a starting point for corrective instruction.

Tests of another type are those which provide drill or practice in the fundamental operations in arithmetic. These tests furnish material for repetition of the various elements in each fundamental operation. They usually allow for individual instruction and practice. Even in a large class each pupil can drill on the exercises he most needs until he is ready to go to the next drill. Objectives for honest, persistent effort on the part of the child are provided. The child knows the progress he is making and the goals he is trying to reach. These tests serve as instruction, practice, and testing materials.

Tests of the fourth type furnish a means for using the skills developed in learning the fundamental processes. Pupils should know how to use these fundamentals in problem solving, and how to develop skill in arithmetical reasoning. If these tests are scored with a double score they are of greater value than if only a single score is used. The child may be given a double score on such test; one on the accuracy of his arithmetical operations and one on the principle used. By such a process the reasoning may be separated from the computation.

RESULTS OF THE TEST

TABLE 33

Showing the Number of Pupils in Each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the pupils of the County on Test No.8, Arithmetic Reasoning.

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
II	295	14	13
III	277	30	35
IV	324	48	48
V	295	63	64
VI	283	74	73
VII	284	82	80
VIII	275	90	91
Total	2033		

The number of pupils in each grade, the norm for each grade, and the median scores made by the pupils in the county are given in Table 33. If the median score for each grade is located on the Educational Profile Chart in the test booklet and the corresponding school grade is ascertained, the following will be obtained:

Grade 2 -- school grade not shown
Grade 3 -- accelerated 2 months
Grade 4 -- normal
Grade 5 -- accelerated 1 month
Grade 6 -- retarded 1 month
Grade 7 -- retarded 3 months
Grade 8 -- accelerated 2 months

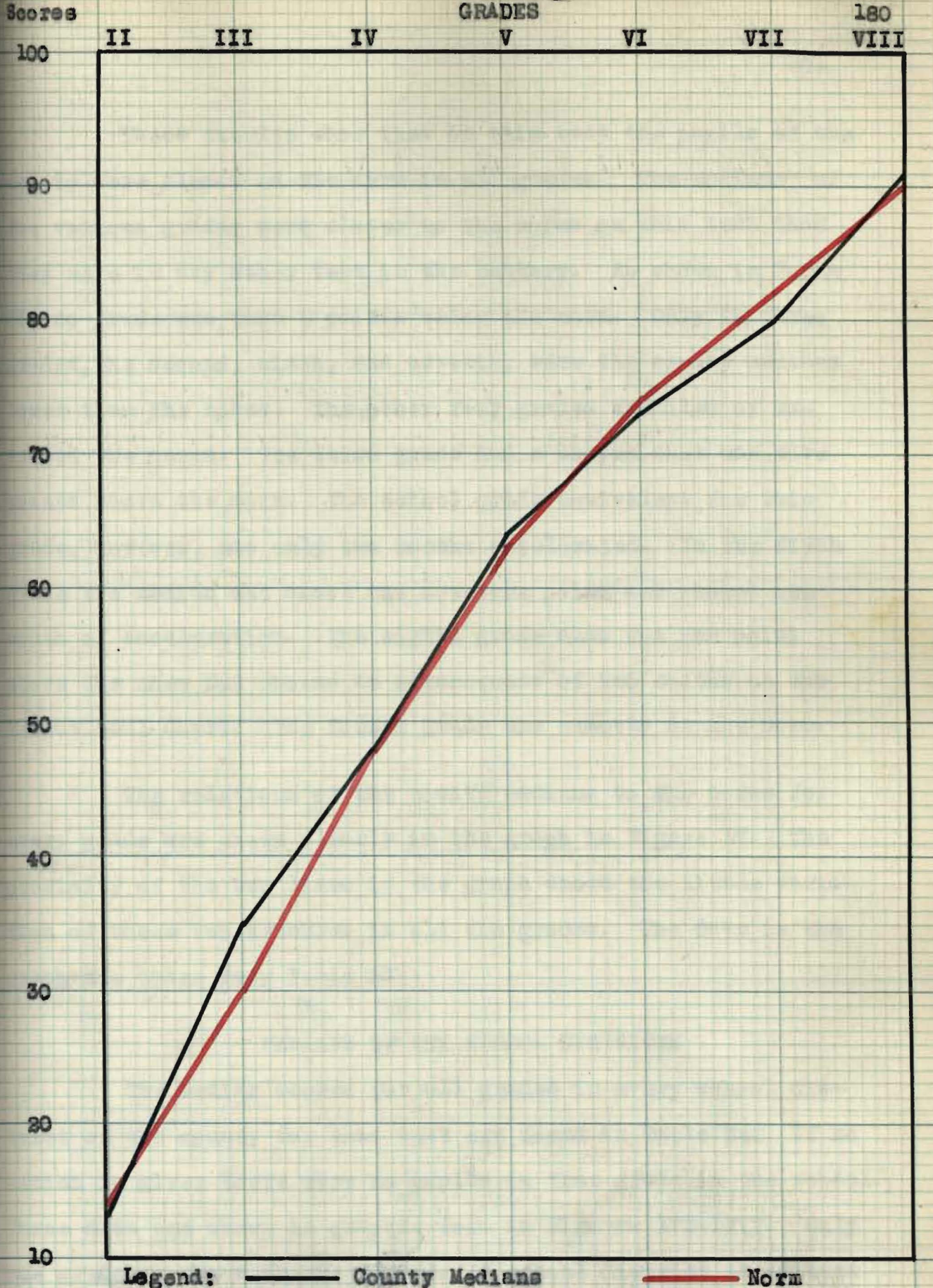


Figure LV. Median scores of the grades of Lyon County, Kansas, for Test No. 9, Arithmetic Reasoning, of the New Stanford Achievement Test in comparison to the norm.

These results show that on this test the pupils of the county were almost at the norm in all grades. The medians of the various grades were closer to the norms on this test than they were in any other test in the battery. As shown in Table 33, no grade was than 2 points below the norm. Only in three grades, the second, sixth, and seventh, were the county medians lower than the norms. The other four grades equalled or exceeded the norms. The third grade had a median that was five points above the norm. The school grade equivalent for this grade, however, was only two months accelerated. In the fifth grade the median was above the norm one point and showed one month of acceleration. The eighth grade also was one point above the norm but showed an advancement of two months on the Educational Chart. The fourth grade was exactly at the norm.

The relations of the county medians to the norms for every grade are shown clearly in the graph in Figure LV. The proximity of the two lines in the graph shows the little variation of these two measures in all the grades. The data in the graph are taken from Table 33.

MEDIANS OF THE SCHOOL DISTRICTS

The median scores for all grades in every school district of the county for this test are found in Table 34. If no median is given there were no pupils in that grade in the school. These data are shown in graphic form in Figures LVI-LXII. Only one grade is shown in one figure. A school district is omitted from the graph if it did not have that grade. These graphs show

TABLE 34

Showing the Medians of all the Grades in the School Districts of Lyon County, Kansas for Test No.9, Arithmetic Reasoning, of the New Stanford Achievement Test.

Dist. No.	GRADE 2	3	4	5	6	7	8
C.1	3	34	48	70	70	88	87
C.2	12	38	54	66	82	92	98
C.3	12	39	58	73	64	80	97
C.4	3	38	42	64	84	75	82
Jt.3			42	51		80	104
3				64		77	94
4	12	27	61	48	80	78	104
5	23	29		48	70	84	
6				62	85	77	87
7	21	32	39	48	75	71	100
8	12	17	48	44		77	
9				83	86	92	
10	30	30		67	72	70	88
11	3	32	61	51	43	74	80
12			58	60	64	74	70
13	12	20	59	67	77	70	85
14	3	3	34	55	67	85	82
15	17	40	33	57	67	64	80
16	3	27		39	81	64	100
17		44	64	80	74	64	84
18		27	58	82	91		91
19	7		21	39	65	91	82
20	8	34	45	59	79	84	87
21		34	34	59	70		91
22	21	21	44	54	64		94
23	3	29	46		80	77	89
24	12	53	34		80	70	95
26	3		34	70	68	87	83
27	29	34	34	53		77	
28	38		38	81	85	84	
29		21	48		70	65	76
30	12	34	57	59	77	94	102
31		29	58	69	81	84	98
32	3	20	47	60	62	69	67
33	39		54	55	51	74	88
34	12	39	34	64	61	75	92
36	3			65	78		107
37		39	53		73		
38	3		51				
39	3	29	48	70	72	54	84
40	34	46	65		72	85	95
40E	12	29	61	54		75	98
42	8	20	57	76	81	70	67
43		53	67	67	86	83	85
44	3	48	58	72	80	70	92
45	16	28	35	70	58	88	82
47	3	34		64	78	78	82
48	12	34	48	61	67	87	82
51	20	12	53	65	64	73	114
53	12	34	47	77	83	87	100
54	21	34	39	58	73	80	94
55	3	34	47	68	84	82	89
56		53	58		75		92
57		39	43		78		97
58	12	34	59	74	78	88	102
59	20		52			86	88
60	25	39	53	70	70	62	80
62			61	64		61	67
63	25		48	58	79	72	77
64	3	30	58	68	67	117	92
65	19		58	54	67	80	79
66	12		39		70	80	80
68			61	67	80	70	
69	39	39	64		54	65	
71	3	21		80	64	83	80
72	28	32	37	42	62	88	97
73	3	58	67	64	61	83	
74	17	28	52	67	77	72	95
75	17		62	87	87		84
76	44		46	72	62	94	82
77	3	35	45	52	62	77	84
78	21	29	36	43	59	68	91
79	21	39	54	56	70	81	100
80	11	44	47	72	82	78	97
81			36	64		74	85
82	21	21	34	67	70		85
83	29	43	46	46	77	76	98
84	3	21	60	77	72	83	
85	12		57	50	57		70
86	21	32	62	62	71	75	88
87	21	44	43	58	77		83
88		21	29	77	80	94	77
89		29	70			74	94
90			41	64			94
91		21	42	47	72	82	
92			42	82	67	97	72
95	3	16	39	52	70	82	109
96	28			62		52	
97	29	31	22	58	71	77	81
98	28		38	52	48	87	112
100		53	67	67	72	80	101
101	3	12	44			64	102
103		48	34	58		70	105
104	12	34	48	70	80	80	88
105	21	12	48		64		
106	12	12	30		86	81	101
107	29	48	61	74			
108	3		46	63	64	67	83
109	21	29	58	61	53	77	83
110	12	32	52	47	63	62	82
111	3	41	48	58	38	70	91
112			29	39			93
113	3		67	74	77		91
114					77	79	88
116	12		39	74		86	
117			48		67	67	85
118		34	39	61	67	96	84
St.J	20	34	48	67	64	77	95

the comparison of the median of a school district to the county median, to the norm, and to the medians of other districts.

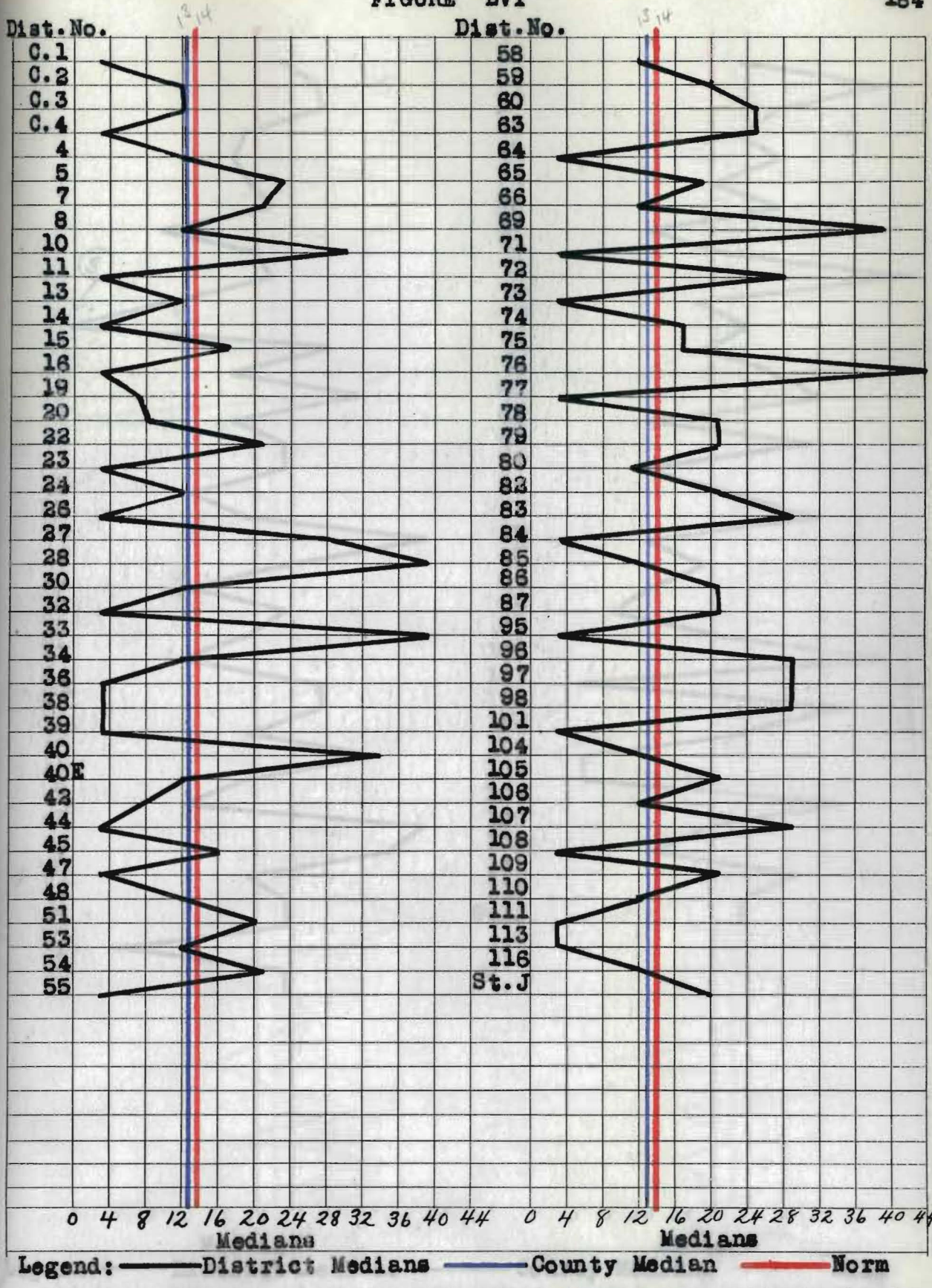
Figure LVI contains the medians for Grade 2. Low medians were obtained in many schools, scores of 3 which means that no problems were solved correctly by these pupils. The highest median score was that of District 76 which was 44. The school ranking next were Districts 89, 28, and 33, each with 39. The range was 41. According to Table 35, the quartile deviation was 9.22.

The medians for Grade 3 are shown in the graph in Figure LVII. One district, Number 14, had a median of 3 which was the lowest in the group and which fell below the limit of the graph. Others with low scores were Districts 51, 105, and 106, each with 12. The school with the highest median was District 73 with 58. Districts 24, 56, 43, and 100 each had 53 for the next highest. The range in this grade was 55; the Q was 9.95.

Figure LVIII shows the medians for Grade 4. The highest score of this group was 70 which was attained in District 89. The next highest was 67 for Districts 43, 73, 100, and 113. The two lowest schools were District 19 with 21 and District 97 with 22. The range was 49 and the Q was 11.74. This was the highest quartile deviation in any grade for this test.

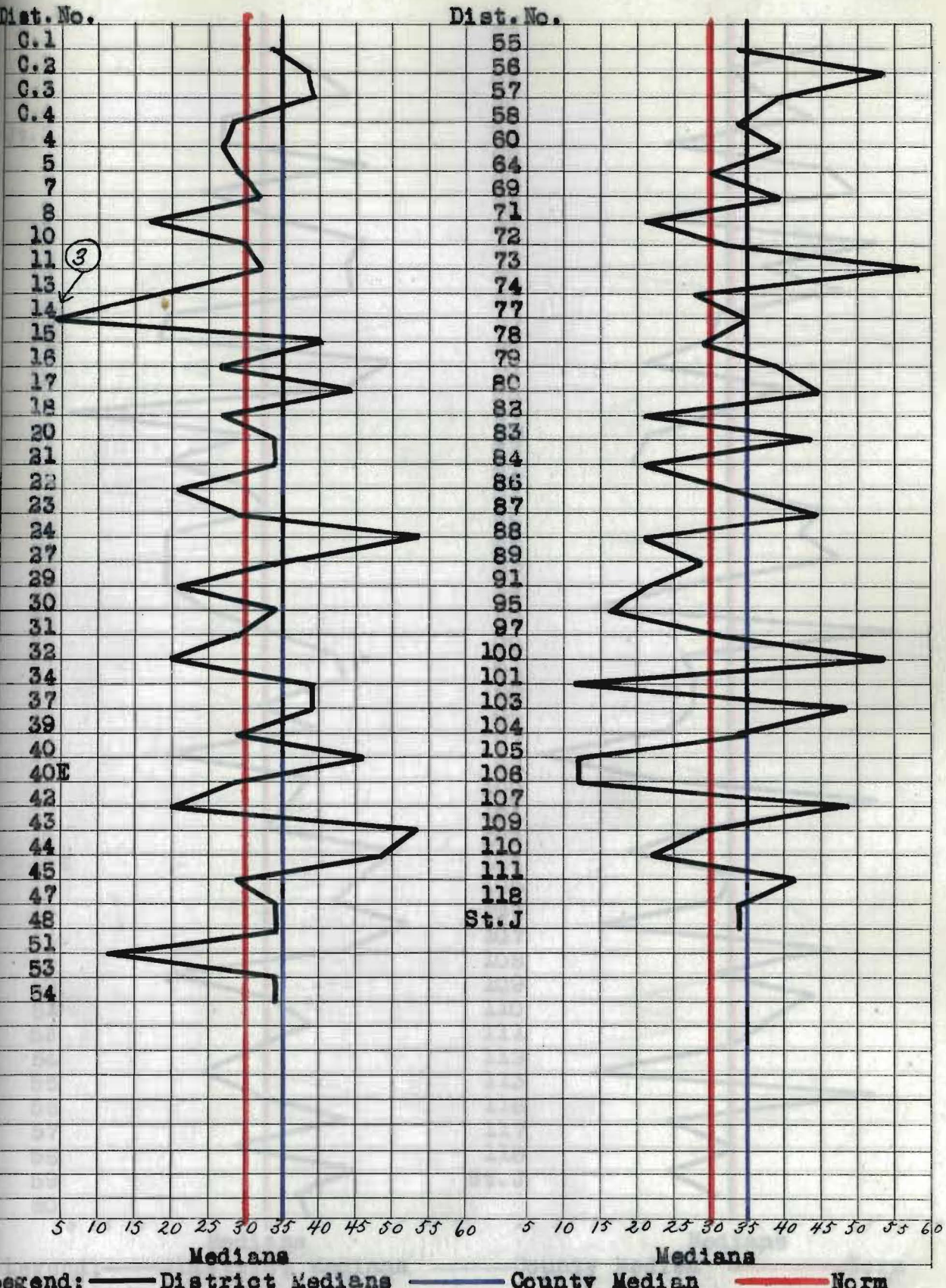
The medians for Grade 5 are given in the graph in Figure LIX. District 75 had the highest median, 87. District 9 was next with 83 and District 92 was third with 82. The low median score was 39 which was the median for Districts 16, 19, and 112. The range of medians was 48, the quartile deviation was 9.9.

FIGURE LVI

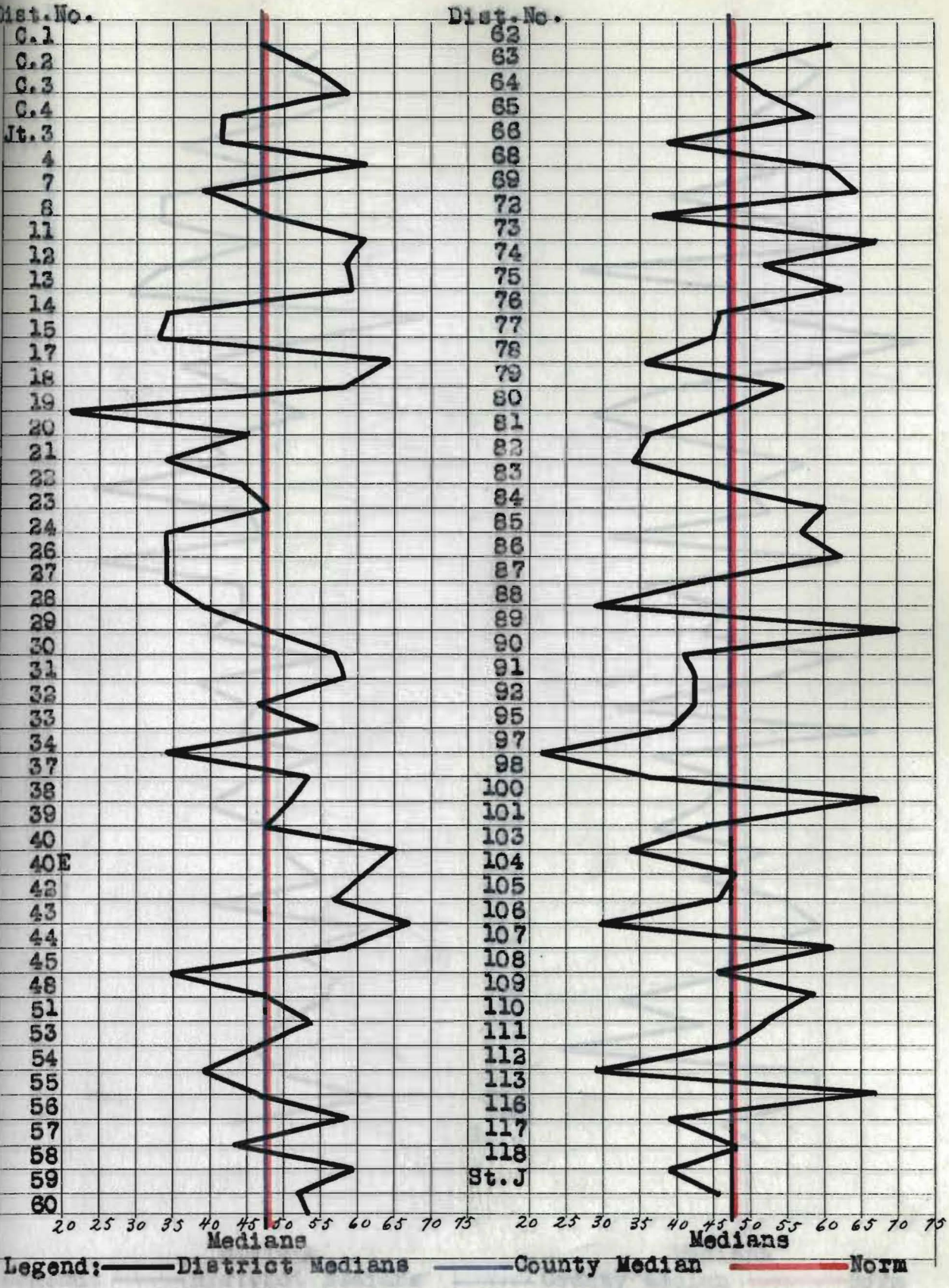


Showing medians of the second grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 9, Arithmetic Reasoning, of the New Stanford Achievement Test.

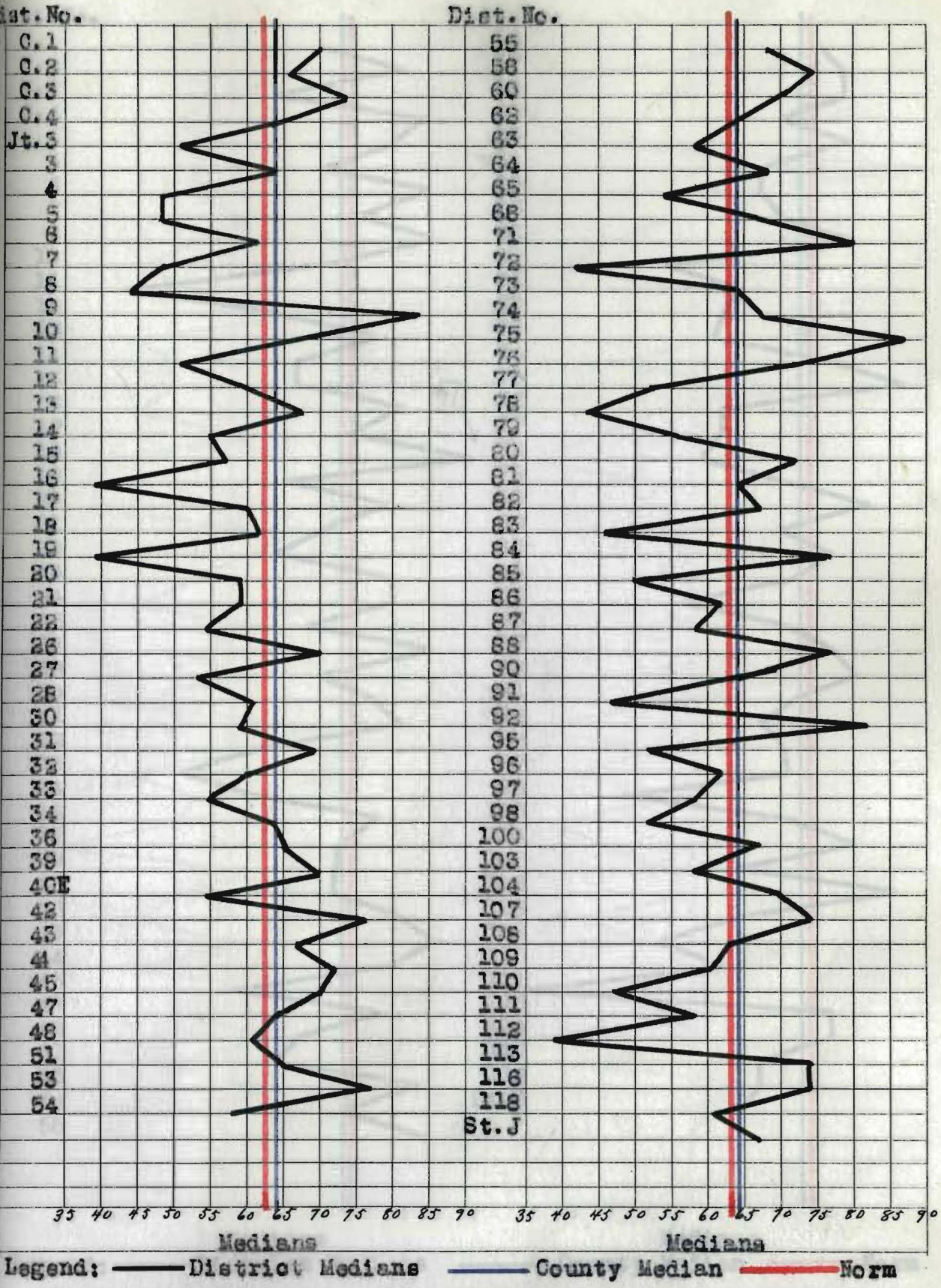
FIGURE LVII



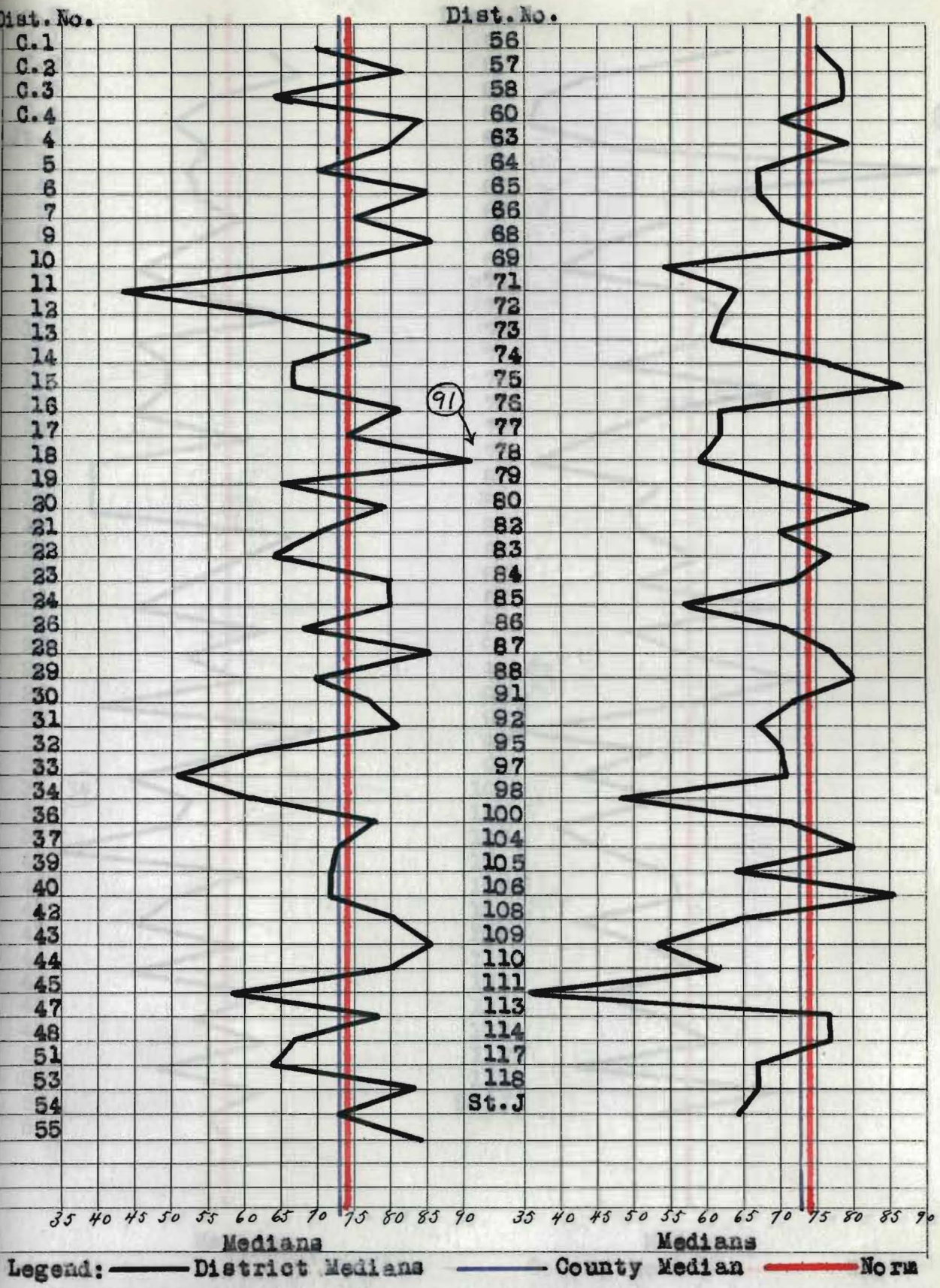
Showing medians of the third grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 9, Arithmetic Reasoning, of the New Stanford Achievement Test.



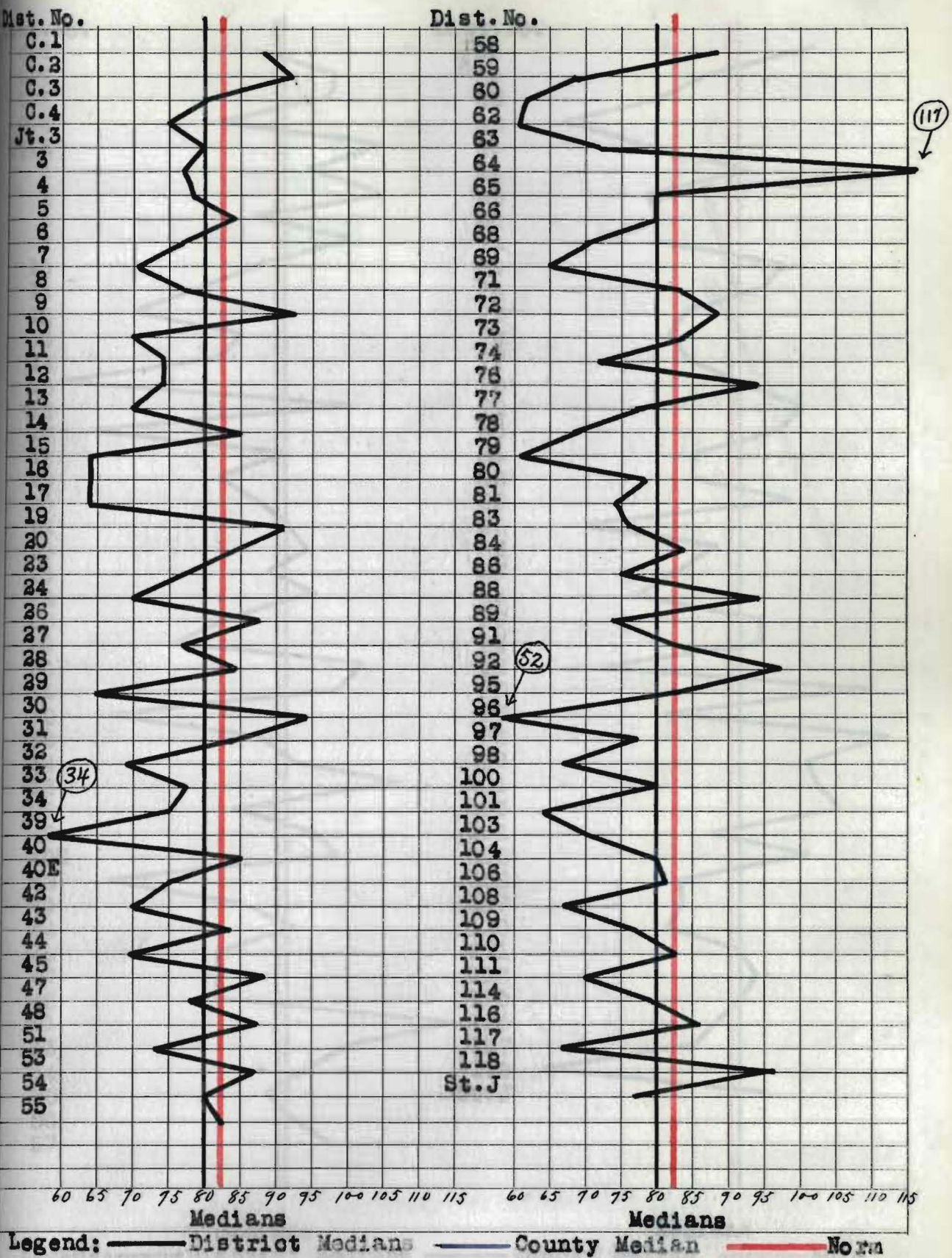
Showing medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.9, Arithmetic Reasoning, of the New Stanford Achievement Test.



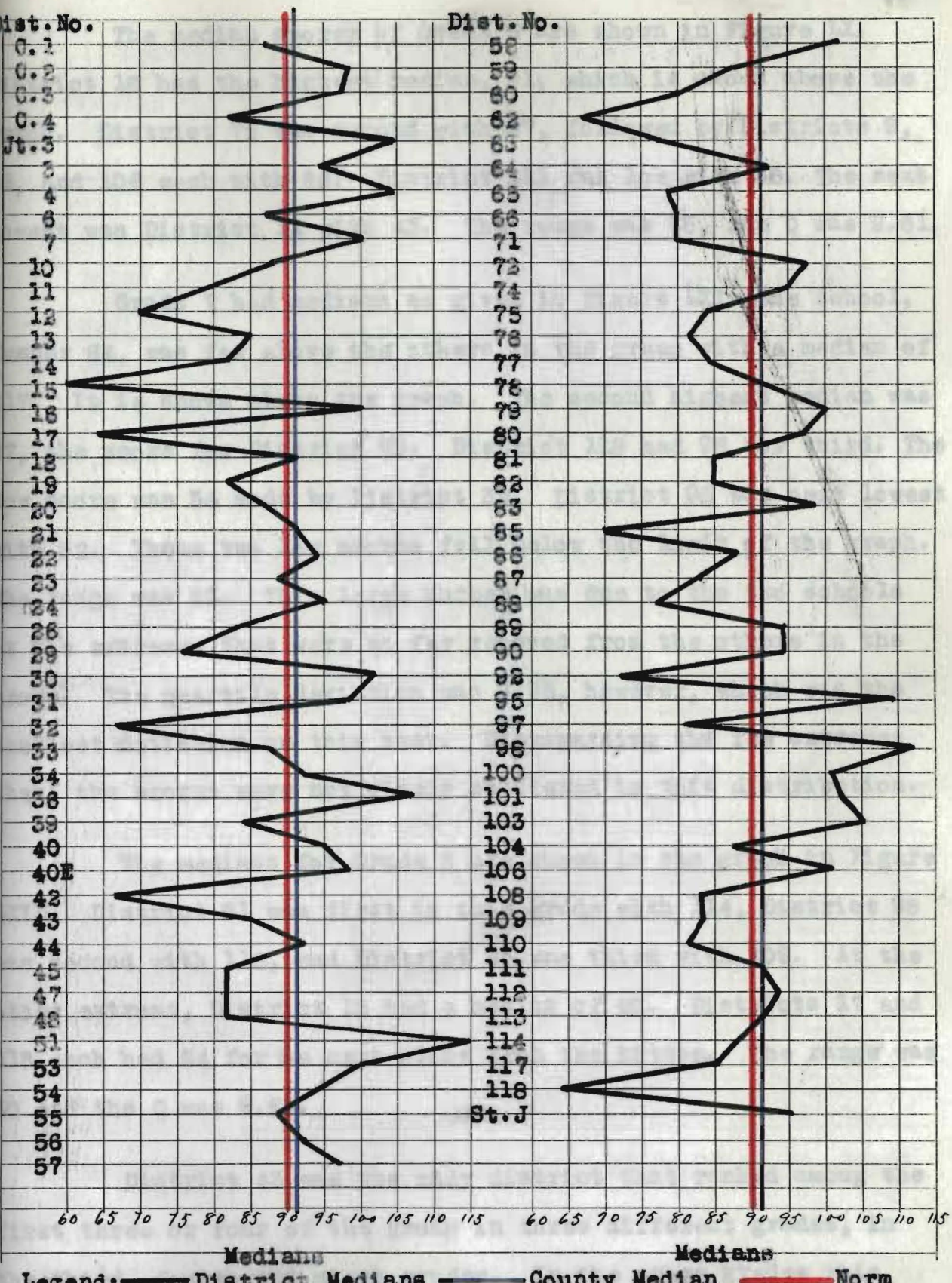
Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 8, Arithmetic Reasoning, of the New Stanford Achievement Test.



Showing medians of the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 8, Arithmetic Reasoning, of the New Stanford Achievement Test.



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 9, Arithmetic Reasoning, of the New Stanford Achievement Test.



Legend:——District Medians ——County Median ——Norm

Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 9, Arithmetic Reasoning, of the New Stanford Achievement Test.

The median scores of Grade 6 are shown in Figure LX. District 18 had the highest median, 91, which is shown above the graph. District 75 was second with 87, followed by Districts 9, 43, and 106 each with 86. District 111 was low with 36. The next lowest was District 11 with 43. The range was 55, the Q was 9.61.

Grade 7 had medians as given in Figure LXI. One school, Number 64, was far above the others in the group with a median of 117. It is shown above the graph. The second highest median was 97, the score for District 92. District 118 had 96 for third. The low score was 34 made by District 39. District 96 was next lowest with 52. These two low scores fell below the limit of the graph. The range was 83. This large number was due to the two schools at the extremes that were so far removed from the others in the group. The quartile deviation was 8.96, however, which was the smallest deviation on this test. Disregarding the few extremes then, the scores were not widely scattered in this distribution.

The medians for Grade 8 are shown in the graph in Figure LXII. District 51 was first in this grade with 114, District 98 was second with 112, and District 95 was third with 109. At the other extreme, District 15 had a median of 60. Districts 17 and 118 each had 64 for the next place from the bottom. The range was 50 and the Q was 9.85.

District 43 was the only district that ranked among the first three or four of the group in three different grades, in the third, fourth and sixth grades. In the other grades this school ranked comparatively high also. District 107 which has been at the top in other tests was somewhat lower in this test,

TABLE 35

Showing the Quartiles and the Quartile Deviations of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No. 9, Arithmetic Reasoning, of the New Stanford Achievement Test given in September, 1930

	GRADE						
	2	3	4	5	6	7	8
Third Quartile	21.97	39.24	59.63	73.27	82.63	88.69	101.16
Median	13.39	34.50	48.29	64.05	73.19	80.24	90.72
First Quartile	3.54	21.34	36.16	53.46	63.41	70.76	81.46
Quartile Deviation	9.22	9.95	11.74	9.90	9.61	8.96	9.85

TABLE 36

Showing the Decile Ranking of the Various Grade of the Elementary Schools of Lyon County, Kansas for Test No.9, Arithmetic Reasoning, of the New Stanford Achievement Test.

	GRADE						
	2	3	4	5	6	7	8
9th Decile	34.47	49.19	65.67	81.07	89.28	97.00	107.12
8th Decile	30.57	42.02	61.50	74.56	84.10	90.62	102.36
7th Decile	21.40	38.45	57.66	71.97	81.16	87.00	98.06
6th Decile	20.27	35.39	53.17	68.65	76.69	83.62	93.78
(Median) 5th Decile	13.39	34.50	48.29	64.05	73.19	80.24	90.72
4th Decile	12.59	29.38	43.71	61.36	70.57	75.60	86.91
3rd Decile	3.84	21.92	38.05	56.98	64.89	72.30	83.19
2nd Decile	3.23	20.77	33.81	48.93	61.94	68.36	79.17
1st Decile	2.61	13.28	27.00	38.27	55.96	61.76	70.39

although the school still ranked well above the norms in the grades in which it had pupils. No district ranked at the bottom consistently, however. The low marks in the various grades were scattered among many schools.

INDIVIDUAL SCORES

The score of W.H. in the fifth grade of District 58 will be used to illustrate the analysis of individual scores. His score on this test was 74 which was located at the median of his class. According to Table 35, 74 will be located above the third quartile mark in the county distribution. Table 36 will show it just below the eighth decile mark. This indicates that W.H. was better than about 80% of his group in the county, that his arithmetic reasoning ability was exceeded by only a little more than 20% of the fifth grade pupils in the county. W.H. did better on this test than on any other test in this series.

INDIVIDUAL SCORES IN A CLASS GROUP

The scores of the entire fifth grade of District 58 on this test, when arranged in order, were:

94		70	
88		70	
88		70	
80	Third Quartile	70	First Quartile
80		70	
77		64	
77		61	
74		58	
74	-- Median - Score of W.H.		

Total 17

The median of this class was 74. When this median was compared to the norm for this grade, which is found in Table 33 as 63, it may be noted that the class was considerably above the standard. By reference to Table 36, this class is found almost to the

eighth decile mark of the county distribution. In fact, the class as a whole will rank as did W.H., as pointed out in the previous paragraph, since his score was at the median. This fifth grade has a median above the county median for the sixth grade. The sixth grade was only one point below its norm so the grade here discussed was about a full year advanced in arithmetic reasoning according to this test. The upper fourth of the class was equal to or above the seventh grade median. Only two pupils in the class, the two at the bottom of the group, were below the county median and below the norm for the grade. The class as a whole are shown as doing superior work in this phase of arithmetic.

CONCLUSIONS

1. According to the results of this test, the pupils of the elementary schools of the county are doing about average work in reasoning problems in arithmetic.
2. The deviation of the county median from the norm in the various grades was from 5 points above the norm to 2 points below it.
3. Four of the seven grades tested were normal or above, showing an acceleration of 1 to 3 months.
4. Three grades were below the norms. These were retarded from 1 to three months.
5. The pupils of the county had better scores on this test than on any other test in the battery.

CHAPTER XI

TEST NO.10 — ARITHMETIC COMPUTATION[1]

DESCRIPTION OF THE TEST

This test measures the ability of the pupil to do various arithmetical computations. In the Primary Examination, there are 25 exercises that cover the four fundamental operations, including a few examples in fractions and decimals. The Advanced Examination includes these 25 and enough more to make a total of 60 exercises and problems. The additional group of problems include more difficult exercises in the fundamentals, the interpretation of a graph, problems involving percentage, negative numbers, squares of numbers, and the solution of examples using algebraic terms.

The authors, in selecting items for the test, chose problems that would give a representative sampling of all the important possible types of examples, found by making a careful analysis of the leading textbooks and tests in arithmetic. They have included examples ranging from simple primary combinations through successive degrees of complexity to the type of mathematics usually taught in the ninth grade.

The directions at the beginning of the test are:

> "Get the answers to these examples as quickly as you can without making mistakes. Look carefully at each example to see what you are to do."

The score is obtained by evaluating the number of examples that were solved correctly by the use of the table of equivalents that accompanies the test. If there were no problems right the score given was 3.

1 In the Primary Examination Arithmetic Computation was Test 5, but as noted in Chapter 6, the test and the results will be discussed in this chapter with the Advanced Examination.

The nature of other tests in arithmetic were discussed in the preceding chapter. Reference should be made to this discussion in considering this test.

RESULTS OF THE TEST

The median scores made on this test by the pupils in the elementary schools of the county are given in Table 37. The number of pupil and the norm for each grade are shown also. The medians and the norms are shown graphically in Figure LXIII. The graph shows more readily than does the table the relationship existing between the county medians and the norms. As is shown, the medians for grades 2 and 3 are above the norms but in all the other grades the medians are below. The fourth grade was 2 points below the norm, the fifth grade was 5 points below, the eighth grade 6 points below, and the sixth and the seventh grades each 9 points below. The Educational Profile Chart in the test booklet shows the school grade equivalents for the medians of the various grades as follows;

Grade 2 --school grade not shown (approximately 5 months)
Grade 3 -- accelerated 1 month
Grade 4 -- retarded 1 month
Grade 5 -- retarded 4 months
Grade 6 -- retarded 8 months
Grade 7 -- retarded 1 year and 1 month
Grade 8 -- retarded 8 months

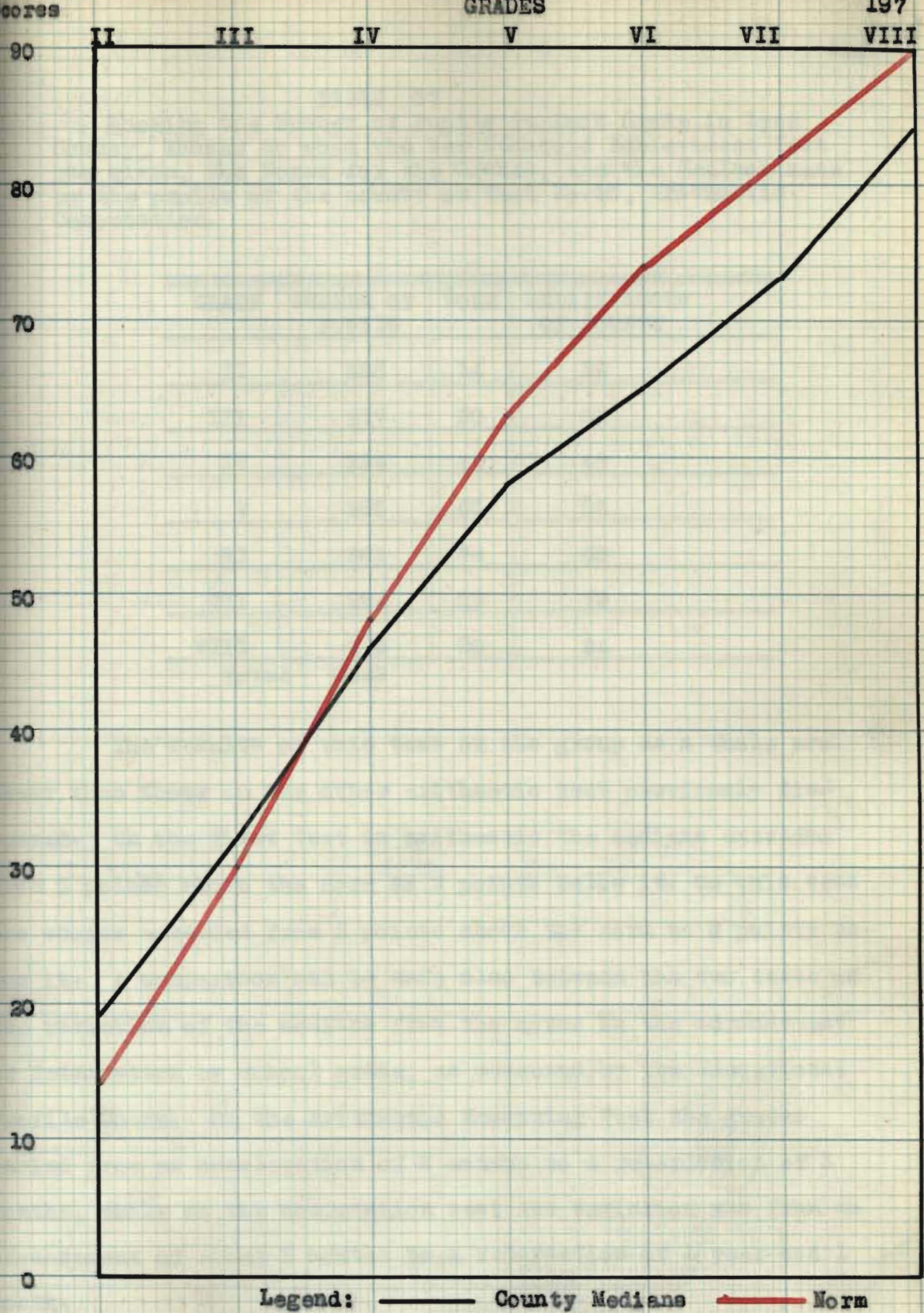


Figure LXIII. Median scores of the grades of Lyon County, Kansas, for Test No. 10, Arithmetic Computation, of the New Stanford Achievement Test in comparison to the norm.

TABLE 37

Showing the Number of Pupils in Each Grade in Lyon County, Kansas to whom the New Stanford Achievement Test was given, the Norms for the Grades, and the Medians made by the pupils of the county on Test No.10, Arithmetic Computation.

GRADE	NUMBER OF PUPILS	NORM	MEDIAN SCORE OF COUNTY
II	295	14	19
III	277	30	32
IV	324	48	46
V	295	63	58
VI	283	74	65
VII	284	82	73
VIII	275	90	84
Total	2033		

The results of this test on the group as a whole are lower than those on the other arithmetic test previously discussed. On the first test in arithmetic the medians extended from 5 points above the norm to 2 points below it. On this test the scores extended from 5 points above the norm to 9 points below it. A comparison can be made also between the two tests on the variation of the medians from the norms in the advancement or retardation by school grade, as measured by the Educational Profile Chart. On the Arithmetic Reasoning Test the grades varied from an acceleration of 2 months to a retardation of 3 months, while on the computation test the variation was from an advancement of about 5 months to a retardation of 1 year and 1 month.

TABLE 38

Showing the Medians of all of the Grades in the School Districts of Lyon County, Kansas for Test No. 10, Arithmetic Computation, of the New Stanford Achievement Test.

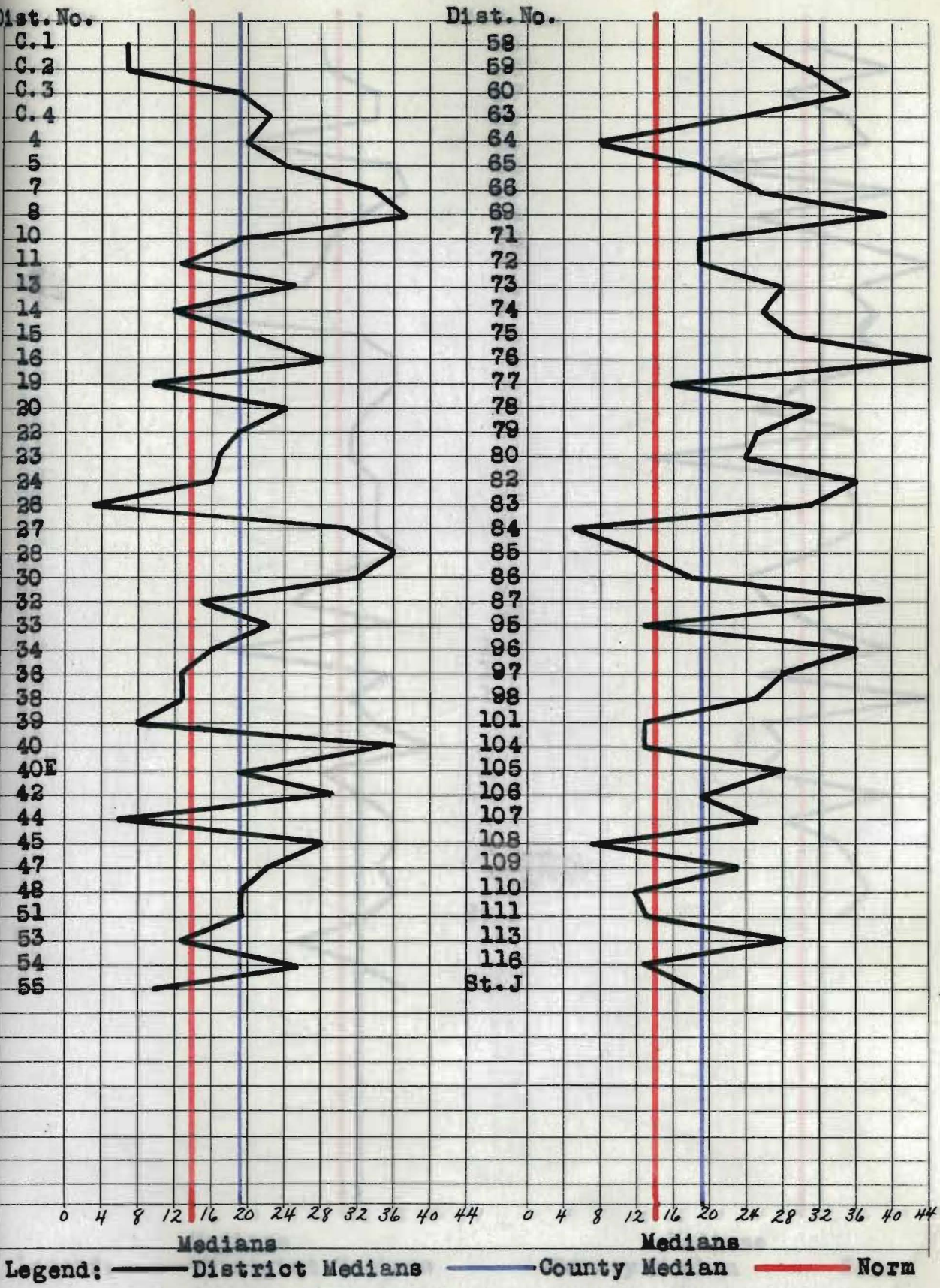
Dist. No.	GRADE 2	3	4	5	6	7	8	Dist. No.	GRADE 2	3	4	5	6	7	8
C.1	7	28	53	56	60	94	94	58	25	35	56	64	73	90	90
C.2	7	29	46	58	72	92	94	59	31		35			74	74
C.3	19	34	42	60	71	83	101	60	35	37	58	60	64	67	73
C.4	22	34	44	62	75	80	77	62			62	61		58	77
Jt.3			36	40		70	93	63	24		39	58	70	67	76
3				60		61	98	64	8	20	46	63	62	92	83
4	20	19	58	48	63	67	95	65	19		47	56	68	67	72
5	24	36		58	62	91		66	25		36		58	71	80
6				52	70	68	72	68			60	56	68	70	
7	34	37	47	48	64	66	95	69	39	40	53		62	77	
8	37	32	44	47		70		71	19	25		64	44	68	83
9				62	60	69		72	19	34	44	57	58	85	72
10	19	29		61	64	67	109	73	38	44	56	50	60	65	
11	13	28	45	43	61	58	60	74	26	35	47	62	62	83	88
12			34	58	64	68	68	75	29		46	63	73		70
13	25	26	40	56	65	70	74	76	44		33	63	63	88	72
14	12	12	38	53	43	65	68	77	16	38	47	52	62	66	67
15	20	32	42	44	64	64	58	78	31	36	34	50	60	68	73
16	28	36		44	58	58	83	79	25	41	47	51	62	65	80
17		36	58	55	70	64	65	80	24	30	38	67	86	87	77
18		33	61	52	74		110	81			31	60		76	90
19	10		39	48	80	76	72	82	36	25	31	60	74		90
20	24	31	52	45	76	78	84	83	31	38	41	52	67	69	93
21		31	50	57	65		64	84	5	13	53	53	64	81	
22	19	34	31	44	80		90	85	12		58	48	57		82
23	17	34	47		76	66	92	86	18	34	49	56	57	70	72
24	16	34	44		62	73	79	87	39	36	28	47	59		58
26	3		50	53	57	74	70	88		37	31	56	76	71	76
27	31	37	42	47		64		89		31	51			74	70
28	36		47	64	62	77		90			43	53			98
29		28	37		60	65	71	91		24	43	57	65	78	
30	28	25	43	53	69	71	104	92			46	57	58	93	72
31		36	47	64	64	72	80	95	13	26	47	49	53	72	107
32	15	18	42	53	62	64	62	96	36			58		63	
33	22		59	57	62	80	90	97	28	32	52	61	80	79	40
34	16	35	44	50	53	78	87	98	25		42	51	49	48	98
36	13			61	61		101	100		39	56	61	83	76	90
37		31	50		66			101	13	25	42			61	90
38	13		42					103		44	39	53		65	76
39	8	34	44	47	59	53	86	104	13	26	42	62	70	83	90
40	38	40	43		63	74	83	105	28	28	51		58		
40E	19	28	56	51		73	74	106	19	25	36		83	77	101
42	29	32	52	55	66	73	82	107	25	39	56	65			
43		36	62	61	75	71	70	108	7		48	54	56	64	92
44	6	36	50	47	67	55	97	109	23	28	44	58	60	63	83
45	28	34	45	56	80	68	72	110	12	34	43	44	63	62	67
47	22	36		50	68	63	72	111	13	36	39	56	57	53	83
48	19	32	42	56	71	91	91	112			34	39			84
51	19	25	50	63	68	70	101	113	28		53	64	62		90
53	13	32	52	64	68	86	85	114					65	68	68
54	25	37	36	61	68	62	101	116	13		31	44		69	
55	10	30	34	48	72	72	97	117			44		63	53	96
56		39	42		61		91	118		37	47	51	65	70	74
57		28	34		64		83	St.J.	19	34	47	60	60	67	92

MEDIANS OF THE SCHOOL DISTRICTS

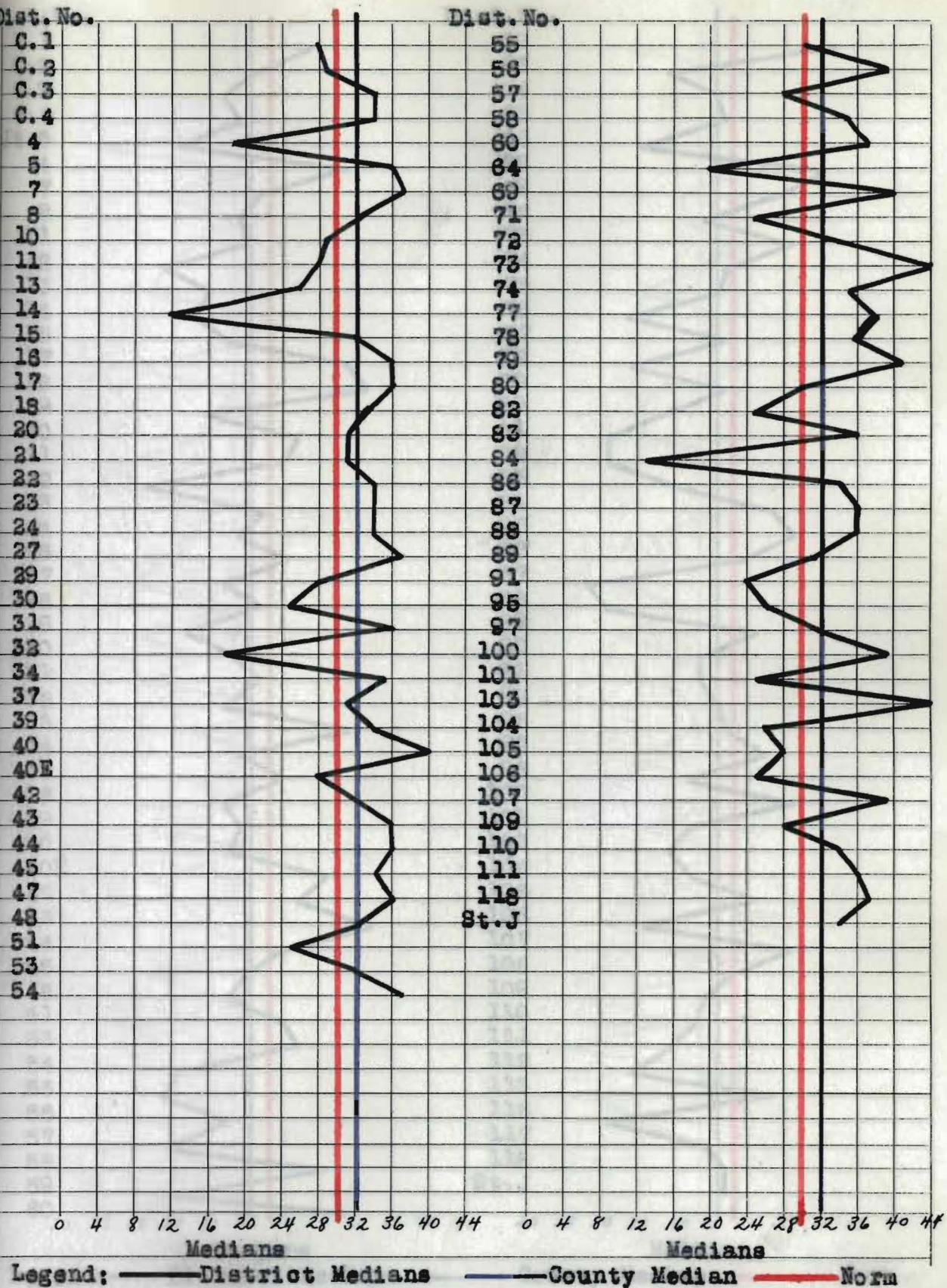
The median scores on this test for all grades of every school district are shown in Table 38. If no median is shown, the school had no pupils in that grade. By the use of the table the median of any grade of any school district may be ascertained. The scores are shown graphically in Figures LXIV-LXX. Medians for a single grade are given on one graph. If a district had no grade it is omitted from the graph for that grade. The graphs show clearly the position of a median of any school either from the county median or the norm. The relationship of the medians of the several districts is shown also.

The medians for Grade 2 are shown in Figure LXIV. District 76 had the highest median of the group, 44. Districts 69 and 87 were next, each with 39. The low median was 3, that of District 26. District 84 was next to the bottom with 5, followed by District 44 with 6. The range was 41. According to Table 39, the quartile deviation was 7.72.

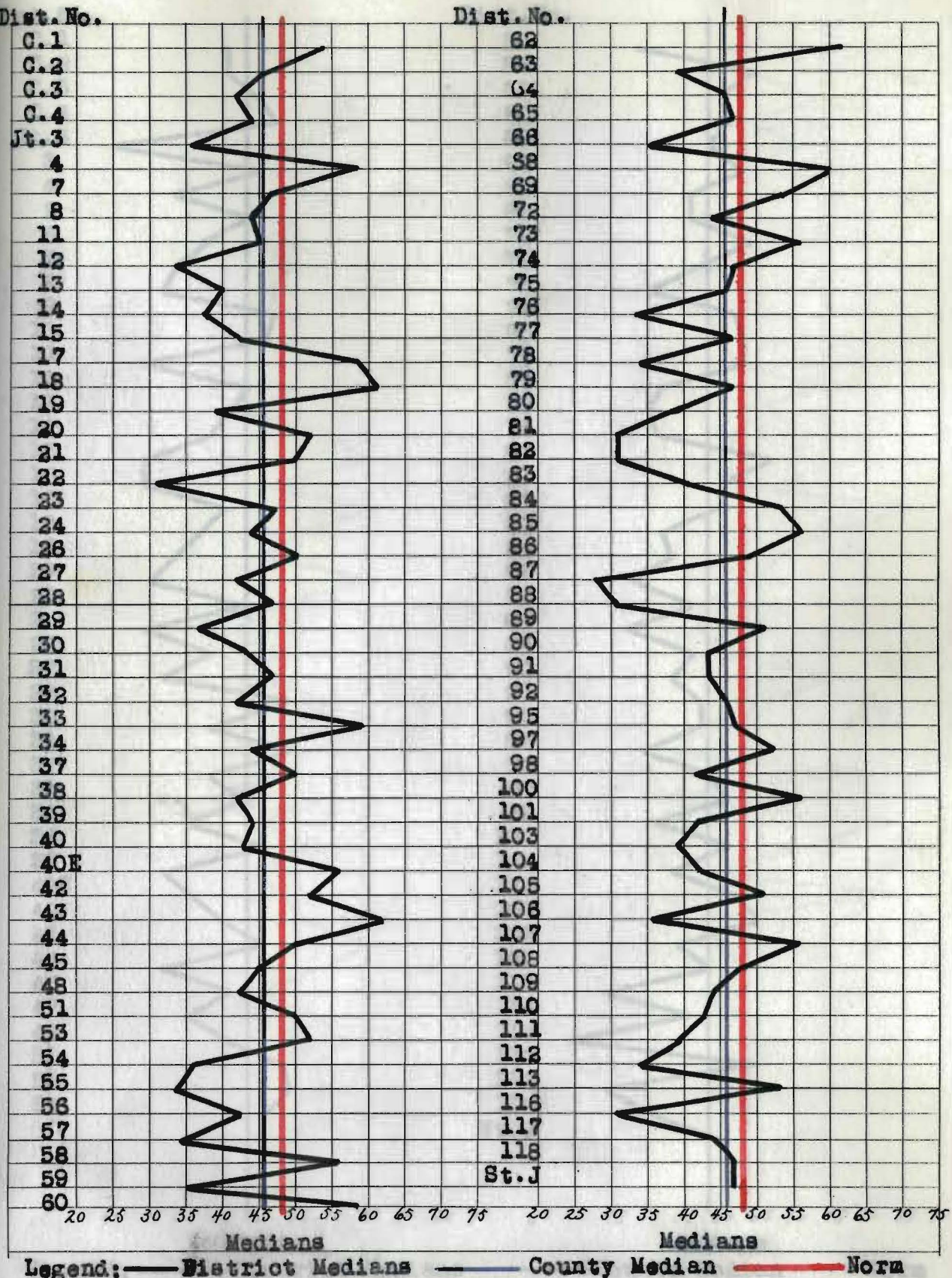
Figure LXV contains the graph showing the medians for Grade 3. Districts 103 and 73 each had 44 which was the highest median in the group. District 79 was next with 41, followed by Districts 40 and 69 each with 40. The lowest median was 12, the score of District 14. The next lowest was 13 which was the score of District 84. The range of this group was 32. The quartile deviation was only 4.48 which was the smallest Q on this test.



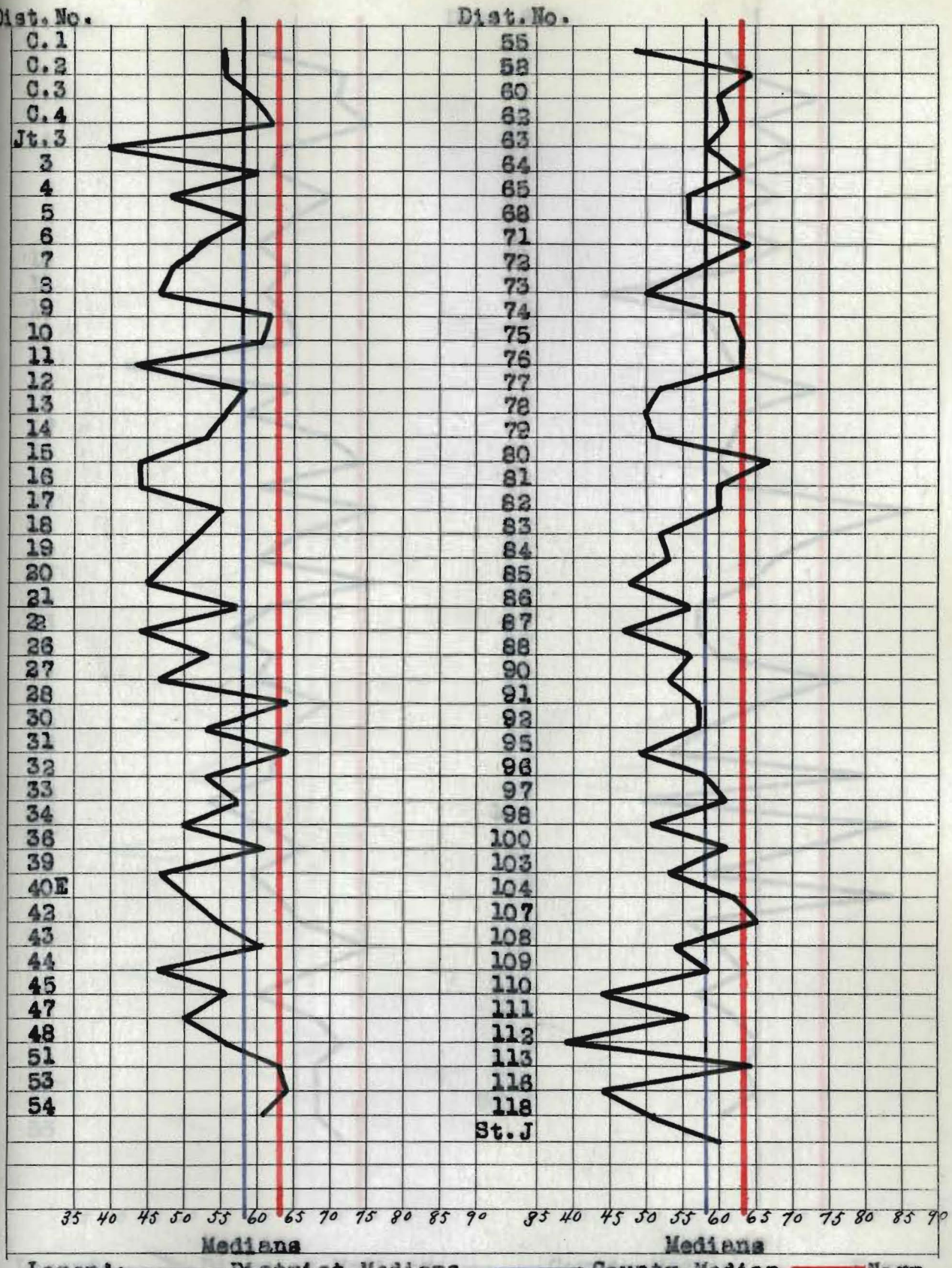
Showing medians of the second grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No.10, Arithmetic Computation, of the New Stanford Achievement Test.



Showing medians of the third grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 10, Arithmetic Computation, of the New Stanford Achievement Test.

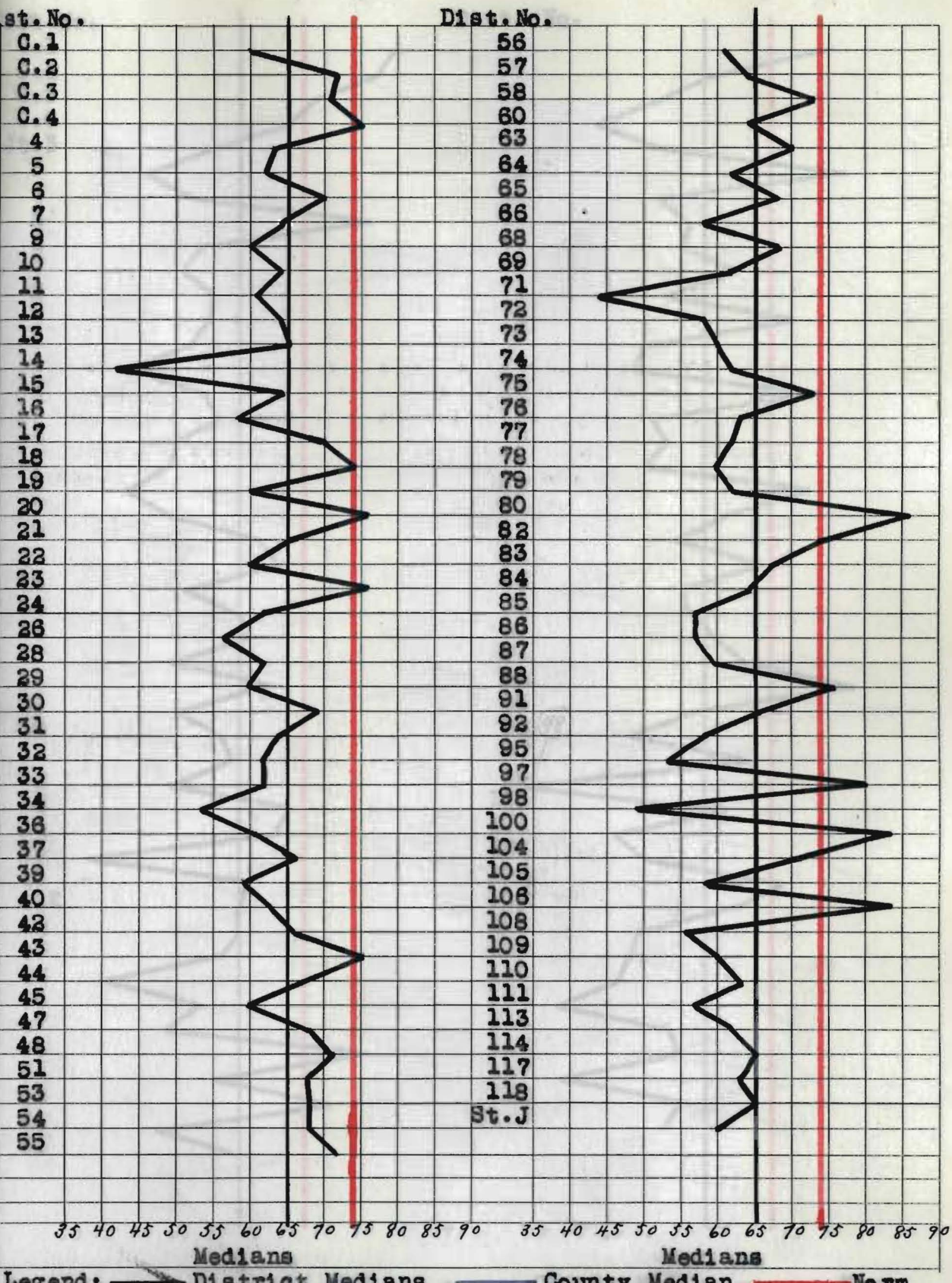


Showing medians of the fourth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 10, Arithmetic Computation, of the New Stanford Achievement Test.



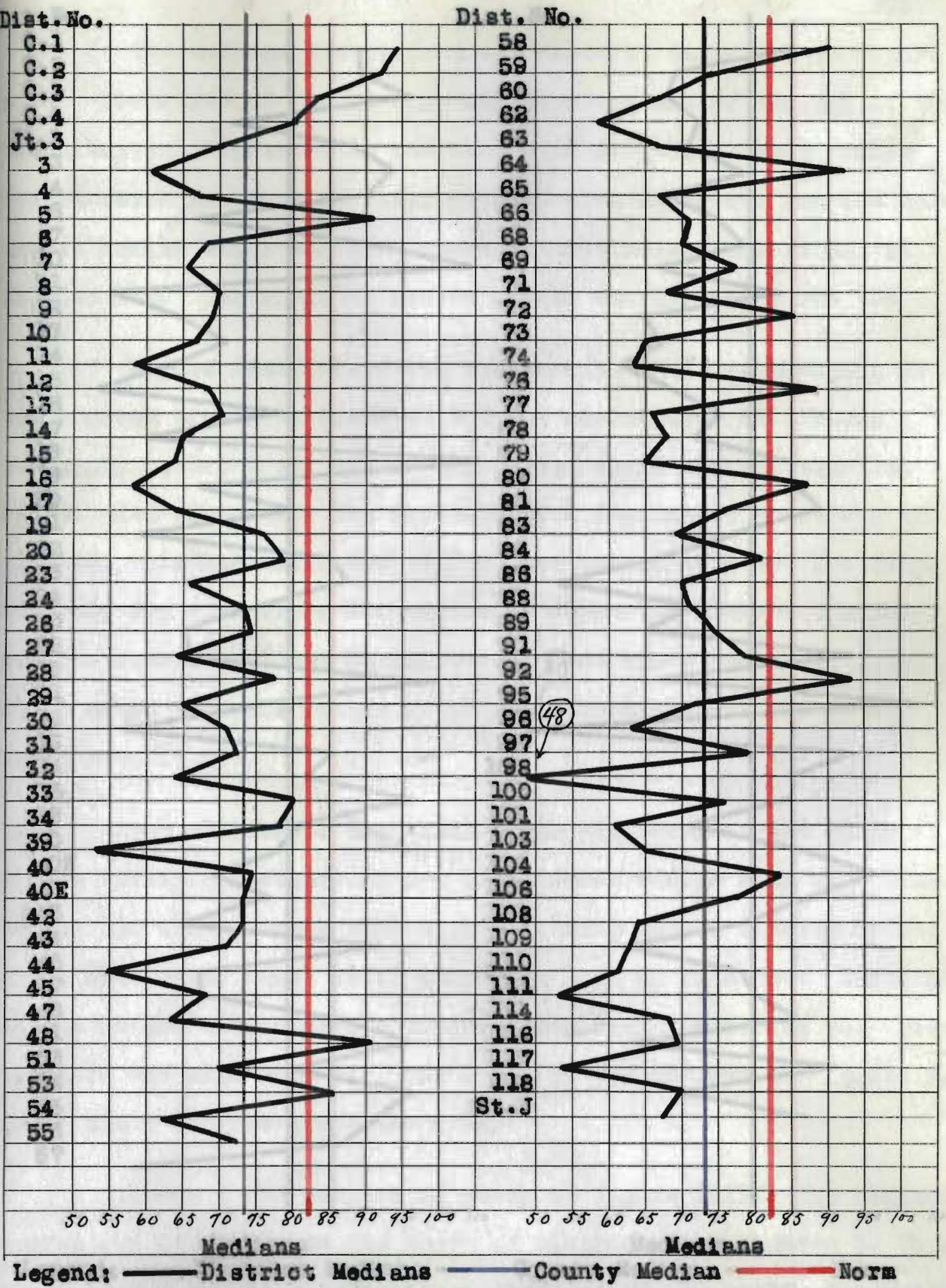
Legend: ——— District Medians ——— County Median ——— Norm

Showing medians of the fifth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 10, Arithmetic Computation, of the New Stanford Achievement Test.

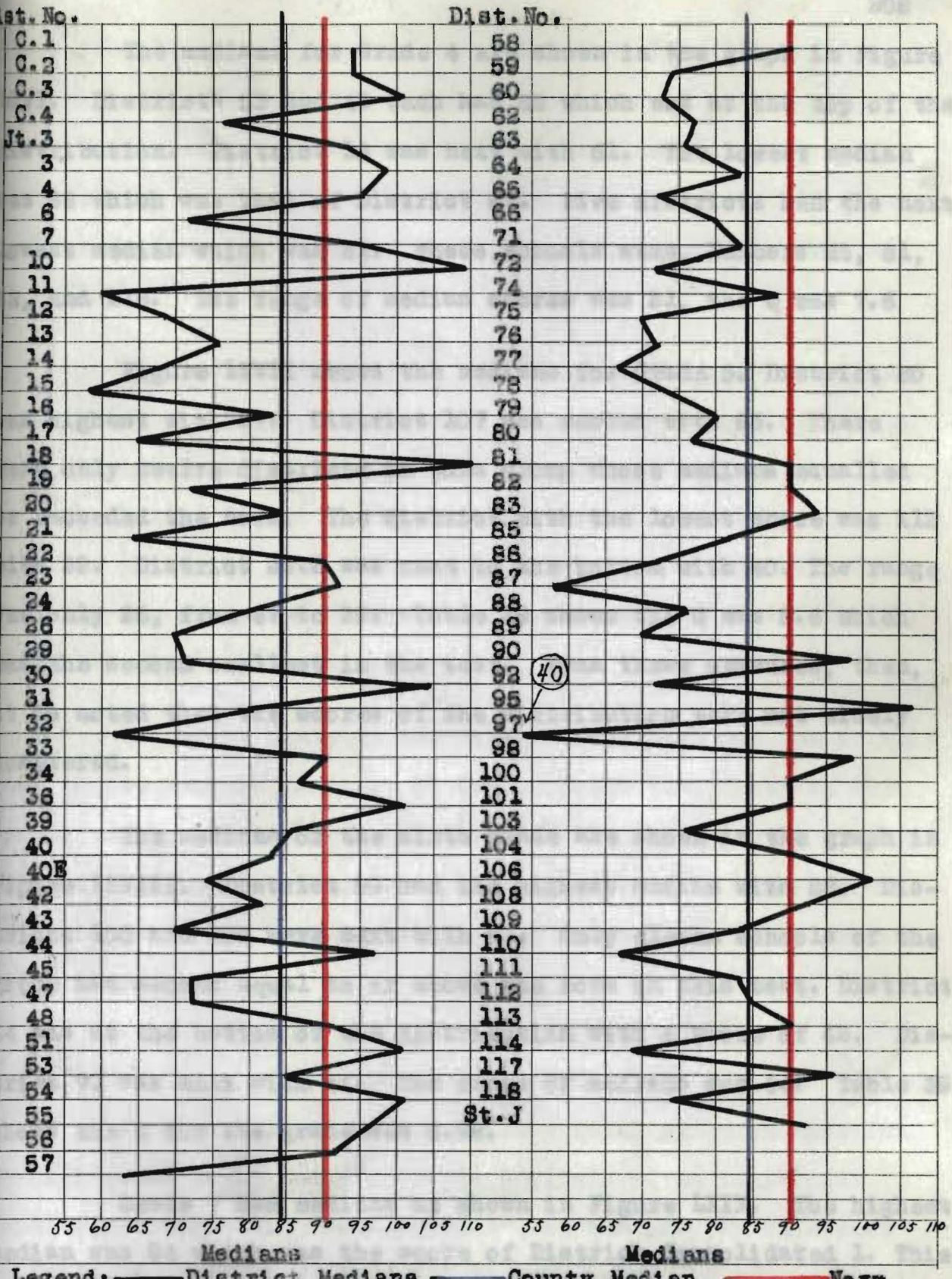


Legend: District Medians — County Median — Norm

Showing medians of the sixth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 10, Arithmetic Computation, of the New Stanford Achievement Test.



Showing medians of the seventh grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 10, Arithmetic Computation, of the New Stanford Achievement Test.



Legend: ——District Medians ——County Median ——Norm

Showing medians of the eighth grade of the elementary schools of Lyon County, Kansas, by school districts, for Test No. 10, Arithmetic Computation, of the New Stanford Achievement Test.

The medians for Grade 4 are shown in the graph in Figure LXVI. Districts 62 and 43 each had 62 which was at the top of the distribution. District 18 was next with 61. The lowest median was 28 which was that of District 87. Five districts had the next lowest median which was 31. These schools were, Numbers 22, 81, 82, and 116. The range of median scores was 31, the Q was 7.6

Figure LXVII shows the medians for Grade 5. District 80 was highest with 67. District 107 was second with 65. There were only twelve districts in this group whose medians equalled or exceeded the norm. The district with the lowest score was 112 with 39. District Jt.3 was next to the bottom with 40. The range was only 28, from 67 to 39. Table 39 shows the Q was 5.6 which was the second smallest in the test. From these measures, then, it is noted that the scores of the distribution were not widely scattered.

The medians of the sixth grade are shown in the graph in Figure LXVIII. District 80 had the highest median with 86. Districts 100 and 106 were next with 83. Only eleven schools of the group had scores equal to or above the norm on this test. District 14 was at the bottom of the distribution with a score of 42. District 71 was next with 44. The range of medians was 44. Table 39 shows the Q for the grade was 5.96.

Grade 7 had medians as shown in Figure LXIX. The highest median was 94 which was the score of District Consolidated 1. This was followed by 93, the median of District 92 and by 92, the median of District 64. The next in order were District 5 and 48 each with 91 and District 58 with 90. District 98 was lowest with 48.

Other schools with low scores were Districts 111,117, and 39, each with 53. The range was from 94 to 48 or 46 points. The quartile deviation was 10.12 which was considerably more than that measure in the preceding grades for this test. This shows a wider scattering of scores in this distribution than in the others.

The medians of Grade 8 are shown in the graph in Figure LXX. District 18 was highest with 110, followed by District 10 with 109 and District 95 with 107. The lowest score of the group was 40, that of District 97. It was below the limit of the graph. District 15 and 87 were next to the bottom, each with 58. The range of the group was 42 but the quartile deviation was 12.18 which was the largest in the test.

No school district was consistently high nor low on this test in the various grades. It can be noted that District 107 was not among the highest scores in all the grades as it was in all the tests except the tests in arithmetic. The school did rank comparatively high in all grades, however, in these arithmetic tests.

INDIVIDUAL SCORES

Again the score of W.H. of the fifth grade of District 58 will serve as an example of the analysis of an individual pupil's ranking. His score in this test was 56. By reference to Table 39, this score is found to rank below the county median, which was 58 for the fifth grade. Locating this score by the use of Tables 39 and 40, it is found above the first quartile mark

TABLE 39

Showing the Quartiles and the Quartile Deviations of the Various Grades of the Elementary Schools of Lyon County, Kansas for Test No.10, Arithmetic Computation, of the New Stanford Achievement Test given in September, 1930

	GRADE						
	2	3	4	5	6	7	8
Third Quartile	28.27	37.09	54.02	62.69	72.47	85.24	96.04
Median	19.48	31.92	45.68	58.12	64.62	72.96	83.56
First Quartile	12.84	38.13	38.32	51.50	60.51	65.00	71.68
Quartile Deviation	7.72	4.48	7.60	5.60	5.98	10.12	12.18

TABLE 40

Showing the Decile Ranking of the Various Grade of the Elementary Schools of Lyon County, Kansas for Test No.10, Arithmetic Computation, of the New Stanford Achievement Test.

	GRADE						
	2	3	4	5	6	7	8
9th Decile	31.94	39.59	59.58	64.88	81.35	94.91	105.96
8th Decile	29.19	37.55	55.52	63.42	74.28	88.62	98.33
7th Decile	25.62	36.63	52.68	61.96	70.65	82.00	93.99
6th Decile	24.55	35.50	50.03	60.50	67.42	76.92	90.27
5th Decile (Median)	19.48	31.92	45.68	58.12	64.62	72.96	83.56
4th Decile	16.35	30.46	42.86	55.29	62.98	69.95	78.04
3rd Decile	13.33	28.92	40.33	52.75	61.33	66.65	73.35
2nd Decile	12.36	25.34	37.24	50.35	59.16	63.42	70.00
1st Decile	8.48	19.71	32.82	43.03	54.73	60.37	64.86

and above the fourth decile level of the fifth grade distribution. This places this pupil above 40% of the children in his grade but, at the same time, exceeded by about 60%.

SCORES OF A CLASS GROUP

The scores of all the pupils in the fifth grade of District 58, arranged from highest to lowest, were:

73	64
71	64
70	62
68 Third Quartile	62 First Quartile
67	61
65	61
64	60
64	56 --Score of W.H.
64 -- Median	
	Total 17

The median of this class was 64. The county median was 58, as shown in Table 39. This shows that this class group ranks above the average in the county. The norm for this grade was 63, according to Table 37, which places the class even above that level. Classifying the group by quartile and decile ranking according to the county distribution , this fifth grade class was found above the third quartile which was 62.69 and above the eighth decile mark which was 63.42. W.H. was found at the bottom of his class but not so far removed from his companions nor from the norm as was his case in many previous tests in the battery. He seemed to do better in arithmetic than in some other subjects in the curriculum that were covered by this series of tests. He was the only one in his class to fall below the county median and his score was practically at that point. It was only .12 of a point short of the county median.

The lower fourth of the class fell some below the norm, though not a considerably distance. The upper fourth was above the county median for the sixth grade and the highest score in the class was above the seventh grade median.

CONCLUSIONS

1. The pupils of the county showed poorer results on this arithmetic test than on the arithmetic reasoning test.

2. The second and third grades had medians above the norms for their respective groups. Grade 2 showed an advancement of about 5 months and Grade 3 about 1 school month.

3. The other five grades fell below the class norms from 2 to 9 points, or as measured by the Educational Chart, were from 1 month to 1 year and 1 month retarded.

4. Since the results in arithmetical computation were inferior, the extensive use of practice tests in this subject which will provide drill on the fundamental operations might be prescribed. These tests will be especially helpful in the school in which low scores were made by most of the pupils. One set of drills may be used in all the grades and may be used from year to year so that the expense is comparatively small. The use of such tests will not burden the teacher since the pupils themselves may aid in the scoring. They relieve the teacher of the task of making drills for the pupils. They furnish the pupils exercises in the fundamental operations which are interesting, helpful, and recreational.

CHAPTER XII

COMPARISON OF THE RESULTS OF THE TEST IN THE THREE TYPES OF SCHOOLS IN THE COUNTY: SUPERIOR, STANDARD, AND NON-STANDARDIZED.

CLASSIFICATION OF THE SCHOOLS OF THE COUNTY

The elementary schools of Lyon County, Kansas are classified according to the standardization schedule provided for in the regulations of the State Board of Education of Kansas. All the schools of the state are compared on a uniform basis and are scored on a system based on 1,000 points. The schools that score 950 points or more are ranked as Superior and those that score 850-950 points are ranked as Standard.

The two types of standardized schools are explained in a bulletin issued by the Kansas State Board of Education, "Standardization of Rural and Graded Schools." Quoting from this pamphlet:[1]

> " 1. STANDARD SCHOOL. This classification may be given to any rural school making a score of 850 points, including the required items as indicated by bold-face type. A STANDARD GRADE SCHOOL must maintain a nine-month term, employ two or mor teachers in the grades, and make a score of 850 points, including the required items.
>
> 2. SUPERIOR SCHOOL. This classification may be given to any school which has a building of approved architectural type, modern in all its appointments, and making a score of 950 points, including the required items indicated by this mark (#). A SUPERIOR GRADE SCHOOL must maintain a nine-month term and have four or more superior teachers."

The score card* used is divided into four parts, each consisting of a varying number of items. Explanatory annotations on all the items on the card are found on the back of the score

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1 George A. Allen, Jr., Editor, Standardization of Rural and Graded Schools, page 5, Kansas State Printing Plant, Topeka, Kansas, 1928, 32 pages.

* See Appendix for sample of score card.

card. Part I deals with the yard and outbuildings. 100 points are given for a perfect score on this section. The items pertain to the grounds, trees and shrubs, walks, outbuildings, and playground. Part II contains 8 items pertaining to the school building. The total number of possible points for this division is 200. Part III refers to the equipment of the school. 250 possible points are given to the section. Part IV deals with the school proper and is subdivided into three parts. One division scores the teacher: the preparation (certificate), appearance, poise, experience, teaching ability, records kept, and the like. 300 possible points is the total on this part. The following items concerning the pupils are in the next division: attendance, punctuality, appearence, conduct, application to school work, and care of school property. 100 points may be obtained on this section. The third part, organization, has 50 possible points. It contains items on daily program, plan book, and extra-curricular activities.

The schools are scored by the county superintendent in cooperation with the rural school supervisors of the State Department of Education. The county superintendent scores all the schools under his supervision each year. A copy of the score card is sent to each school. Standard and Superior schools are furnished with a certificate and a plate by the state department to designate their standings. Schools that do not maintain the conditions which gave them the ranking are taken from the approved list and asked to turn in their plate. They may be reinstated by meeting the requirements. The certificates are renewed each year.

At the time this Stanford Achievement Test was given, in September and October, 1930, there were eight schools in Lyon County that were classified as Superior Schools. These were Districts Consolidated 2, 8, 26, 44, 45, 53, 55, and 58. There were 300 pupils in these schools. In this chapter these pupils will be grouped together and the medians obtained on these tests for the group will represent the superior schools.

There were nineteen schools that were classified as Standard Schools. This group included the following districts: Consolidated 1, Consolidated 3, Consolidated 4, 4, 20, 22, 24, 30, 32, 71, 72, 82, 87, 88, 91, 104, 106, 111, and 113. There were 520 pupils in these schools who will be group together. The median scores of these children will represent this class of schools.

The other eighty-one districts of the county were not classified in either of the above groups and will be designated as "Non-Standardized schools in this study. There were 1213 school pupils in this group.

The purpose of this chapter is to compare the three types of schools by grades, according to the results of this test.

RESULTS IN GRADE II

The median scores of the pupils in Grade 2 in the three types of schools on the five tests in the battery are shown in Table 41. The medians of the composite scores and the number of pupils in each of the three types of schools are included also. The norm for the grade and the county medians, found by using the total number of pupils in all the county in one distribution, are

given too. It will be noted in an examination of the data that the Non-Standardized schools ranked higher than either of the standardized schools on all the sub-tests except number 2 and number 3. In test 2, the Standard schools ranked highest, the Non-Standardized next, and the Superior schools last. In test 3 the Superior schools were first, the Non-Standardized second, and the Standard schools were last. In tests 1 and 4, the Non-Standardized schools were first, the Superior second, and the Standard schools third. The Non-Standardized school led in test 5 and the Standard schools were next with the Superior schools last. In the composite scores the ranking of the types of schools was: Non-Standardized schools first, Superior schools second, and Standard schools third.

TABLE 41

Showing the Median Scores on Each of the five sub-tests and the Composite Score of the New Stanford Achievement Test, Primary Examination, made by the pupils of the Second Grade in the three types of elementary schools of Lyon County, Kansas.

	NORM	COUNTY MEDIAN	TYPE OF SCHOOL		
			SUPERIOR	STANDARD	NON-STANDARDIZED
Test 1	14	12	3.80	3.60	12.84
Test 2	14	17	16.78	17.45	17.37
Test 3	14	8	11.25	6.40	8.27
Test 4	14	13	12.93	12.76	13.90
Test 5	14	19	13.63	19.26	20.00
Composite Score	14	13.4	12.89	12.70	13.80
Number of Pupils		(Total 295)	45	82	168

RESULTS IN GRADE III

The medians for Grade 3 in each of the sub-tests and for the composite scores are tabulated in Table 42. In all but one of the sub-tests, the fifth, the Superior school were first for this grade. In the fifth test which is Arithmetic Computation in the Primary Examination, the Non-Standardized schools were in the lead, with the Standard schools second, and the Superior schools third. In the first, second, and fourth tests, the Non-Standardized schools ranked second and the Standard schools were third. In the third test, however, the Standard schools were above the Non-Standardized schools. On the Composite scores the Superior schools ranked first with a median score of 31.47, the Non-Standardized schools were second with a median of 29.15, and the Standard schools were third with 25.42.

TABLE 42

Showing the median scores on Each of the five sub-tests and the Composite Score of the New Stanford Achievement Test, Primary Examination, made by the pupils of the Third Grade in the three types of elementary schools of Lyon County, Kansas.

	NORM	COUNTY MEDIAN	TYPE OF SCHOOL		
			SUPERIOR	STANDARD	NON-STANDARDIZED
Test 1	30	22	29.00	18.75	23.00
Test 2	30	25	28.67	24.00	26.30
Test 3	30	26	33.40	24.00	23.86
Test 4	30	35	35.70	34.00	34.34
Test 5	30	33	31.30	31.27	34.92
Composite Score	30	28.9	31.47	25.42	29.15
Number of Pupils	(Total 277)		46	86	145

RESULTS IN GRADE III

The medians for Grade 3 in each of the sub-tests and for the composite scores are tabulated in Table 42. In all but one of the sub-tests, the fifth, the Superior school were first for this grade. In the fifth test which is Arithmetic Computation in the Primary Examination, the Non-Standardized schools were in the lead, with the Standard schools second, and the Superior schools third. In the first, second, and fourth tests, the Non-Standardized schools ranked second and the Standard schools were third. In the third test, however, the Standard schools were above the Non-Standardized schools. On the Composite Scores the Superior schools ranked first with a median score of 31.47, the Non-Standardized schools were second with a median of 29.15, and the Standard schools were third with 25.42.

TABLE 42

Showing the median scores on Each of the five sub-tests and the Composite Score of the New Stanford Achievement Test, Primary Examination, made by the pupils of the Third Grade in the three types of elementary schools of Lyon County, Kansas.

	NORM	COUNTY MEDIAN	TYPE OF SCHOOL		
			SUPERIOR	STANDARD	NON-STANDARDIZED
Test 1	30	22	29.00	18.75	23.00
Test 2	30	25	28.67	24.00	26.30
Test 3	30	28	32.40	24.00	23.86
Test 4	30	35	33.70	34.00	34.54
Test 5	30	33	31.30	31.37	34.92
Composite Score	30	28.9	31.47	25.42	29.15
Number of Pupils	(Total 277)		46	86	145

TABLE 43

Showing the Median Scores on Each of the ten sub-tests and the Composite Score of the New Stanford Acheievment Test made by the Pupils in the Fourth Grade in the Three Types of Elementary Schools of Lyon County, Kansas.

	NORM	COUNTY MEDIAN	TYPE OF SCHOOL		
			SUPERIOR	STANDARD	NON-STANDARDIZED
Test 1	48	43	44.17	42.73	42.70
Test 2	48	46	45.83	47.18	45.93
Test 3	48	48	45.83	43.50	41.87
Test 4	48	43	44.37	43.33	43.05
Test 5	48	44	45.31	46.25	42.72
Test 6	48	37	38.94	33.75	37.75
Test 7	48	50	52.91	47.50	49.80
Test 8	48	51	54.17	51.77	50.06
Test 9	48	48	50.41	47.14	48.45
Test 10	48	48	51.14	43.81	45.83
Composite Score	48	45.5	47.12	45.22	45.27
Number of Pupils	(Total 324)		39	90	195

RESULTS IN GRADE IV

The medians for Grade 4 in each of the sub-tests and for the composite scores are tabulated in Table 43. There are ten tests in this grade and in the grades that follow. The Superior schools ranked first in all but three of the tests; in the fifth and sixth tests they were second, and in the second test they were third. In the second and the fifth tests the Standard schools ranked first. These schools ranked second in four tests and were third in the remaining four tests. The Non-Standardized schools ranked above both of the standardized schools in the sixth test. They were second in four of the tests and third in the other five tests. On the composite scores the ranking of the types of schools was as follows: Superior schools first with 47.12, the Non-Standardized schools second with 45.27, the Standard schools third with 45.22. The second and third scores were quite close together.

RESULTS IN GRADE V

The medians for Grade 5 in each of the sub-tests and for the composite scores are shown in Table 44. The Superior schools were first in all of the tests, except the seventh in which they were second. The Standard schools were first in the seventh test, and second in all the other tests except the second and tenth tests in which they ranked third. The Non-Standardized schools were third in all the tests but the two just mentioned, tests 2 and 10, in which they ranked above the Standard schools. In the composite scores the Superior schools ranked first, the Standard schools second, and the Non-Standardized schools third.

TABLE 44

Showing the Median Scores on Each of the Ten Sub-tests and the Composite Score of the New Stanford Achievement Test made by the Pupils in the Fifth Grade in the Three Types of Elementary Schools of Lyon County, Kansas.

	NORM	COUNTY MEDIAN	TYPE OF SCHOOL		
			SUPERIOR	STANDARD	NON-STANDARDIZED
Test 1	63	60	65.50	60.36	57.74
Test 2	63	56	61.80	59.06	59.08
Test 3	63	58	61.56	59.17	56.32
Test 4	63	49	54.64	51.25	46.83
Test 5	63	49	57.08	52.50	47.05
Test 6	63	46	48.50	45.82	45.10
Test 7	63	59	61.50	63.12	57.80
Test 8	63	58	62.50	58.93	55.60
Test 9	63	64	72.50	64.70	62.25
Test 10	63	58	61.12	57.30	57.42
Composite Score	63	57.2	61.61	58.26	55.53
Number of Pupils	(Total 295)		51	55	189

TABLE 45

Showing the Median Scores on Each of the Ten Sub-tests and the Composite Score of the New Stanford Achievement Test made by the Pupils in the Sixth Grade in the Three Types of Elementary Schools of Lyon County, Kansas.

	NORM	COUNTY MEDIAN	TYPE OF SCHOOL		
			SUPERIOR	STANDARD	NON-STANDARDIZED
Test 1	74	71	72.50	72.50	70.35
Test 2	74	67	70.00	67.50	66.57
Test 3	74	68	72.00	70.00	67.41
Test 4	74	63	72.00	70.00	60.66
Test 5	74	54	52.50	60.50	51.83
Test 6	74	61	69.44	61.66	54.50
Test 7	74	71	71.66	72.14	70.07
Test 8	74	69	75.00	68.90	67.06
Test 9	74	73	80.83	75.00	71.47
Test 10	74	65	69.30	64.47	63.23
Composite Score	74	67	71.85	65.98	65.38
Number of Pupils	(Total 283)		40	68	175

RESULTS IN GRADE VI

The medians for Grade 6 in each of the subtests and for the composite score are tabulated in Table 45. The Superior schools ranked second in tests 5 and 7, and first in all the other tests. They were tied with the Standard schools for first in test 1. The Standard schools were first in the fifth and the seventh tests and second in all other tests. The Non-Standardized schools ranked below both the Superior and the Standard schools in all the tests in this grade. In the composite scores the order of rank was as follows: Superior schools first with 71.85, Standard schools second with 67.98, and Non-Standardized schools third with 65.38.

RESULTS IN GRADE VII

Table 46 shows the medians for Grade 7 for each of the sub-tests. In this grade the Superior schools ranked first and the Standard schools second in all the tests except the fifth. In this test the Standard schools ranked above the Superior schools. It is noted that the Non-Standardized schools had a rank inferior to the standardized schools in all the tests. In the composite scores the ranking is the same as the order for standardization: Superior first, Standard second, and the Non-Standardized third.

TABLE 46

Showing the Median Scores on Each of the Ten Sub-tests and the Composite Score of the New Stanford Achievement Test made by the Pupils in the Seventh Grade in the Three Types of Elementary Schools of Lyon County, Kansas

	NORM	COUNTY MEDIAN	TYPE OF SCHOOL		
			SUPERIOR	STANDARD	NON-STANDARDIZED
Test 1	82	81	84.58	81.83	78.70
Test 2	82	77	81.56	80.83	74.81
Test 3	82	80	83.65	83.03	76.11
Test 4	82	79	84.50	82.95	75.00
Test 5	82	65	69.64	74.50	59.73
Test 6	82	75	80.83	76.79	70.38
Test 7	82	78	85.62	84.70	75.80
Test 8	82	78	82.50	81.18	75.75
Test 9	82	80	86.78	83.86	75.29
Test 10	82	73	82.91	79.58	69.09
Composite Score	82	76.9	82.73	81.36	73.70
Number of Pupils	(Total 284)		45	65	174

RESULTS IN GRADE VIII

Table 47 gives the medians for Grade 8 for each of the sub-tests and the composite scores. As in the seventh grade, the schools of Superior rank exceeded those of the Standard classification in all but one test, the first. In this test the Superior schools fell below the Standard group. The Standard schools were second in all the tests with the exception just mentioned. The Non-Standardized school ranked lowest in every test in this grade. As in many of the preceding tests, the Superior schools were first in the composite scores, the Standard schools were second, and the Non-Standardized schools were third.

TABLE 47

Showing the Median Scores on Each of the Ten Sub-tests and the Composite Score of the New Stanford Achievement Test made by the Pupils in the Eighth Grade in the Three Types of Elementary Schools of Lyon County, Kansas.

	NORM	COUNTY MEDIAN	TYPE OF SCHOOL		
			SUPERIOR	STANDARD	NON-STANDARDIZED
Test 1	90	90	91.25	92.00	85.25
Test 2	90	85	87.50	85.77	84.57
Test 3	90	86	88.50	86.66	85.53
Test 4	90	87	94.00	91.42	82.83
Test 5	90	79	85.83	83.57	75.60
Test 6	90	86	92.50	87.69	84.86
Test 7	90	88	93.75	92.50	85.62
Test 8	90	94	97.50	94.23	92.75
Test 9	90	91	93.33	91.81	90.08
Test 10	90	84	92.50	91.00	80.14
Composite Score	90	87	91.60	89.22	84.82
Number of Pupils	(Total 275)		34	74	167

SUMMARY AND CONCLUSIONS

The following summary shows the ranking of the medians of the composite scores for the several grades:

Grade 2 -	Non-Standardized	-Superior	-Standard
Grade 3 -	Superior	-Non-Standardized	-Standard
Grade 4 -	Superior	-Non-Standardized	-Standard
Grade 5 -	Superior	-Standard	-Non-Standardized
Grade 6 -	Superior	-Standard	-Non-Standardized
Grade 7 -	Superior	-Standard	-Non-Standardized
Grade 8 -	Superior	-Standard	-Non-Standardized

It can be noted that in every grade the Superior schools ranked above the Standard schools and with but one exception above the Non-Standardized schools. The Standard schools were found above the Non-Standardized schools in the four higher grades, the fifth to the eighth, inclusive. In the third and fourth grades the Non-Standardized schools ranked above the Standard school and in Grade 3 they had a higher median than both of the standardized schools.

These results show that the Superior school did better work in this achievement test than was done by the other schools. The differences between the standings of the other two types of schools is not so clear-cut. Little, if any, difference is found between them. It is difficult to rank one group above the other. Therefore the rankings of the three types of schools, according to the findings on this test, were: Superior School first, Standard and Non-Standardized Schools rank about equal for second place.

CHAPTER XIII

REPETITION OF THE TEST TO *MEASURE* PROGRESS

Another form of the Stanford Achievement Test was given in about one-third of the school districts in April, 1931.* The improvement in the work of the pupils can be measured by making a comparison of the results of the test that was given in September, 1930 with those of the test that was given in April, 1931. The number of schools that gave the test in April was markedly reduced because all the expense of the testing materials was paid by the individual schools. No funds from other sources were available as was the case in the fall testing program.

Comparisons of the results of the two tests will be shown in this chapter. The norms for the several grades were higher in the spring than in the fall. The discussion will deal with one grade at a time.

Table 48 shows the medians made by the pupils in Grade 2. One column gives the medians on the five sub-tests as found when the test was given at the beginning of the term, in September, 1930. These scores are not the same as previously given in this study because the distribution includes only the schools in which the test was given the second time. The norm, as is indicated, is the same as before. It is 14 for this grade. In the second column are the median scores as found on the test when given near the close of the term, in April, 1931. The third column in the table shows the

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* The following school districts gave the test in September, 1930 and again in April, 1931: Consolidated 3, 6, 18, 20, 26, 27, 29, 98, 30, 31, 37, 40, 42, 45, 48, 51, 53, 55, 58, 64, 65, 66, 85, 86, 87, 88, 91, 101, 104, 107, 109, 110, and 112. (Total 33 districts)

number of points gained. The normal gain in this grade according to the norms should be 13 points. A gain equal to or larger than this amount was made in three of the sub-tests. The gain on test 1 was 21.82 points. It should be noted, however, that the group was far below the norm in the fall and that they were still below the norm in the spring. On test 2 the gain was below the required amount but because the fall median ranked above the norm the median in the spring was a little above its norm. On test 3, which is Dictation or Spelling, the pupils in these schools showed a remarkable increase. The median was low in the fall but in the spring it exceeded the norm by 7 points. The gain on the next test, Arithmetic Reasoning, was below the normal gain by about 2½ points. The spring median, too, was below the norm. On test 5, the gain was satisfactory. The medians were above the norms at both times. The gain in this test was about normal.

TABLE 46

Showing the Progress on Each of the Five Sub-tests in the New Stanford Achievement Test, Primary Examination, made by the Pupils in Grade 2 in some of the Schools of Lyon County, Kansas from September, 1930 to April, 1931.

	MEDIAN SEPT. 1930	MEDIAN APRIL 1931	GAIN
Test 1	3.85	25.67	21.82
Test 2	16.70	27.67	10.97
Test 3	9.28	34.22	24.94
Test 4	13.31	23.78	10.47
Test 5	19.46	34.00	14.54
Norm	14	27	13
Number of Pupils	63	64	

TABLE 49

Showing the Progress on Each of the Five Sub-tests in the New Stanford Achievement Test, Primary Examination, made by the Pupils in Grade 3 in some of the Schools of Lyon County, Kansas from September, 1930 to April, 1931.

	MEDIAN SEPT. 1930	MEDIAN APRIL 1931	GAIN
Test 1	24.00	42.81	18.81
Test 2	26.00	40.93	14.93
Test 3	29.50	50.36	20.86
Test 4	34.42	43.62	9.20
Test 5	31.29	50.25	18.96
Norm	30	45	15
Number of Pupils	110	129	

The September and April medians made by the pupils in Grade 3 are given in Table 49. The norms indicate that the gain should be 15 points for normal development. On test 1, the gain exceeded this. However, the fall median was below the norm so that the spring median was low also. The gain in test 2 was but .07 of a point below the required amount but again both medians were below the norms. On the third test the gain was 20.86. The fall median was about equal to the norm so that the median in the spring was 5 points above its norm. On test 4 the gain was only 9.2 and both medians were below the norms. The gain on test 5 was 18.96. The fall median was above its norm 1.29 points and the spring median was above its norm 5.25 points.

The pupils in these schools that were in Grade 4 had medians as shown in Table 50. The norms indicate that the normal gain should be 13. In test 6 the gain was only 1.42 points. The medians were far below the norms on both testing in this test. On three other tests the gain was about one-half of the amount that the normal increase should have been. On the seventh test the gain was 11.37 which approached the normal gain. The gain on the five remaining tests was above the required 13 points. In the fall the medians for the seventh, eighth, and ninth tests were equal to or above the norm. In the spring the median for test 8 was below the norm but the medians for test 7 and test 9 were still satisfactory. The gain on test 10 was sufficient to raise the spring median about to the norm level.

TABLE 50

Showing the Progress on Each of the Ten Sub-tests in the New Stanford Achievement Test, made by the Pupils in Grade 4 in some of the Schools of Lyon County, Kansas from September, 1930 to April, 1931.

	MEDIAN SEPT. 1930	MEDIAN APRIL 1931	GAIN
Test 1	41.45	58.03	16.58
Test 2	45.69	59.22	13.53
Test 3	42.66	58.25	15.59
Test 4	43.28	49.37	6.09
Test 5	45.93	52.50	6.57
Test 6	32.83	34.25	1.42
Test 7	48.81	60.18	11.37
Test 8	48.81	54.41	5.60
Test 9	47.63	63.83	16.20
Test 10	44.58	60.46	15.88
Norm	48	61	13
Number of Pupils	127	105	

TABLE 51

Showing the Progress on Each of the Sub-tests in the New Stanford Achievement Test made by the Pupils in Grade 5 in some of the Schools of Lyon County, Kansas from September, 1930 to April, 1931.

	MEDIAN SEPT. 1930	MEDIAN APRIL 1931	GAIN
Test 1	58.43	67.33	8.90
Test 2	57.32	68.46	11.14
Test 3	57.92	66.33	8.41
Test 4	47.81	63.64	15.83
Test 5	47.71	64.67	16.96
Test 6	46.46	51.07	4.61
Test 7	58.97	67.14	8.17
Test 8	57.50	63.46	5.96
Test 9	65.96	77.50	11.54
Test 10	57.50	70.90	13.40
Norm	63	72	9
Number of Pupils	83	106	

The fall and spring medians for the fifth grade are shown in Table 51. The norms show that a gain of 9 points should have been made by the pupils in this grade. In five of the tests this amount of gain was not made. In three of them, however, the gain was more than 8 points. The gain was more than 9 points in the remaining tests. It should be noted that only one of the September medians was above the norm; that was the ninth test. The gain in test 9 was more than the required amount so that the April median was also above the norm. None of the other April medians equalled or exceeded the norm.

TABLE 52

Showing the Progress on Each of the Sub-tests in the New Stanford Achievement Test made by the Pupils in Grade 6 in some of the Schools of Lyon County, Kansas From September, 1930 to April, 1931.

	MEDIAN SEPT.1930	MEDIAN APRIL 1931	GAIN
Test 1	67.19	73.20	6.01
Test 2	66.67	76.03	9.36
Test 3	68.12	77.50	9.38
Test 4	63.57	77.19	13.62
Test 5	51.00	71.25	20.25
Test 6	60.00	76.00	16.00
Test 7	69.00	76.75	7.75
Test 8	67.50	73.50	6.00
Test 9	72.50	82.95	10.45
Test 10	65.67	82.19	16.52
Norm	74	81	7
Number of Pupils	70	79	

The medians made by the pupils in the Sixth Grade on the test in September and in April are shown in Table 52. The gain in this grade should have been 7. In the first and the eighth test the gain was only 6. The medians in both of these tests were below the norm. In all the other tests the gain made was above the required amount for normal growth. None of the September medians were equal to the norm. In the column of April medians, however, it is found that the scores in tests 9 and 10 exceeded the norm. In four of the tests the pupils showed a gain of twice or more than the amount required for normal development. In the fifth test the gain was almost three times the normal growth but was still below the norm in April.

TABLE 53

Showing the Progress on Each of the Sub-tests in the New Stanford Achievement Test made by the Pupils in Grade 7 in some of the Schools of Lyon County, Kansas from September, 1930 to April, 1931

	MEDIAN SEPT.1930	MEDIAN APRIL 1931	GAIN
Test 1	78.33	84.23	5.90
Test 2	77.93	85.00	7.07
Test 3	81.25	83.75	2.50
Test 4	78.00	86.11	8.11
Test 5	68.75	80.62	11.87
Test 6	76.15	85.00	8.85
Test 7	80.77	87.85	7.08
Test 8	79.41	92.31	12.90
Test 9	80.45	90.00	9.55
Test 10	71.67	80.80	9.13
Norm	82	88	6
Number of Pupils	82	78	

Table 53 shows the medians for Grade 7 for the September and April Tests. The pupils should have made a gain of 6 points in this grade. On the first test the increase was only .1 of a point short of the 6 points. In the third test the gain was only 2.5 which was less than half the amount required for normal growth. The gain was above the required number of points in all the other tests. In test 5 the gain was about double the required 6 points. The increase in the eighth test was more than twice the normal gain. None of the September medians were above the norm. In April three medians compare favorably with the norm. Test 7 was just below the norm and tests 8 and 9 exceeded it.

TABLE 54

Showing the Progress on Each of the Sub-tests in the New Stanford Achievement Test made by the Pupils in Grade 8 in some of the Schools of Lyon County, Kansas from September, 1930 to April, 1931.

	MEDIAN SEPT.1930	MEDIAN APRIL 1931	GAIN
Test 1	87.19	90.83	3.64
Test 2	85.18	90.83	5.65
Test 3	85.39	90.68	5.29
Test 4	88.50	97.11	8.61
Test 5	80.93	86.87	5.94
Test 6	88.05	99.70	11.65
Test 7	90.25	89.75	-.50
Test 8	93.41	94.42	1.01
Test 9	88.75	98.50	9.75
Test 10	83.50	96.39	12.89
Norm	90	95	5
Number of Pupils	67	73	

The September and April medians for the pupils in these schools in the eighth grade are shown in Table 54. The gain for the group should have been 5 points. In test 7, Geography, the pupils lacked a half point of holding the April median the same as the September median. Perhaps the fact that the eighth grade pupils do not study Geography in regular school work may help to explain this loss. It was the only loss in all the tests in all the grades. The gain in tests 1 and 8 both are below the standard increase. The gain in the other tests was above the 5 points required for normal growth for the grade. In tests 6 and 10 the gain was more than double the required amount. Two of the September medians and four of the April scores were above the norms. The April median in test 8 was almost equal to the norm, only .58 below.

SUMMARY

TABLE 55

Showing the Number of Tests in Each Grade in which the Gain was Above or was Below the Required Number of Points for Normal Gain.

	Total No. Tests	No. of Tests in which Gain was	
		Above or Equal to Requirement	Below Requirement
Grade 2	5	3	2
Grade 3	5	4	1
Grade 4	10	5	5
Grade 5	10	6	4
Grade 6	10	8	2
Grade 7	10	9	1
Grade 8	10	7	3
Totals	60	42	18

Table 55 shows the number of tests in each grade in which the pupils made a gain from September to April which was above or equal to the number of points required to show normal development and the number in which the increase was below that standard. In the fourth grade the required gain was made in exactly one half of the tests. In all other grades the pupils made the required gain in most of the tests. The totals show the increase was above or equal to the normal development in 42 of the tests out of a total of 60 tests. This indicates that the pupils of the schools in which the test was given twice have made progress, according to the number of points to have been gained, that corresponds favorably with the normal growth as shown by the norms for this test.

It should not be assumed, however, that the work in these schools is up to the standard. The April medians in most of the tests in every grade were below the norms which would indicate the pupils were below the standard levels in spite of the normal growth from September to April. The pupils were so far below the norms in the fall that, although the advancement was normal or better, the majority of the April medians still were inferior to the norms.

Throughout the analysis of the results of these testing programs, Grades 2 and 3 were found not far from the norms, Grade 4 showed a lower standing, Grades 5 and 6 fell considerably lower, Grade 7 showed a tendency to rise toward the norms, and Grade 8 was again nearer the norms. The question as to the cause for this "sagging" in the intermediate grades arises. Perhaps the teachers neglected the pupils in these grades in order to aid those in the primary grades and in the grammar grades. The pupils in the beginning years cannot work much without the aid of the teacher and perhaps the preparation for the county examinations in the seventh and the eighth grades makes a big demand on the teacher's time and efforts.

A CORRELATION OF THE STANFORD ACHIEVEMENT RESULTS AND THE DIPLOMA EXAMINATION GRADES IN GRADE EIGHT

The coefficient of correlation that existed between the September scores of the eighth grades and the diploma examination grades was obtained. It was found to be .68 .03. It was found by using the product-moment formula on the Otis Correlation Chart. The significance of this coefficient of correlation may be found if

reference is made to the quotation given in Chapter II, page 44. It falls under the "high" classification. This indicates that the pupils in Grade 8 did similar work both in the Achievement test and in the Diploma Examinations. It further bears out the fact that in this grade the instruction was about normal.

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STATE OF KANSAS—DEPARTMENT OF EDUCATION 8-31—10,000

SCORE CARDS FOR GRADED SCHOOLS

GEO. A. ALLEN, JR., *State Superintendent.* FLORENCE H. WALKER AND J. H. HOUSTON, *Supervisors.*

School name..... District No..... County.....

Superintendent or Principal..... Salary..... Length of Term.....

I recommend for approval { Accepted (850 required)..... / Standard (850) required..... / Superior (950 required)..... } Renewal { Standard..... / Superior..... } Reinstatement..... Removal.....

Date.....193..... (Signed).....
County Superintendent.

Enrollment by grades: I.....II.....III.....IV.....V.....VI.....VII.....VIII.....

	Bold-faced type required for Standard School All Items Required for Superior School	Possible Score	Superintendent's Score 1931-32	1932-33	1933-34	1934-35
I.	**SITE** 100					
1.	**Grounds**..... Size..... clean..... fenced..... trees..... shrubs..... walks..... well drained..... smooth..... play area, size..... shape..... unobstructed.....	25				
2.	**Source of water supply**..... Well..... cistern..... carried..... city system..... analyzed.....	20				
3.	**Toilets (2 sanitary)**..... Outside (**screened**)..... chemical..... water flush.....	20				
4.	**Flag pole and two flags**..... Outside flag..... inside flag, on staff..... not on staff..... silk..... wool..... cotton.....	15				
5.	**Recreation**..... Balls: base..... volley..... basket..... foot..... bars..... giant stride..... teeters..... swings..... **Play supervised by teacher**.....	20				
	Total.....	100				
II.	**BUILDING** 200					
1.	**General condition**.....	30				
2.	**Lighting**..... Cross lights..... **left light**..... **left and rear light**..... square feet in floor..... square feet in windows.....	25				
3.	**Interior equipment:** **Cloak Rooms**..... **Pupils**, number..... Possible score 12..... Teacher's..... Possible score 3.....	15				
	Lunch cupboard.....	5				
	Blackboards..... Slate..... **hyloplate**..... **cement**.....	25				
	Window shades..... Adjustable..... nonadjustable..... north windows.....	10				
	Heat..... **Basement furnace**..... **room heater**..... hoatrola or similar type..... common stove.....	25				
	Ventilation..... Window with boards..... fresh air intake to furnace or heater..... foul air outlet through flue..... special ventilator.....	25				
4.	**Interior Decoration**..... Color of walls..... paint..... paper..... **clean**..... **pictures**..... **display board**..... posters neatly arranged.....	40				
	Total.....	200				
III.	**EQUIPMENT** 250					
1.	**Furniture:** (*a*) **Desks: single**..... **properly arranged**.....	25				
	(*b*) **Bookcase:** closed..... built in.....	10				
	(*c*) Musical instruments: piano..... organ..... victrola..... radio.....	15				
	(*d*) **Teacher's desk and chair**.....	10				
2.	**Library:**					
	Number approved books from Reading Circle.....	25				
	Has law been complied with? yes..... no.....					
	Supplementary readers: (2 sets) (Give No. in each grade).....	30				
	(Kind) (No.) (Kind) (No.)					
	Grade 1.....					
	Grade 2.....					
	Grade 3.....					
	Grade 4.....					
	Dictionaries :Large one..... **Small ones (one for each 5 pupils above 3d grade)**..... Kind.....	20				

(OVER)

Bold-faced type required for Standard School All Items Required for Superior School	Possible Score	Superintendent's Score			
		1931-32	1932-33	1933-34	1934-35
III. EQUIPMENT 250—Continued					
Encyclopedia (World Book..... Compton's Pictured Encyclopedia.....)	15				
Reference sets (Lincoln Library..... Book Trails..... Book of Knowledge..... Pictured Knowledge..... Human Interest Library.....)	10				
Reference books	5				
Juvenile Magazines Name 1..... 2.....	15				
3. **Maps**..... **Globe** (U. S..... N. A..... S. A..... Eu..... Asia..... Af..... Hemispheres..... Kansas.....)	15				
4. **Primary material** Minimum list of primary materials. (check) word cards..... phrase cards..... phonogram cards..... figure cards..... colored sticks..... colored crayons.... color cubes..... sharp-pointed scissors..... paste..... pencil sharpener..... assorted construction paper (9x12)..... drawing paper (9x12).....	20				
5. **Drinking facilities** (Cups and pump..... bubbler..... cooler and cups.....)	20				
6. Washing facilities Lavatory..... basin..... paper towels..... individual towels..... liquid soap..... antiseptic soap..... thermometer..... sweeping compound, etc.....	15				
Total	250				
IV. THE SCHOOL 450					
1. **Certificate** (2d grade..... 1st grade..... N. T..... 30 hr..... 60 hr..... Degree..... hours college.....)	60				
2. Classroom Management:					
Temperature	25				
Ventilation	25				
Arrangement of material	20				
Attractiveness of room	20				
Management of pupils	30				
3. Classroom Procedure:					
Pupil activity	30				
Interest in work	30				
Teacher activity	30				
Daily preparation	30				
Instruction	30				
Room atmosphere **Conducive to good work**..... Distracting.....	30				
Attitude toward pupils	30				
Professional attitude	30				
Attention to individual needs	30				
Total	450				
Grand Total	1000				

REMARKS:

New Stanford Achievement Test

By TRUMAN L. KELLEY, GILES M. RUCH, and LEWIS M. TERMAN

ADVANCED EXAMINATION: FORM V

FOR GRADES 4-9

Name..... Grade.....Boy or girl.....

Age..... When is your next birthday?..... How old will you be then?.....

Name of school..... Date.....

TEST	SCORE	AGE EQUIVALENT	GRADE EQUIVALENT
1. Paragraph Meaning			
2. Word Meaning			
Total (Average) Reading			
3. Dictation			
4. Language Usage			
5. Literature			
6. History and Civics			
7. Geography			
8. Physiology and Hygiene			
9. Arithmetic Reasoning			
10. Arithmetic Computation			
Total (Average) Arithmetic			
Total (Average) Score			

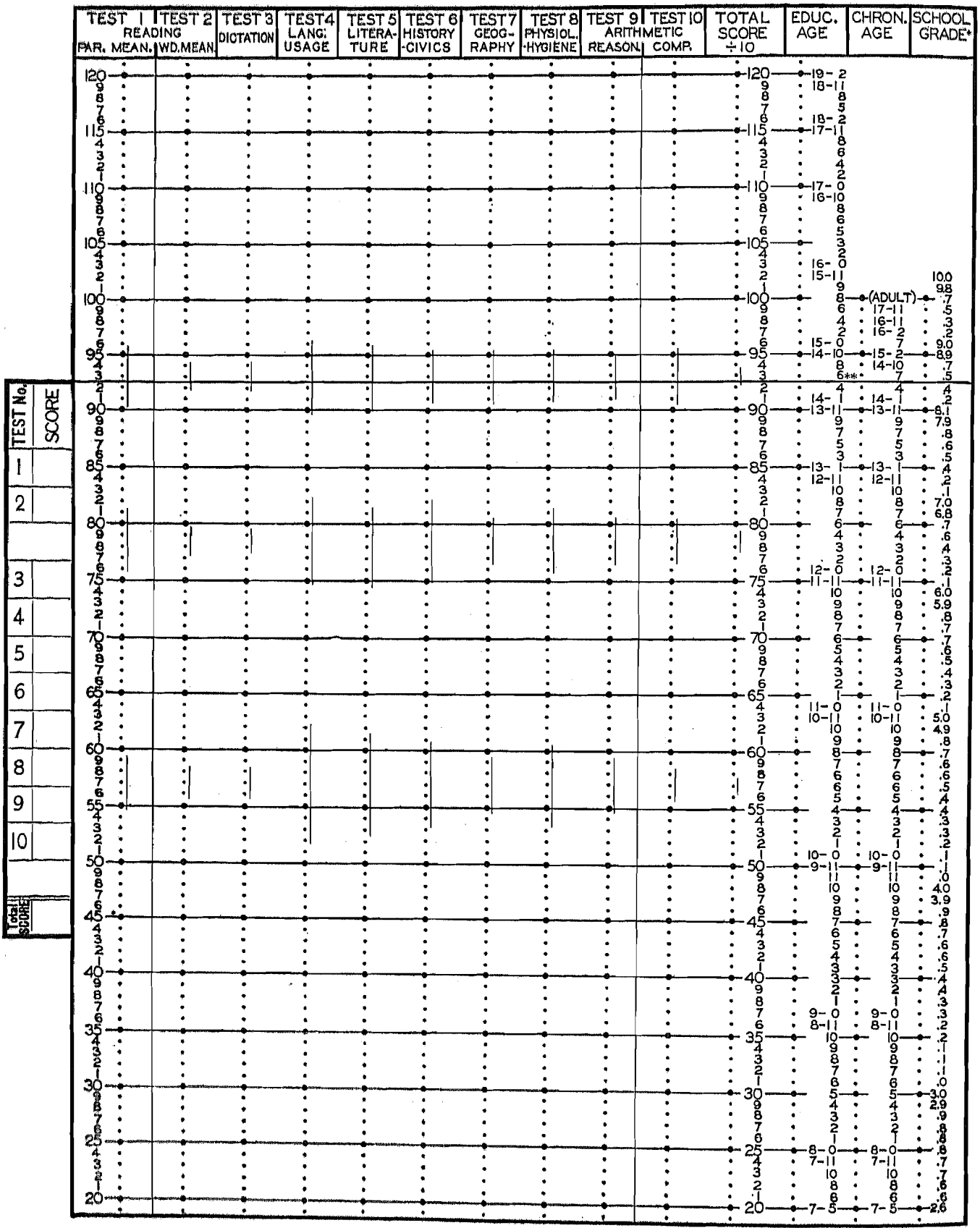
First record in this table the scores for Tests 1 to 10. Then find the Total Score. Then insert the scores for Total Reading and Total Arithmetic in the boxes to the left of the column headed "Score." For accuracy and convenience in recording the scores in the table in the left-hand margin of page 2, fold the page on the heavy line at the left of the profile chart and copy the scores from the above table (being careful to omit the Total Reading and Total Arithmetic).

TO THE EXAMINER. *Do not administer this test without first reading carefully the Directions for Administering.*

Published by World Book Company, Yonkers-on-Hudson, New York, and Chicago, Illinois
 NSAT: ADV.: V-14

PRINTED IN U.S.A.

EDUCATIONAL PROFILE CHART: NEW STANFORD ACHIEVEMENT TEST, ADVANCED EXAMINATION



* Grade defined as in Table 1 of the *Directions for Administering*. ** Educational Ages above this point are extrapolated values. See *Guide for Interpreting* for explanation of vertical lines.

☞ *This Profile Chart is the table of norms for the Advanced Examination.*

DIRECTIONS: Write JUST ONE WORD on each dotted line.

SAMPLE:

Dick and Tom were playing ball in the field. Dick was throwing the ball and..... was trying to catch it.

1 Ned was crying because his pony had died. Just then a fairy appeared and asked him why he was so sad. "Because," said Ned, "my dear little.....is dead."

2-3 Christmas brought toys for all. There was a ball for Mary and a cart for Paul. When the children found the presents, they were very happy. Paul played with his..... and Mary with her.....all day.

4-5 Helen and Kate pulled their sled through the deep snow to the top of the hill and soon were coasting swiftly down again. They did this over and over. The.....was so deep that they found it hard work to drag the .....to the top.

6-7 A gray pussy saw a lark out in the field and thought it would make a fine dinner. "Come here, pretty lark," said the....., "and I will show you the bell that hangs on my neck." But the wise lark said he did not care to see the.....and flew away quickly.

8-9 A pretty squirrel once lived in a hollow tree near the window of a farmhouse. In the room where the window was, a little girl named Nellie lay sick. Every day the..... came to the window and chattered as though to keep.....from getting lonesome.

10-11 A grizzly bear had a home in the high peaks of the mountains. Four flocks of bighorn sheep occupied the same area but there never was any trouble between the.....and the.....

12-13-14 Sarah practices on the piano every morning while Tom tries to play tennis alone. One day Tom asked Sarah to play with him and she said, "I can't, it would make me sick to play." "Playing.....won't hurt you," said.....; "it's better for you than playing the.....so much."

Go right on to the next column.

15-16 An old fairy tale tells of a little girl who was cured of telling falsehoods. A wise fairy clasped a diamond necklace about the little girl's throat. Whenever she said anything that was not true, the diamonds turned to coal until the truth was told. This so shamed the .....that she finally learned to speak only the.....

17-18 Although Bert and John were brothers, they were not at all alike. John was big and strong and he had very few friends. On the other hand,.....was small and weak but he was.....by everyone.

19-20 The Eskimos sometimes live in homes made of blocks of ice. Since ice melts rapidly when exposed to a temperature above 32 degrees, it is necessary for the Eskimos to keep the temperature of the room below..... degrees to keep the house from.....

21-22-23 All animals have some way of defending themselves from attack. The lion has sharp teeth, the rhinoceros has a hide so thick that scarcely anything can pierce it, while the deer can jump and run with great speed. If a single animal had the lion's....., the rhinoceros' thick....., and the deer's ability to....., it would be hard to conquer.

24-25-26 Dumped into Ernest's corner of the attic are a roller skate and a much-read storybook. "Ernest likes me better than he likes you," said the skate. "Why, you poor skate, how mistaken you are," said the book. At this moment they heard from outdoors, "Come on, Ernest, let's scoot." The word "scoot" set the book's leaves a-trembling and sent a thrill of joy through the iron heart of the skate. But just then it began to rain hard, "Pitter-patter, pitter-patter," on the attic roof. This sent a thrill to the heart of the....., and a shudder to the heart of the..... Soon Ernest came in and said, "Where is that old.....of mine?"

27-28 Trout cannot live in water which is warmer than that of their cold native mountain streams, and they prefer flowing water to still water. In the government fish hatcheries the baby trout are kept in special tanks in which the water is kept.....and.....

Turn the page and go right on.

29–30 Johnny was walking down the sidewalk in a very peculiar way. He was saying, "If I step on a crack, I will break my back; if I step in the middle, I will feel fit as a fiddle." His .....were not of the same length, because he was trying not to step on a .....

31–32 Leonardo da Vinci, the artist who painted "The Last Supper," also made important discoveries as a scientist. We do not often think of him as both.....and.....

33–34 In a certain village a ton of coal costs as much as a cord of wood, but it produces twice as much heat. Therefore the poor families in this village should be advised to burn .....rather than.....

35–36 Steel is made from iron and is therefore a manufactured product. Similarly brass is commonly made from copper and zinc. This explains why we never hear of..... and.....mines.

37–38 The Iroquois and many other tribes of Indians were very fond of war. However, the Papago Indians of Arizona prefer peace and quiet. The men sit lazily in the shade of their huts while the women weave baskets. It is hard to imagine the.....Indians going to war or.....hard.

39–40 Deciduous trees lose their leaves in winter, while evergreens, as their name implies, do not. Therefore, in forests composed of .....trees the ground is less shaded in winter than is the case in forests whose trees are.....

41–42 There are many kinds or breeds of cattle, each one being of some special use to man. Jersey cows are not highly desirable for meat, but produce large quantities of rich milk. Hereford cattle have just the opposite characteristics. Consequently, if one wanted to produce beef, he would choose the..... rather than the.....breed.

43–44 All things considered, water is the most important factor that determines success or failure in agriculture. Temperature is frequently a limiting factor, but.....is much oftener than temperature the .....factor.

Go right on to the next column.

45–46 "Prince," said the Sultan, "your condition can never be sufficiently deplored; no one can be more sensibly affected by your misfortune than I am. Never did anything so extraordinary befall any man! One thing only is wanting—revenge to which you are entitled; and I will omit nothing in my power to effect it." The.....expressed his gratitude and began to plan how he might secure the .....to which the Sultan thought he was entitled.

47–48 Ora and Anna Blackmore are twins. They have a sister, Helen, and two friends, Clara and Bessie. Write the names of two Blackmore girls who are not of the same age. .....and.....

49–50 When we hear of the Chinese wearing wooden shoes and eating with chopsticks, we think it very odd. A Chinaman would be just as surprised at our leather shoes and our table forks and spoons. The.....of any people appear.....to anyone not familiar with them.

51–52 A few yards away large birds were greedily feeding upon dead fish, regardless of our presence. They were buzzards, scavengers of our southern seacoasts. In spite of their being ugly and unmannered, we owe them a kind of respect, for we have learned to know they are among the best friends of dwellers in the tropic ....., disposing as they do of decaying.....which otherwise might be a menace to health.

53–54 Many gardeners plant perennial flowers in preference to annuals because the former will bloom for more than one season. Since nasturtium is an annual and hollyhock is a perennial, we can expect the.....will live longer than the.....

55–56 If I were writing about the rich, I should be inclined to divide them, according to their attitude toward life, into workers and parasites. The motto of the worker is, "I owe the world a life," and the motto of the..... is, "The.....owes me a living."

57–58 Man will risk as much for notoriety as for money. If this were not true, why would anyone risk his life by going over Niagara Falls in a barrel? Such a feat, even if successful, may bring the "hero" no....., but it is certain to bring him much.....

Go right on to the next page.

Number right	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score	3	13	16	18	20	23	25	27	29	31	33	35	37	39	41	43	44	46	47	49	51	53	54	56	58	59	60	61	62	64	65	66	67	69	70	71	72	73	75	76	77

59–60–61 We have all seen iron subjected to hot fires and yet it did not burn. However, iron does "burn up" and this fact is demanding the attention of some of our greatest engineers. Iron combines very readily with oxygen to form iron oxide, known as rust. Oxidation is only a form of slow combustion. Consequently, if.....is not treated to..... oxidation it will soon.....

62–63 A nation composed of good homes is a good nation. The best homes teach their children high ideals and good habits which tend to prevent sickness, poverty, vice, or crime. A .....has few problems which would not be half cured if all.....were good ones.

64–65 One of the fundamental aims of silent reading is that of training each child to attain his highest level of achievement in speed without lowering his accuracy of comprehension. Neither..... nor ..... should be developed at the expense of the other.

66–67 A membrane which permits the passage of water through it but which does not permit substances dissolved in water to pass is called a semi-permeable membrane. One which allows dissolved substances as well as..... to pass is a .....membrane.

68–69 We like to subdue. Boys like to go stamping through the woods, breaking their way through to new paths. Before this modern age, war and hunting offered opportunities for the fighting spirit. The lives of most of us today are more..... Modern conditions make little demand on our..... tendencies.

70–71 To pant for recognition, to yearn to impress one's personality upon one's fellow-men, is the essence of ambition. The ambitious person may think that he merely thirsts to "do something" or "be somebody," but really what he craves is to figure potently in the minds of others, to be greatly loved, admired, or feared. To reap even a great success which no one .....does not satisfy the yearnings of the.....individual.

Go right on to the next column.

72–73 Among the most characteristic and amazing properties of bacteria is their ability for rapid multiplication. It has been estimated that the descendants of one bacterium under continued favorable conditions would in two days number 281,500,000,000 and in three days weigh about 7,000 tons. Fortunately, under ordinary conditions.....does not proceed unchecked at such a .....

74–75 "Naïve" and "unsophisticated" are frequently confused. The former suggests a type of behavior which is artless, spontaneous, and free from restraints of custom. The latter implies fully as great lack of knowledge of social usage, and, in addition, conduct which is primitive and perchance inelegant. Thus, the .....youth was the first to enter the car, and his.....little sister warmly kissed him in the presence of the king.

76–77 The production of bodily energy involves a chemical process. Animal energy is derived directly from food. All cell activity involves the expenditure of energy. Therefore all .....have to be.....

78 Fundamentally, education depends upon the capacity of a person to profit by past experiences. Past situations modify present and future adjustments. Education in its broadest sense means acquiring experiences that serve to.....existing inherited or acquired tendencies of behavior.

79–80 Suppose that in a certain country the law provides that a will, to be a valid legal instrument, must be signed by the testator (maker) in the joint presence of at least two witnesses who must themselves sign the document in attestation of the testator's signature. Mr. Brown having drawn up a will in the morning calls in Mr. Smith to witness his signature and in the afternoon calls in Mr. Jones. Since Mr. Jones was not present in the morning, Mr. Brown again signs the will and Mr. Jones then signs it. This will is.....because the two witnesses.....witnessed the making of Mr. Brown's signature.

End of Test 1. Look over your work.

DIRECTIONS: Draw a line under the word that makes the sentence true, as shown in the samples.

SAMPLES:

A rose is a
box flower home month river

A roof is found on a
book person rock house word

1 New York is the name of a
city person ride river school

2 A shining thing is
dull high bright warm wide

3 Silk is for
books dresses gardens horses letters

4 Joyful means
even great happy short slow

5 Tears come usually when we
drink eat talk walk cry

6 A horn makes
pictures plans suits music tears

7 A limb is a part of a
story table tree wall window

8 To stitch is to
reward sew starve suggest tempt

9 The ocean is.
fire land paper water wood

10 To lift means to
raise begin drive laugh watch

11 Cotton is used for baskets
clothes dinners notes wheels

12 An American is a
ball house person place table

13 A farmer works chiefly with
fish coal plants rocks wood

14 Beaches are found on a
barn coast cloak horse roof

15 A vessel is a
boat bow cloth forest lady

16 To pronounce is to
sail show speak stand watch

17 A couch is a kind of
bed captain offer pick wall

18 To be free is to have liberty
luxury patience religion revenge

Go right on to the next column.

19 Frightful means discreet precise
enthusiastic terrifying vigorous

20 Clever means
bright neat peculiar stern upright

21 A snake is a foreigner
gallery geography mold serpent

22 To inquire is to
appear rest ask sleep watch

23 A remark is something that is
destroyed slow held kept said

24 To despise is to
bind effect hate obey observe

25 A parson is a
minister pond porch prison robin

26 A monstrous thing is
horrible modest musical useful torn

27 An argument is a discussion
gully gymnasium penance perjury

28 Injury means
charm experience haste harm limit

29 A misunderstanding is a kind of diadem
disagreement disk magnet monastery

30 To scare is to
sympathize tackle taunt terrify loan

31 A worshiper is domestic
fearful gracious religious steady

32 To sneer is to
scoff scorch scratch scream scrub

33 To be brave is to be humble
courageous frightful honorable ignoble

34 Contentment means notion
provision rainbow satisfaction trifle

35 Unarmed means advantageous
beggarly defenseless verbal wasteful

36 A purchaser is a
flatterer buyer flirt hearer voter

37 A sawmill produces
candy brides dew wire lumber

38 Commerce means
speed station trade uncle weather

39 To grant means to
get give see step wish

Go right on to the next page.

Number right	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score	3	13	16	19	22	25	27	29	31	33	35	37	39	41	43	44	45	47	48	49	51	52	53	55	56	57	58	60	61	62	63	64	66	67	68	69	70	71	72	73	75

40 Violence usually causes benefit happiness harm knowledge respect

41 A literary person is a champion driver robber founder writer

42 A cave is a ballad dresser frontier grotto plea

43 An occupation is a kind of bath luxury activity relative vein

44 Thou means her him me they you

45 To reveal is to abuse disclose mess motor seek

46 Solemnity means legibility magic neutrality seriousness untidiness

47 A ballot is used in draining freezing grinding voting wrapping

48 Ambition means aspiration frivolity loitering remorse slothful

49 To heed is to escape fancy hurry notice prove

50 Lifeless means inanimate indefinite infamous undecided untidy

51 Dignified means lonely monstrous prominent spiritual stately

52 An opponent is an owl antagonist officer outlaw inlet

53 Tumultuous is boisterous hapless jocund lowly massy

54 Constancy means grudge morsel rainfall steadfastness warfare

55 Eternally means already always completely entirely squarely

56 Liberality means promotion robbery reproof scandal generosity

57 A legacy is an inheritance inscription ox ankle elf

58 A frenzy is a county growth majority robber rage

59 To forbear means to abstain knead ladle loan mimic

Go right on to the next column.

60 To be prompt is to be formal frightful hospitable punctual purified

61 Capacity refers to authority bloom climate habit volume

62 Shameful means dispassionate immaterial naïve scandalous tractable

63 Romantic means perverse sentimental shabby shameless spry

64 Meager means exceptional scant suspicious trivial vertical

65 Indefinite means congenial indebted lawless workmanship vague

66 To be elaborate is to be artless complicated headstrong plain ignored

67 Ceaseless means boisterous diminished discontented ended incessant

68 Unscrupulous means dishonest vagrant voluntary willful zigzag

69 To sever is to cut hurt jump tie twist

70 To quail is to attack cower expand hunt retreat

71 Submissiveness means daring cute heaviness wise meekness

72 Doleful means molten nameless oriental vague rueful

73 An associate is an adversary antagonist emigrant ensign ally

74 Covetous means avaricious bountiful gaudy gray-headed harassed

75 A reprobate is one who is very ugly cowardly wealthy wicked youthful

76 To impair is to brand commend damage mingle scrape

77 Sluggish means cadaverous inert loquacious spectral vertiginous

78 An insurrection is a fugitive rebellion publication punishment hermit

79 Quiescent means inactive angry perfect quick troublesome

80 Audacious means absurd adverse casual daring hapless

End of Test 2. Look over your work.

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
76	77	78	79	80	82	83	84	85	87	88	89	90	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	109	110	111	112	114	115	117	118	120	122	124

um	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
ore	3	5	6	7	8	9	9	10	11	12	13	14	15	16	18	19	20	21	23	25	27	28	30	32	33	35	36	38	40	42	44	46	48	49	51	53	55	57	58	59	60

Full score for easier sentences not dictated.....

Number right in sentences dictated.....

Sum.....

Sum	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Score	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	81	82	83	84	84	85	86	86	87	87	88	89	90	90	91	92	93	94	95

Sum	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
Score	96	97	98	99	100	101	102	103	104	106	107	108	109	110	111	112	113	114	115	115	116	117	117	118	119	121	123	125

DIRECTIONS: Draw a line under the word or phrase that makes the better sentence, as shown in the samples.

SAMPLES:

Apples is / are good.

He told / telled me.

1 He heated / het the water.

2 I calculate / intend to go to the Fair.

3 He hasn't seen anybody. / nobody.

4 Add them / those numbers.

5 A bunch / fleet of ships appeared.

6 It is I. / me.

7 The sun raises / rises in the morning.

8 You have give / given me two presents.

9 He found it in under / under the table.

10 I was there before you was. / were.

11 Jane is prettier / more prettier than Helen.

12 He didn't know that, either. / neither.

13 I have often ate / eaten oranges.

14 He seldom / seldom ever goes to town.

15 I doubt whether / that it ever happened.

16 I remember / remember of seeing him there.

17 That looks like either / either looks like John or Joe.

18 It is neither white nor / or black.

19 The truck carried a heavy cargo. / load.

20 He served twenty years for his crimes. / sins.

21 It was most beautiful / the beautifulest of all.

22 A noun is the name of something. / when you name something.

23 I asked him which one he choosed. / chose.

24 The patient feels more strongly / stronger every day.

25 The man which / whom you see is John.

26 They returned again / back again to their homes.

27 I am respectfully / respectively yours.

28 We divided them among / between the four of us.

29 The baskets were all ready / already filled.

30 Had we been / of been near we could have seen him.

31 The play was a complete / howling success.

32 He was barely within / in speaking distance.

33 Each boy brought their / his own book.

34 But don't forget, / Don't forget, however, that I am here.

35 This is a course worth while / worth pursuing.

36 The enemy attacked / attackted us in the night.

Go right on to the next column.

Go right on to the next page.

Difference	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score	20	34	37	40	42	44	46	49	51	53	56	58	60	61	62	64	66	68	70	71	73	75	76	77	79	80	81	82	84	85	86	88	89	90	91	92	93	94	95	96	97

37 He acted the part perfect. / perfectly.

38 He could / couldn't scarcely chew it.

39 Us / We girls are going to town.

40 It is superior to / than the other.

41 She felt his absence keen. / keenly.

42 Several congressmen antagonized / opposed the bill.

43 I liked him the best of all. / any.

44 He has often ridden / rode alone.

45 His attitude was distinctively / distinctly friendly.

46 I am enthusiastic / wild about my new car.

47 He drove the carefullest / most carefully of all.

48 He fell off / off of his bicycle.

49 They all unanimously / unanimously voted against it.

50 Slavery was abolished / repealed in 1863.

51 They / They both loved each other.

52 I believe in observance / observation of the Sabbath.

53 She invited Mary and me. / myself.

54 I am certain that she shall / will come.

55 Do not cherish / pursue an idle fancy.

Go right on to the next column.

56 She laid / lay on the couch and slept.

57 She likes Mary and I. / me.

58 I forgot his name and felt disconcerted. / discomposed.

59 You, the captain, are / is in command.

60 He caught almost / almost caught a hundred fish.

61 I have often rang / rung this bell.

62 Seeing as how / Inasmuch as I promised, I will go.

63 You have fewer / less letters today.

64 Mary is the hero / heroine of the play.

65 This is her. / she.

66 They are both the / the same color.

67 After scolding me, / When I had been scolded, I was sent home.

68 Due / Owing to lack of funds, the project failed.

69 If father was / were here, I would go.

70 The spectators / audience praised the auto show.

71 Everyone gave himself / themselves to rejoicing.

72 The family was raised / reared in the city.

73 The mountains inspired us with amazement. / awe.

74 Each of them are / is good.

End of Test 4. Look over your work.

Number right....................

Number wrong....................

Difference....................

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
98	99	100	101	102	103	104	104	105	106	107	108	109	109	110	111	112

58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
112	113	114	115	116	117	118	119	120	122	123	125	127	130	133	136	140

DIRECTIONS: Draw a line under the word that makes the sentence true, as shown in the samples.

SAMPLES:

A giant is a big dog man boat

The Bible is the name of a
place country book

1 Little Red Riding Hood took cakes to her
aunt cousin grandmother

2 Black Beauty was a crow dog horse

3 Billy Whiskers was a
goat mongoose pony

4 The bear in "Snow-White and Rose-Red" was a fairy king prince

5 Troubles came from the box of
Arachne Pandora Syrinx

6 The man cast into the lions' den was
Daniel Jonah Joseph

7 Androclus removed a thorn from the foot of a bear dog lion

8 One of Robin Hood's followers was
Duke of York John Silver Little John

9 Venus was goddess of
love the chase the harvest

10 "Ben Hur" is famous for the
chariot race long siege great storm

11 Dr. Dolittle lived in
Polynesia Puddleby Pushmi

12 Thor lost his
armor chariot hammer

13 Hans Brinker lived in
Germany Holland Switzerland

14 Lancelot was a king knight sailor

15 Don Quixote was a
king knight sailor

16 "Twenty Thousand Leagues Under the Sea" tells of Puck Captain Nemo Uncas

17 The word "courtship" reminds us of
John Edwards Miles Standish Wm. Penn

18 "Huckleberry Finn" was written by
Cooper Mark Twain Stevenson

Go right on to the next column.

19 "A Christmas Carol" was written by
Dickens Thackeray Wiggin

20 The naiads were
islands mountains nymphs

21 Sindbad was a dwarf knight sailor

22 "Treasure Island" tells about
Long John Micawber Uncas

23 The people who went into exile were the
Egyptians Jews Persians

24 Sir Launfal sought the
Golden Fleece Holy Grail Silver Buddha

25 "Toby Tyler" tells about a
circus horse race rooster fight

26 "Little Women" was written by
Alcott Brown Sedgwick

27 Prometheus was set free by
Hercules Phaeton Vulcan

28 The Swiss Family Robinson lived as
merchants pioneers sailors

29 "The Last of the Mohicans" is about
fairies Indians sailors

30 "The Prince and the Pauper" was written by
Tarkington Mark Twain Thackeray

31 A king famous for his wisdom was
David Pilate Solomon

32 The Dead Sea is in
Babylonia Palestine Syria

33 "The Call of the Wild" was written by
Cooper Jack London Mark Twain

34 "Hamlet" was written by
Coleridge Scott Shakespeare

35 Lord Fauntleroy always called his mother
darling dearest honey

36 The story of "The Covered Wagon" is a story of life about 1776 1850 1925

37 "The Lady of the Lake" was written by
Dryden Gray Scott

38 Shakespeare was noted for his
novels plays short stories

39 The king ruling at the time of Jesus' birth was David Herod Solomon

Go right on to the next page.

Difference	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score	20	34	37	40	43	46	49	52	55	58	61	64	67	69	72	75	77	78	80	81	82	84	85	86	87	88	89	90	91	91	92	93	94	95	95	96	97	98	99	100	101

40 Andromeda was rescued from the sea monster by **Perseus** **Pygmalion** **Sir Cedric**

41 Punch and Judy are
actors **elves** puppets

42 Mrs. Wiggs was always
cross **happy** **despondent**

43 Ichabod Crane is a character from
Cooper **Irving** **Mark Twain**

44 "The Crimson Sweater" is a story of
athletics **love** **war**

45 Mowgli grew up with
Indians **lions** **wolves**

46 The god who supported the heavens was
Achilles **Atlas** **Hercules**

47 Mecca was the birthplace of
Buddha **Mohammed** **Moses**

48 Kenilworth was a **castle** **city** **man**

49 Gene Stratton Porter wrote books of
adventure **romance** **the sea**

50 Ben Hur was a **Greek** **Jew** **Turk**

51 The scene of "Evangeline" is laid in
Acadia **Maryland** **Pennsylvania**

52 "The Man Without a Country" was written by **Aldrich** **Emerson** **Hale**

53 Asgard is the home of the
Greek gods **Norse gods** **Roman gods**

54 "Seventeen" was written by
Kelland **Mark Twain** **Tarkington**

55 Pan played on **a harp** **a lute** **pipes**

56 Roland was a knight of
Charlemagne **Arthur** **Frederick the Great**

57 Helen's Babies were **Budge and Toddie**
Mary and Jane **Tom and Pat**

58 The blind poet was
Keats **Milton** **Shelley**

59 "A Midsummer Night's Dream" is a
play **poem** **song**

60 "Bob, Son of Battle" tells of a
boy **dog** **horse**

Go right on to the next column.

61 Odin was a god of the
Greeks **Norse** **Romans**

62 Caesar's funeral oration was given by
Anthony **Cicero** **Cassius**

63 The woman who turned into a pillar of salt was the wife of **Cain** **Esau** **Lot**

64 Lobo was a **bear** **fox** **wolf**

65 "Oliver Twist" tells about
Artful Dodger **Long John Silver** **Peggotty**

66 Holmes wrote **"The Spy"**
"The Deacon's Masterpiece" **"Kim"**

67 Daddy Long Legs was a
doll **man** **spider**

68 "Break, Break, Break" was written by
Browning **Goldsmith** **Tennyson**

69 "Elegy Written in a Country Churchyard" was written by **Poe** **Gray** **Rice**

70 The goddess born from the head of Jupiter was **Freya** **Juno** **Minerva**

71 "A Perfect Tribute" is a story of
Lincoln **Roosevelt** **Washington**

72 A character in "The Lady of the Lake" is
Elaine **Gabriel** **Roderick Dhu**

73 The friend of the Three Musketeers was
D'Artagnan **Dick Shelton** **Sir Nigel**

74 "The Trail of the Sandhill Stag" was written by **Roberts** **Seton** **White**

75 "Lead, Kindly Light" was written by
Carlyle **Cardinal Newman** **Phillips Brooks**

76 "Captains Courageous" is about
Ben Gunn **Diska Troop** **John Silver**

77 "Flow Gently, Sweet Afton" was written by
Burns **Keats** **Tennyson**

78 "The Ancient Mariner" was written by
Browning **Coleridge** **Longfellow**

79 "Annabel Lee" was written by
Poe **Longfellow** **Wordsworth**

80 "The Story of a Bad Boy" tells of setting fire to a **stagecoach** **hayrack** **house**

End of Test 5. Look over your work.

Number right.....

Number wrong..... ÷ 2 = ...

Difference.....

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
102	102	103	104	104	105	105	106	106	107	108	109	110	111	112	113	114	115	117	118	119	121	122	123	124	125	126	127	128	129	130	131	133	134	135	137	139	141	143	146

DIRECTIONS: Draw a line under the word or phrase which makes the sentence true.

1 The Pilgrims came from
England France Spain

2 Columbus made his first voyage to America in 1492 1620 1776

3 The canal which was opened for traffic in 1914 was the Erie Suez Panama

4 Columbus received his financial support from
Portugal Spain Italy

5 The members of the American Legion are
foreigners laborers ex-soldiers

6 The highest officer of a city is the
alderman chief of police mayor

7 The greatest Northern general of the Civil War was Grant Sheridan McClellan

8 The man who invented the process of hardening rubber was Edison Ford Goodyear

9 The first French settlers in America were
farmers miners traders

10 An ally of America in the Revolutionary War was Prussia Holland France

11 The Spanish missions were
forts churches castles

12 The first Englishman to sail around the world was Raleigh Nelson Drake

13 A voter has to be at least
18 years old 20 years old 21 years old

14 The discoverer of the Pacific Ocean was
Balboa Magellan De Soto

15 The Quakers are a tribe of Indians
political party religious sect

16 A famous Confederate general was
Gage Stonewall Jackson Meade

17 The Louisiana Purchase was made during the presidency of Jefferson Madison Monroe

18 The "Rough Riders" were led by
Pershing Roosevelt Sheridan

19 The term of the President of the United States is 2 years 4 years 6 years

Go right on to the next column.

20 The population of the United States in 1920 in millions was about 55 90 110

21 In 1819 Florida was purchased from
France England Spain

22 The battle of San Juan Hill was fought in the World War Civil War War with Spain

23 The turning point of the Civil War was at
Antietam Gettysburg Pittsburg Landing

24 Spain's treatment of Cuba was
harsh wise liberal

25 The average number of children per American family is about 1 3 5

26 In the United States the usual size of a jury is 6 12 16

27 The United States Military Academy is located in West Point Annapolis Washington

28 States are not permitted to
establish schools levy tariffs pass laws

29 Valley Forge relates to the Civil War
Revolutionary War War of 1812

30 The Missouri Question concerned
emigration slavery tariffs

31 The reaper was invented by
McCormick Howe Watt

32 The number of children employed in mills is increasing decreasing about constant

33 The Orient refers to
Europe Africa Asia

34 The modern process of manufacturing steel was invented by Bessemer Edison Bell

35 The American Revolutionary War began in
1762 1775 1783

36 The second President was
Adams Jefferson Madison

37 A famous early traveler was
Marco Polo William Penn Peter Stuyvesant

38 The U. S. Food Administrator during the World War was Hoover Pershing Wilson

39 Several famous debates were held between Lincoln and Clay Webster Douglas

40 Parliaments are similar to
courts cabinets legislatures

Go right on to the next page.

Difference	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score	20	34	38	42	45	48	51	54	57	60	62	64	66	68	69	71	73	74	76	77	78	80	81	82	83	85	86	87	88	89	89	90	91	92	93	93	94	95	96	97	98

41 The crime which brings the greatest punishment is larceny manslaughter murder

42 A firm believer in the League of Nations was Roosevelt Wilson Lodge

43 The Emancipation Proclamation was issued by Jefferson Lincoln Washington

44 The "Lusitania" was
an airship a battleship an ocean liner

45 Our federal government refers to the government of the states nation cities

46 The Virginia and Kentucky Resolutions opposed war Alien and Sedition Acts Canada

47 The Boxer Rebellion occurred in
Japan Cuba China

48 A famous seaport of 1500 was
Venice Alexandria Rome

49 Cabinet officers can be removed from office only by the President House Senate

50 "Direct legislation" is provided for by the initiative recall Volstead law

51 A serious financial panic occurred in
1837 1861 1865

52 The X.Y.Z. Affair occurred with
France England Japan

53 The army can be called forth only by
Congress Supreme Court Sec'y of War

54 A city is most likely to own its
electric lights gas plant water system

55 Next in importance to agriculture in 1860 was mining lumbering manufacturing

56 Haig commanded the forces of
France Italy England

57 The Oregon boundary was settled during the presidency of Polk Tyler Garfield

58 America's worst failure in the War of 1812 was on the sea in Canada at New Orleans

59 The Saar Valley reminds us of the
World War War of 1812 Mexican War

60 A well-known tariff law bears the name of
Garfield Arthur McKinley

61 A President who was impeached but acquitted was Jackson Johnson Grant

Go right on to the next column.

62 The United States disputed the control of Yap with Japan China Chile

63 The Constitutional Amendment abolishing slavery was the 11th 12th 13th

64 Heavy governmental expenses are often met by the sale of stocks shares bonds

65 The Emancipation Proclamation freed slaves numbering in millions about 3 1 9

66 The Constitution assigns judicial powers to
Congress Supreme Court the President

67 The chief national problem in 1865 was
slavery states' rights reconstruction

68 A famous early educator was
Horace Mann Henry Clay Andrew Jackson

69 The Spanish Armada was destroyed in
1898 1588 1492

70 After the World War Bohemia became part of Czechoslovakia Germany Russia

71 A city with especially well-planned streets is Boston Brooklyn Washington

72 The Lewis and Clark Expedition was sent out by Jefferson Washington Hamilton

73 Typical life in early New England was that of the plantation small town open country

74 The inventor of the incandescent electric light is Edison Bell Marconi

75 The Red Cross was founded by
Clara Barton Jenny Lind Rockefeller

76 A state that was once an independent country is Missouri Ohio Texas

77 Impeachments are tried by the
House Senate Cabinet

78 The chief cause of the Mexican War was
disputed territory immigration oil rights

79 Burgoyne surrendered his army at
Saratoga Trenton Yorktown

80 The Gadsden Purchase refers to
military supplies ships land

End of Test 6. Look over your work.

Number right..................

Number wrong.................. ÷ 2 = ...

Difference..................

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
99	100	101	102	102	103	104	105	105	106	107	107	108	109	110	111	112	113	114	116	117	119	120	121	123	124	125	127	128	129	130	131	133	134	136	137	139	140	142	145

DIRECTIONS: Draw a line under the word which makes the sentence true.

1 Christmas comes in
December January July

2 The Eskimos are great
fishermen miners farmers

3 The shape of the earth is
flat square round

4 The largest bodies of water are called
seas oceans lakes

5 Cotton grows on a
bush vine tree

6 The sun rises in the
west east south

7 Silk is produced extensively in
Australia Japan New Zealand

8 The Panama Canal Zone is controlled by
France Mexico United States

9 Animals provide us with
cotton leather linen

10 Decayed plants help to make soils
poorer heavier richer

11 Granite is a kind of
tree rock fruit

12 The camel is commonly found in
Arabia Switzerland Chile

13 A city having excellent water transportation is
New Orleans Indianapolis Denver

14 Much tropical fruit is raised in
Florida Kentucky Tennessee

15 Very favorable conditions for manufacturing are found in
England Russia Turkey

16 A state having very little rainfall is
Nevada Washington Pennsylvania

17 Gold is mined extensively in
Ohio Pennsylvania Colorado

18 The New England Indians fertilized corn with
fish manure lime

19 The city of Atlanta is in
Florida Georgia Tennessee

20 Reindeer are common in
Italy India Siberia

Go right on to the next column.

21 A river bounding Mexico on the north is the
Orinoco Rio Grande Colorado

22 A state having no seacoast is
Maryland Idaho South Carolina

23 The farm crop of most importance in Brazil is
coffee corn potatoes

24 The British capital is
Liverpool London Edinburgh

25 A principal industry of Switzerland is making
watches cotton cloth steel

26 A country with a highly developed railroad system is
Egypt Germany China

27 Czechoslovakia is in
Asia Europe Africa

28 Zinc is a product of
mining lumbering agriculture

29 Persia is famous for its
schools rivers rugs

30 Seals are valuable chiefly for their
meat furs oil

31 A country composed of islands is
Japan Mexico Arabia

32 The central part of the U.S. is chiefly
mountains plains plateaus

33 The Erie Canal is in
Canada New York Pennsylvania

34 A great cattle country is
Ireland Congo Argentina

35 There are many diamond mines in
Mexico Japan South Africa

36 An important river of Europe is the
Indus Yukon Danube

37 A very important Canadian industry is
weaving iron mining fishing

38 Day and night are caused by the earth's
rotation acceleration inclination

39 A country situated on an island is
England Italy Portugal

40 One of the pests attacking the cotton is the
gopher gypsy moth boll weevil

Go right on to the next page.

Difference	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score	20	34	38	42	44	46	48	50	52	54	56	57	58	59	60	62	63	64	66	67	69	70	71	72	73	73	74	75	76	76	77	78	79	80	81	82	83	84	85	86	87

41 A principal export from Australia to Boston is sugar corn wool

42 Very little wheat is grown in
Florida Indiana Michigan

43 Buddhism is a common religion in
India France United States

44 When it is noon in New York, it is 9 A.M. in
Omaha Portland, Ore. Cincinnati

45 A country with about the same latitude as Alaska is Norway Spain Japan

46 One of the greatest lumbering states is
Kansas Illinois Washington

47 The sea between Europe and England is the
Baltic North Caspian

48 The continent having the most irregular coast line is Europe South America Africa

49 The Colorado River is most noted for its
shipping canyon fishing

50 Louisiana is best adapted for
mining fishing agriculture

51 Canton is a city in
China France Japan

52 A heavy meat-eating country is
Greece United States China

53 Mexico is ruled by a
czar king president

54 A monsoon is a kind of
plain plateau storm

55 A country ruled by a king is
France Denmark Switzerland

56 The nation having the greatest merchant marine is France United States Gt. Britain

57 An important factor in the growth of Los Angeles is mines water power climate

58 A principal lake section of the U.S. is the
south west northeast

59 A group of islands is called an
isthmus archipelago avalanche

60 The mountains in northern India are the
Himalayas Abyssinia Caucasus

61 The largest river in the world is the
Amazon Mississippi Congo

Go right on to the next column.

62 The path of the earth around the sun is its
axis orbit diameter

63 The origin of the population of Argentina is chiefly European Indian Asiatic

64 Weather bureau maps show wind direction by isotherms isobars arrows

65 In most South American countries they speak Portuguese English Spanish

66 Belfast is in
England Belgium Ireland

67 A seaport of the Pacific Ocean is
Valparaiso Copenhagen Havana

68 The most backward continent is
Africa Asia South America

69 The steppes are plains of
India Africa Russia

70 Growing corn needs
heavy rainfall warm nights dry winters

71 Alcohol is made from
gasoline grains oils

72 The Cape of Good Hope is at the southern end of South America Africa India

73 An important rubber-manufacturing center is Birmingham Akron Denver

74 The state producing the most iron ore is
Pennsylvania Minnesota Ohio

75 The mountains separating Russia and Siberia are the Ural Pyrenees Caucasus

76 Meridians are used in measuring
longitude altitude latitude

77 The largest country in area in North America is Mexico Canada United States

78 A famous wheat district is the valley of the
Red River Colorado River Delaware River

79 Sponges are obtained from Bering Sea
Great Salt Lake Mediterranean Sea

80 The width of the Temperate Zone is
$23\frac{1}{2}°$ $90°$ $43°$

End of Test 7. Look over your work.

Number right..................

Number wrong.................. ÷ 2 = ...

Difference..................

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
89	90	91	92	94	95	96	97	98	99	100	101	102	104	105	106	108	109	110	111	112	113	115	116	117	118	120	121	122	123	125	126	127	128	129	130	132	133	135	137

DIRECTIONS: Draw a line under the word or phrase which makes the sentence true.

1 The body is covered by
muscles bones skin

2 Tobacco is especially harmful to
young children men women

3 A poor food for a child's breakfast is
milk bread beans

4 The heart pumps water air blood

5 The nerves of the eye are stimulated by
sound odors light

6 The heart is found in the
chest spinal column abdomen

7 Two bones meet to form a
ligament tendon joint

8 The body gets its oxygen from
water air food

9 The movement of the blood is called
circulation digestion respiration

10 Much foot trouble is due to poor food
too much walking improper shoes

11 Vaccination is often used to prevent
malaria smallpox pneumonia

12 The "telephone system" of the body is the
circulation nerves muscles

13 Ventilation is concerned with obtaining
good food fresh air sleep

14 An example of an alcoholic drink is
lemonade whisky soda-water

15 The framework of the body is the
skeleton blood vessels muscles

16 Bleeding should be treated by
giving alcohol inducing vomiting bandaging

17 One of the skin senses is
temperature taste odor

18 The organ of the mind is the
heart spinal cord brain

19 Pneumonia is a disease of the
heart muscles lungs

20 The principal part of the nervous system is
the brain medulla cord

Go right on to the next column.

21 Mosquitoes breed chiefly in
manure milk water

22 Poor ventilation results from heating by
oil stoves fireplaces stoves

23 The common house fly often lays its eggs in
leaves manure water

24 "Prohibition" concerns the sale of
tobacco alcohol drugs

25 The energy required by the muscles is furnished from the nerves food bones

26 A hindrance to good breathing is
exercise tight clothing cold air

27 Hookworm disease in the United States is commonest in the South North East

28 Muscle action is controlled by the
nerves bones blood vessels

29 Peas are eaten largely for their
fats sugar protein

30 Food remains in the stomach about
15 minutes 3 hours 1 day

31 The small intestine is a part of the system of
digestion circulation respiration

32 A food containing considerable oil is
rice potatoes walnuts

33 One object of respiration is the absorption of
oxygen carbon dioxide nitrogen

34 A good heat-producing food is
olive oil turnips watermelons

35 Reading lights should be placed
at the rear in front below

36 Fresh fruits and vegetables are valuable for their vitamins protein fats

37 A molar is a joint tooth nerve

38 The nerve of sight is the
olfactory auditory optic

39 The forcing of air from the lungs is called
inspiration expiration oxidation

40 The nutrient present in all fresh fruits is
starch fat sugar

Go right on to the next page.

Difference	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score	24	44	46	48	50	52	54	56	57	59	61	62	64	65	67	68	70	71	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	90	91	92	93	94	95	96

41 A disease of the nose and throat is
sciatica neuritis catarrh

42 Chemicals which kill bacteria are called
germicides solvents laxatives

43 Tissue-building material is furnished largely by
fats salts proteins

44 The spinal column is made up of
vertebrae ribs phalanges

45 The esophagus empties into the
stomach liver pancreas

46 An antidote is a
poison disease remedy

47 The branches of the trachea are called the
eustachian tubes bronchial tubes pleurae

48 Quinine is a remedy for
tuberculosis smallpox malaria

49 Involuntary muscles control movements of the
legs intestines arms

50 Iron is needed mainly by the
bones blood teeth

51 The most powerful muscles of the body are those of the
arm head back

52 Potatoes are rich in
carbohydrates fats proteins

53 Dust and germs are kept from the lungs by the
epiglottis capillaries mucous membranes

54 The pancreas is a part of the system of
nerves digestion circulation

55 Inspiration and expiration are together called
perspiration respiration absorption

56 Hay fever is caused by
germs catarrh pollen

57 The aorta is a
blood vessel nerve muscle

58 Saliva acts on
starches sugars proteins

59 Bacteria reproduce by means of
eggs seeds splitting

60 Digested food is taken into the blood in the
stomach pancreas intestines

61 The bursting of a blood vessel in the brain causes
headache apoplexy asphyxiation

Go right on to the next column.

62 An example of a one-celled animal is the
frog fly amoeba

63 The tendons are held close to the bones by
muscles cartilages ligaments

64 Hemoglobin is a substance found in the
red corpuscles stomach brain

65 In eliminating urea the kidneys are assisted by the
liver lungs intestines

66 The irregular bones of the wrist are called
metatarsals phalanges carpals

67 The Black Death was
bubonic plague typhoid fever malaria

68 The air sacs contain
capillaries cilia valves

69 Poor posture is chiefly due to faulty
muscles bones nerves

70 The two upper cavities in the heart are the
auricles ventricles valves

71 Muscular coördination is largely regulated by the
cerebrum pons cerebellum

72 A good tissue-building food is
lean beef cabbage carrots

73 Diabetic persons are helped by taking
iodine thyroid extract insulin

74 The number of coats in the eye is 2 3 4

75 A waste product of muscle action is
oxygen energy lactic acid

76 The bone of the upper leg is the
femur radius tibia

77 The red corpuscles in a drop of blood number
hundreds thousands millions

78 Trypsin is secreted by the
liver stomach pancreas

79 Tuberculosis of the lymph glands is called
scrofula mumps dysentery

80 The enzyme of the saliva is called
ptyalin pepsin trypsin

End of Test 8. Look over your work.

Number right .....

Number wrong ..... + 2 = ...

Difference .....

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
97	98	99	100	101	102	103	104	105	106	108	109	110	112	113	114	116	117	119	120	121	123	124	126	127	129	130	132	133	135	137	138	140	142	143	145	147	149	151	153

DIRECTIONS: Find all the answers as quickly as you can. Write the answers on the dotted lines. Use the margins to figure on.

1 Charles has 6 brown rabbits and 5 white ones. How many rabbits has he?

Answer.....

2 At a school picnic 9 boys and 15 girls went swimming. How many went swimming?

Answer.....

3 Jim has 3 marbles, John has 8, and Bill has 9. If they put them all together, how many will there be?

Answer.....

4 A hen had 9 chicks but 3 of them died. How many were left?

Answer.....

5 Alice gathered 18 roses and took a dozen of them to a friend. How many did she keep?

Answer.....

6 What is the cost of 3 boxes of dates at 21 cents a box?

Answer.....

7 A freight train had 16 cars. Seven of them were box cars. The others were flat cars. How many flat cars were there?

Answer.....

8 There were 100 people at a school play in the afternoon and 150 in the evening. How many people went to the two performances?

Answer.....

9 Three boys together gathered 21 bushels of walnuts. If they shared them equally, how many bushels did each boy get?

Answer.....

10 Bob bought a dozen handkerchiefs at the rate of 3 for $1. How much did he pay for them?

Answer.....

11 Mr. Jones bought a new car for $975. The dealer allowed him $325 for his old car. How much did he have to pay in addition to the allowance for the old car?

Answer.....

Go right on to the next column.

12 Sarah sleeps ten hours every night. If she goes to sleep at nine o'clock, when does she wake up?

Answer.....

13 A man paid the street-car fare for himself and two friends. If the fare is 7 cents, how much change should he receive from a half dollar?

Answer.....

14 How many pounds of popcorn will be needed to plant a 30-acre field if 6 lb. are needed for one acre?

Answer.....

15 Jack had no marbles so he bought as many 3-cent marbles as he could get for 15 cents and then Tom gave him 2 more. How many did Jack have then?

Answer.....

16 Mrs. Fox started a savings account by depositing $85. The next month she deposited $75. A few days later she drew out $40. What was her balance in the bank?

Answer.....

17 A class gave a candy sale and made $23 with which they wish to buy a picture. The picture costs $30 and the 20 pupils in the class decide to share the rest of the cost equally. How much will it cost each?

Answer.....

18 In each 21 pounds of milk there is a pound of milk sugar. How many pounds of milk sugar are there in 1806 lb. of milk?

Answer.....

19 A camping party took 12½ lb. of bacon for a 5-day trip. How much did that allow for each day?

Answer.....

20 Jim has 20 cents to spend for marbles. He is going to buy 2 at 3 cents each and spend the remainder for 2-cent marbles. How many will he get altogether?

Answer.....

Go right on to the next page.

No. Rt.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score	3	12	21	29	34	39	44	48	53	58	61	64	67	70	74	77	80	83	85	88	91	94	96	98	100	102	104	105	107	109	110	112	114	115	117	119	120	122	123	125	127

21 When oranges are 2 for 5 cents, how many can I buy for 60 cents?

Answer.....

22 Milk sells at 12 cents a quart. At this rate, how much will 12 gallons cost?

Answer.....

23 When $1.50 will buy 5 lb. of mixed nuts, how much will $2.40 buy at the same rate?

Answer.....

24 Tom has just 4 weeks of vacation and wishes to spend it in a city which it takes two days to reach by train. How many days can he spend in the city?

Answer.....

25 Frank gets 30 cents for every $1.50 magazine subscription that he sells. What per cent is his commission?

Answer.....

26 A recipe for lobster salad read, "with two cups of lobster meat use ¼ cup of chopped celery." How much chopped celery should be added to 5 cups of lobster meat?

Answer.....

27 A box of 12 dozen oranges cost a dealer $4.80. He sold them at 50 cents a dozen. How much gross profit did he make on each dozen oranges?

Answer.....

28 A dealer profits 6 cents on a half-dozen buttons. How many dozen must he sell to make $12?

Answer.....

29 Jack pays 3 cents for a paper and sells it for 5 cents. What per cent of the selling price is his profit?

Answer.....

30 A man dug 60 bu. of potatoes from .3 of an acre of ground. At this rate, how many bushels should he get from 4 acres?

Answer.....

31 A boy bought 300 oranges at $2.75 per hundred and sold all of them at the rate of 3 for 10 cents. How much did he make if we ignore the cost of doing business?

Answer.....

Go right on to the next column.

32 A boy made a motor-boat trip in 3½ hours when traveling at the average rate of 6 miles an hour. If he had increased his rate by one mile an hour, how long would it have taken him?

Answer.....

33 Mrs. Jackson bought 10 shares of Golden Oil at par ($50). No dividends were paid, and at the end of two years she sold for $23 a share. Not counting brokerage charges and interest, how much had she lost?

Answer.....

34 A tennis court is 36 feet wide and 78 feet long. How many yards is it around the court?

Answer.....

35 A recipe calls for 5 lb. of white flour to 3 lb. of graham flour. How much white flour must be used to make 16 lb. of such a mixture?

Answer.....

36 What does one dollar compounded annually at 10 per cent amount to in 2 years?

Answer.....

37 A man loaned a friend $300. In a year and 8 months the money was returned with $30 interest. What rate of interest was paid?

Answer.....

38 A ladder is standing against a wall in such a way that the base is 12 ft. from the wall and the top of the ladder is 16 ft. from the ground. How long is the ladder?

Answer.....

39 What is the cost of insuring a building valued at $24,000 if it is insured for 80 per cent of its value at the rate of 15 cents per $100 of insurance?

Answer.....

40 A boy made $1.60 by buying apples at 6 for 8 cents and selling them 3 for 8 cents. How many did he sell?

Answer.....

End of Test 9. Look over your work.

DIRECTIONS: Get the answers to these examples as quickly as you can without making mistakes. Look carefully at each example to see what you are to do.

Begin here.

(1) Add
6
1

(2) Add
5
0

(3) Add
7
4
3
5

(4) Subtract
8
3

(5) Add
17
5

(6) Subtract
12
5

(7) Subtract
16
4

(8)
$2 \times 5 =$

(9) Add
37
41
26
55

(10) Subtract
15
9

(11) Subtract
765
327

(12)
$2\overline{)8}$

(13) Add
26890
58475
43261

(14) Multiply
253
6

(15)
$0 \times 4 =$

(16)
$10 \div 2 =$

(17)
$8\overline{)59}$ ____ and ____ remainder

(18) Add
24
12⅝

(19) Subtract
53212
34563

(20)
$9\overline{)58}$

(21)
$2\overline{)15.8}$

(22)
⅛ of 156 =

(23) Multiply
4789
76

(24) Subtract
62⅛
37⅛

(25)
$\frac{9}{10} \times \frac{2}{3} =$

Go right on to the next page.

(26)

$\frac{7}{8} \times \frac{5}{7} =$

(27)

Add
$\frac{4}{5}$
$\frac{1}{3}$

(28)

Subtract
$42\frac{5}{6}$
$28\frac{1}{6}$

(29)

Add
$38\frac{2}{5}$
$27\frac{7}{10}$

(30)

Subtract
$\frac{3}{4}$
$\frac{2}{5}$

(31)

Add
$36\frac{1}{2}$
$32\frac{3}{10}$

(32)

$\frac{2}{3} \div \frac{2}{3} =$

(33)

$\frac{4}{7} \div \frac{4}{9} =$

(34)

Subtract
$66\frac{1}{8}$
$58\frac{3}{8}$

(35)

$29\overline{)46545}$

(36)

$\frac{5}{6} \times 1\frac{10}{11} =$

(37)

$58.25 - 2.9 =$

(38)

Multiply
65.84
5.06

(39)

$25\overline{)11}$

(40)

$11\frac{1}{12} + \frac{5}{6} + \frac{3}{4} =$

(41)

Add
$\frac{1}{6}$
$\frac{9}{10}$

(42)

$\frac{9}{10} \times \frac{4}{15} =$

(43)

Subtract
$205\frac{1}{5}$
$85\frac{3}{8}$

(44)

Subtract
$212\frac{3}{10}$
$39\frac{5}{6}$

(45)

$.6\overline{)3624}$

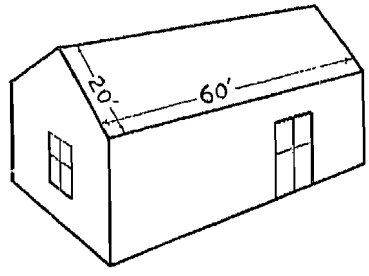
(46)

50 is what per cent of 200?

Answer =

(47)

Find the total roof surface of this building.



Answer =

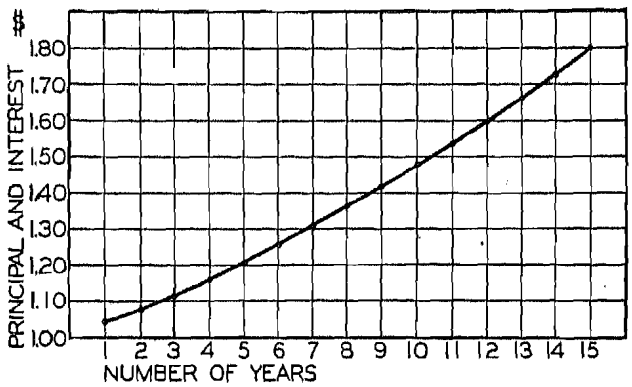
(48)

Add
$22\frac{3}{10}$
$27\frac{5}{6}$

Turn the page and go right on.

(49)

The graph below shows, year by year, the amount of $1.00 invested at 4% interest compounded annually.



What is a dollar worth at the end of the 12th year?

Answer =

(50)

Find the average of

7.53
9.47
8.63
9.02
11.10

(51)

2) 3 yd. 2 ft. 4 in.

(52)

Multiply

6794
4008

(53)

Multiply

−6
+4

(54)

$(4)^8 =$

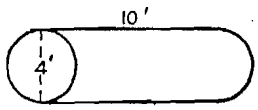
(55)

Add

$7x^2$
$-4x^2$

(56)

Find the volume of this cylinder.



Volume =

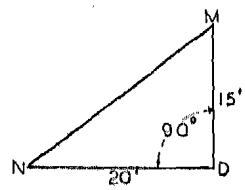
(57)

Principal = $150
Rate = 7 %
Time 1 yr. 6 mo.
Find amount due at maturity.

Answer =

(58)

Find the length of side MN.



$MN =$

(59)

Write this expression in the simplest form:

$-30y + (-6y)$

Answer =

(60)

If $V = \frac{\pi r^2 h}{3}$,

write the formula for h.

$h =$

End of Test 10. Look over your work.

Number right	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Score	3	7	13	19	25	28	31	34	36	37	39	42	44	47	50	53	56	58	60	61	62	64	65	67	68	70	71	73	74	76	78

Number right	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Score	80	83	86	88	90	92	93	95	96	98	101	104	107	109	110	111	112	113	113	114	114	115	115	116	116	117	118	120	122	124

New Stanford Achievement Test

By TRUMAN L. KELLEY, GILES M. RUCH, and LEWIS M. TERMAN

ADVANCED EXAMINATION

DIRECTIONS FOR ADMINISTERING

The following instructions are all that are needed to give the tests. A brief statement is included concerning the nature of the test and the interpretation and uses of the test scores. The instructions for scoring the tests are given with the scoring key. More detailed information concerning the construction, validity, and reliability of the tests; the norms; and the interpretation and uses of the test results are given in the complete *Guide for Interpreting the New Stanford Achievement Test.*

The person in charge of the testing program for a school or school system will need a copy of the complete *Guide for Interpreting the New Stanford Achievement Test* in order to have the test results interpreted and used properly. (The *Guide* must be ordered separately.)

CONTENTS

I. A BATTERY OF ACHIEVEMENT TESTS

Frequently tests selected for the different school subjects have little or no relationship with each other. Their norms have been obtained by different methods and from different groups. They are usually expressed so differently that it is difficult to compare scores made in one subject with scores made in another, or to obtain an average or composite achievement score.

The New Stanford Achievement Test has been devised to avoid these difficulties. It is published either as single tests in eight different subjects or as a composite battery of tests comprising a booklet of twenty-four pages for the Advanced Examination and eight pages for the Primary Examination. The use of the tests in either form yields scores in a given subject which can be easily related to scores obtained in each of the other subjects, as well as compared with the norms for educational age, chronological age, and school grade.

The New Stanford Achievement Test has the following advantages:

Administering. The giving of the test is made as convenient as possible by (1) using the same form of question wherever possible, (2) sample exercises, properly marked, (3) liberal time limits, making the tests measure power rather than speed.

Test scores. Much of the drudgery of scoring and treating test scores has been eliminated in the New Stanford Achievement Test.

The pupil's response in most cases is indicated by a line under the chosen word or phrase. High-grade clerks can be taught to do the scoring satisfactorily, since a scoring key is provided. A device is employed which makes the interpretation of the scores very simple. This is explained on page 6.

Profile chart. This chart gives a graphical representation of the standing of a pupil in each of the several tests, making it possible to tell in which of the subjects the pupil is strongest and in which he is weakest, as well as to compare him with the norms for all of the tests. The comparison of the profile for the same pupil over several years will show comparative progress of the pupil in the several subjects.

II. HISTORY OF THE STANFORD ACHIEVEMENT TESTS

The Stanford Achievement Test was first published in 1923. It appeared in two forms, A and B. They were standardized and equated on the basis of scores of 1500 pupils. Six hundred sixty-six items were included in each form, selected from approximately 5000 items originally chosen from previous tests constructed by the authors and from analyses of textbooks and studies of subject difficulties. The norms for Forms A and B were revised in 1925 on the basis of a careful sampling of 2000 cases from elementary school pupils in twenty-four cities or districts in the United States.

A thorough revision of the tests was completed in 1929, giving the new forms, V, W, X, Y, and Z.[1]

[1] Forms V and W are now published. Forms X, Y, and Z will be published as the need for them arises.

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The revision consisted of the following: (1) The Paragraph Meaning Test was extended to measure ninth-grade ability. (2) The Sentence Meaning Test was discontinued, since the other two reading tests cover the subject adequately. (3) The length of line was shortened in most of the tests to conform with results of scientific investigations of eye movements, and to simplify the scoring. (4) Separate tests were constructed for history and civics, literature, geography, and physiology and hygiene to replace the two tests in history and literature and in nature study and science. (5) The Arithmetic Computation Test was lengthened to include more types of examples and to cover junior high school mathematics. (6) The other tests were also improved but not changed to as great an extent as those mentioned. (7) The test booklet for the Advanced Examination is increased to twenty-four pages. (8) The scoring is made easier by the improved make-up of the tests. (9) The norms for the five new forms (V, W, X, Y, and Z) are the same as the norms for the old Forms A and B. Schools keeping cumulative records can compare scores for the new forms with scores for the old by means of the educational ages provided on the educational profile chart. (10) The norms for the ten tests have been equated so that the score norm for a given age or grade is the same for all the tests. For example, the score 40 (or any other) is an equally good score in all the tests. This makes the interpretation of pupils' scores much easier.

III. CONSTRUCTION OF THE TESTS

The selection of questions for the tests was based on analyses of textbooks, tests, and various sources of data in the educational literature. The type of questions for each test was given thorough investigation from the standpoint of psychological suitability, economy of space and time, ease of scoring, and amount of writing required of the pupil.

The validity of the content was insured first by the basis for the selection of items mentioned above and second by the procedure in making the final choice, which was: (1) to prepare two or three times as many items for a given test as would be needed; (2) to have four or more judges rate each of these items both for content value and difficulty; (3) to select for try-out, on the basis of these ratings, about one and one half times as many items as would ultimately be needed; (4) to break these up into parallel forms on the basis of content and judged difficulty; (5) to give the preliminary forms thus constructed to children in the various grades of schools situated in different parts of the country; (6) to tabulate the responses of all the children for each individual item; and finally (7) to base final choice of items for retention on these results, careful attention of course being given to the proper distribution of content over the subject matter and among the different forms of the test.

The material in each of the five new forms is representative of about the same range of information and skill. Items which were selected for use in the final forms by means of the rigorous criteria mentioned above were arranged to avoid over-emphasis or under-emphasis of any aspect of a subject in any form. The care with which this has been done will be easily observed by any one comparing the various forms with each other.

The items of each test have been arranged in order of difficulty on the basis of scores of pupils selected from a wide range of territory. The five new forms were equated to the two old forms on the basis of testing 5000 pupils.

The reliability of the new forms of the test is shown in the following table of correlations.

TABLE 1

RELIABILITY COEFFICIENTS OF THE TOTAL SCORE BY GRADES

GRADE	TOTAL SCORE
9	.96
8	.96
7	.94
6	.92
5	.97
4	.93
3	.96
2	.98

IV. GENERAL DIRECTIONS

N.B. *The teacher should become thoroughly acquainted with all the directions in this booklet before attempting to give the test.*

CONDITIONS OF THE TEST

The New Stanford Achievement Test can be given satisfactorily by any teacher or principal who is willing to follow the directions in this manual conscientiously and who is reasonably skillful in discipline. The tester should possess a pleasing personality and be able to speak the necessary directions clearly and distinctly enough that every one in the test group may hear.

Pupils may be tested in ordinary classroom groups or in larger groups of a hundred or more, if proper controls are provided. Pupils in Grades 4 to 9 inclusive may be grouped for testing purposes.

Good testing conditions demand that there should be quiet throughout the testing period. Strict obedience and attention on the part of the pupils are absolutely necessary. No questions should be permitted after the testing begins. There should be a spirit of rapport

between the tester and the pupils. No visitors should be allowed. Sufficient assistants should be provided, when large groups are being tested, to see that every one understands what he is to do and that he has the necessary materials with which to do it, and in order to discourage copying or giving assistance in any way.

The person administering the test must speak distinctly and at a moderate speed. Undue stress and levity are to be avoided. An agreeable manner, but one suggestive of authority, is essential. Give all commands in a quick, energetic voice distinct enough for all those for whom it is intended to hear. *Avoid shouting.* Give all directions slowly, with careful attention to emphasis where it is needed. *Follow the directions exactly.* Be watchful, and in so far as possible prevent disturbances within or without the room which might in any way interfere with the work of any pupil. Permit no whispering or copying. Distribute test booklets and administer the tests with dispatch. Systematize the work to avoid delay in administration. Adhere carefully to the time limits. A stop watch is desirable but not absolutely necessary. (The time limits are liberal. Probably many pupils will finish before time is called.) Plan your procedure in detail before attempting to administer the tests. Their administration is easy, but it is necessary to know exactly what to do at each moment of the testing time.

The total working time for the advanced examination, Grades 4 to 9 inclusive, is approximately 150 minutes. The gross time is longer. The authors recommend that this time be broken up into four sittings as follows: Tests 1 and 2 during the first sitting; Tests 3, 4, 5, and 6 during the second; Tests 7, 8, and 9 during the third; and Test 10 during the fourth.

NOTE. The second sitting may be slightly long if too much time is used with the dictation test. In case there is not sufficient time to complete Test 6 during the interval of time available for this sitting, *do not start it* but give it as the first part of the fourth sitting.

FIRST SITTING

Distributing booklets, recording names, etc.		5 min.
Test 1. Reading: Paragraph meaning	Work time 25 min., gross time	26 min.
Test 2. Reading: Word Meaning	Work time 10 min., gross time	11 min.
	Total	42 min.

SECOND SITTING

Distributing booklets		2 min.
Test 3. Dictation	Gross time approximately	15 min.
Test 4. Language Usage	Work time 10 min., gross time	11 min.
Test 5. Literature	Work time 10 min., gross time	11 min.
Test 6. History and Civics	Work time 10 min., gross time	11 min.
	Total	50 min.

(Do not start the history test unless there is sufficient time to finish it. It may be given at the *fourth* sitting.)

THIRD SITTING

Distributing booklets		2 min.
Test 7. Geography	Work time 10 min., gross time	11 min.
Test 8. Physiology and Hygiene	Work time 10 min., gross time	11 min.
Test 9. Arithmetic Reasoning	Work time 20 min., gross time	21 min.
	Total	45 min.

FOURTH SITTING

Distributing booklets		2 min.
Test 10. Arithmetic Computation	Work time 30 min., gross time	31 min.
	Total	33 min.

These schedules are recommended by the authors and have been demonstrated to be feasible and to place no undue strain upon the pupils. Experiments have demonstrated that efficiency in the performance of novel and interesting tasks is not materially affected by as much as 50 minutes of work, even in the case of moderately young children. However, it is not necessary to adhere strictly to these schedules. Testers may break the examination into briefer periods by stopping at the end of any of the separate tests. Under no conditions should a test be started when sufficient time is not available to complete it.

V. DIRECTIONS FOR ADMINISTERING

(*Identical for Forms V and W. To be followed verbatim*)

"Here is a test to show how much you have learned. I will give each of you a test book. Do not write on it or open it until I tell you to." (See that this is obeyed.)

After all are provided with test books and pencils: **"Now fill the blanks at the top of the first page, here.** (Hold up test book and point to the blanks.) **Do it as quickly as you can, but write plainly. On the first line where it says *Name*, write your name.** (Pause.) **After the word *Grade*, write the number that tells what grade you are in.** (Name the grade.) **After *Boy* or *Girl*, write the word that tells which you are.** (Pause.) **On the next line, where it says *Age*, tell how old you are now.** (Pause.) **Then tell when your next birthday will come and how old you will be then.** (Pause.) **On the next line write the name of this school.** (Give the name.) **At the end of the same line write the date."** (Name the date. Give to the younger children any necessary assistance.)

After the blanks have been filled: **"Now, listen carefully and do just what I tell you to do. Do not begin until I say *Go*. The very second I say *Stop*, you must stop and hold your pencils up. After we have begun, you must not ask questions. If you break your pencil, hold up your hand and I will give you another. Do your best and do not pay any attention to what any one else is doing.**

"Now turn over the page to Test 1. Be sure to turn just one leaf. It says Test 1 at the top of the page."

TEST 1. READING: PARAGRAPH MEANING

"Read the words at the top of the page, here. (Hold up booklet and point to the sample sentence.) **It says** (read slowly): ***Dick and Tom were playing ball in the field. Dick was throwing the ball and*** . . . . . (pause) ***was trying to catch the ball.*** **Who was trying to catch the**

ball?" (Encourage pupils to answer aloud.) As soon as the correct answer is given, say: **"Yes, *Tom* was trying to catch it. You must write *Tom* on the dotted line.** (Pause until the word is written.)

"Wherever you see a dotted line, it means that a word has been left out. Begin with No. 1, read each paragraph carefully, and write JUST ONE WORD on each dotted line to show what has been left out. When you have finished this page, turn to the next. There are three pages of this test, and you must keep right on until you finish all three pages. Ready — Go." (See that pupils do not stop at the end of the first or second page. Try to keep all the pupils at work until time is called.)

Allow 25 minutes; then say: **"Stop. Turn to Test 2, on the next page. Be sure to turn just one leaf."** (Pause and make sure that all the pupils have found the place.)

Test 2. Reading: Word Meaning

"Read the directions at the top of the first column. They say, *Draw a line under the word that makes the sentence true, as shown in the samples.* Look at the first sample sentence. *A rose is a box flower home month river.* Of course a rose is a flower; so a line has been drawn under the word *flower*.

Look at the next sentence. *A roof is found on a book person rock house word.* Of course a roof is found on a house; so the word *house* has a line under it. The test has two pages. Answer as many as you can on both pages. In each sentence draw a line under the word that makes the sentence true. Ready — Go." (See that pupils do not stop at the end of the first column or first page.)

Allow 10 minutes; then say: **"Stop. Close your books."**

(First sitting ends here.)

At the beginning of the second sitting see that each child has his own booklet.

Test 3. Dictation Exercise

"Now I am going to read some words for you to write. Listen carefully and be sure to write every word I read. The first sentence is:" (See the list of sentences for the form of the test being used: Read the first sentence intended for the grade being tested. *Read the entire sentence each time. Do not break it up.* A sentence may be re-read once or oftener if necessary.

Slow pupils who are retarding the test may be urged to write faster. The examiner should pronounce the words clearly, in a natural voice. When the harder sentences are reached, it is well to encourage the children by some such expression as, "Do the very best you can, even if you are not able to write *all* the words." At no time are the pupils to be told that this is a spelling test.)

FORM V

Fourth grade starts here.

Get your hat.
I am looking.
Yes, cut the tree.

Fifth grade starts here.

Find the Sunday paper.
The sweet candy is hard.
The rain storm spread.
The agent is the brother of the banker.

Sixth grade starts here.

He bought sugar and soap.
I demand a student ticket.
The crew captured the bridge.
Eight pupils are asleep.

Seventh grade starts here.

He does have ability and courage.
The guest consented to the suggestion.
That area is an undefined region.

Eighth and ninth grades start here.

Papa gave a stylish reception.
An increasing supply is urgent.
I believe the banquet was amusing.
The liberal senator is a favorite.
The gem is probably a novelty.
It was a theft of precious metal.
I appreciate the friendliness of my successor.

Fourth grade stops here.

The franchise was disappointing to the attorney.
The committee of peasants was temporary.
Eliminate disgusting controversies.

Fifth grade stops here.

The tragedies of the tomahawk were anticipated.
I sympathize with the congressional recommendation.
The philosopher was a mischievous (*mĭs'chĭ-vŭs*) spiritualist.

Sixth grade stops here.

The armistice and plebiscite (*plĕb'ĭ-sĭt*) ended the dissension.
The client held the prior covenant.
The Chancellor has rheumatism and pneumonia.

Seventh grade stops here.

The knave and the phrenologist (*frē-nŏl'ŏ-jĭst*) met in the penitentiary.
The poultice (*pōl'tis*) covered a noisome abscess.
The rheostat and the seismograph (*sīs'mō-grăf*) may aid aeronautics (*ā'ĕr-o-nạ'tics*).

Eighth and ninth grades stop here.

After the last sentence for the grade is dictated and copied, say: **"Stop. Turn to Test 4, on the next page."**

FORM W

Fourth grade starts here.

Eat three apples.
He ran to school.
Stand well back.

Fifth grade starts here.

Name a rubber plant.
The boat race was a farce.
Pick the yellow peach.
The church party is tonight.

Sixth grade starts here.

He took a step ahead.
He quickly recovered his health.
A woman built the fence.
Offer your objection to the judge.

Seventh grade starts here.

Avoid the gloomy merchant.
The family had a chicken dinner.
The famous gentleman is my cousin.

Eighth and ninth grades start here.

Praise and honor virtue.
I prefer a different frock.
Ought an employee be jealous?
Can you develop an excellent series?
Foreign competition is valuable.
The secretary notified the professor.
The occupants are a trifle unusual.

Fourth grade stops here.

The religious ceremonies were mysterious.
The minority was especially solemn.
The eminent humorist is my correspondent.

Fifth grade stops here.

The proprietor alleged illness.
The chauffeur (*shō'fŭr*) is an acquaintance of the politician.
Undoubtedly the schedule is fatiguing.

Sixth grade stops here.

Incidentally I will immediately guarantee it.
A parliamentary (*păr-lĭ-mĕn'ta-rĭ*) caucus occurred.
A poultice (*pōl'tis*) for grippe is a nuisance.

Seventh grade stops here.

A coaxing zephyr bent the fuchsia.
The ptomaines (*tō'mā̆-ĭns*) brought on nausea and paroxysms (*păr'ŏk-siz'ms*).
The words "aqueous" and "anhydrous" are antonyms.

Eighth and ninth grades stop here.

After the last sentence for the grade has been dictated and copied, say: **"Stop. Turn to Test 4, on the next page."**

TEST 4. LANGUAGE USAGE

"Read the sample sentence at the side of the page, here (point). **It says: *Apples is — are good.* Which is the right word, *is* or *are?*** (Encourage pupils to reply.) **Yes**; so the word *are* has a line under it.

"Read the next sample: *He told — telled me.* Which is the right word, *told* or *telled?* (Pause for answer.) **Yes**; so the word *told* has a line under it.

"You see there are two pages full of sentences. You must fix all the sentences on both pages. Read each sentence and draw a line under the word that makes the better sentence. Ready — Go." (See that pupils do not stop at the end of the first column or first page.)

Allow 10 minutes; then say: **"Stop. Turn to Test 5, on the next page."**

TEST 5. LITERATURE

"Read the directions at the top of the first column. *Draw a line under the word that makes the sentence true, as shown in the samples.* The first sample sentence reads: *A giant is a big dog man boat.* A giant is a big man, so a line has been drawn under the word *man.* The second sentence reads: *The Bible is the name of a place country book. Book* is the word which makes this sentence true; so a line has been drawn under the word *book.* There are two pages to this test. Answer as many as you can on both pages. You must read each sentence and draw a line under the word that makes the sentence true. Ready — Go." (See that pupils do not stop at the end of the first column or first page.)

Allow 10 minutes; then say: **"Stop. Turn to Test 6, on the next page. Be sure to turn just one leaf."** (Pause until all have found the place.)

TEST 6. HISTORY AND CIVICS

"Here are two more pages of sentences. You must do just as you did in the last test. (Slowly) **Read each sentence and draw a line under the word that makes the sentence true. Answer as many as you can on both pages. Ready — Go."** (See that pupils do not stop at the end of the first column or first page.)

Allow 10 minutes; then say: **"Stop. Close your books."**

(Second sitting ends here.)

At the beginning of the third sitting see that each child has his own booklet.

TEST 7. GEOGRAPHY

"Turn to Test 7." (Pause until all have found the place.)

"Here are two more pages of sentences. You must do just as you did in the last test. (Slowly) **Read each sentence and draw a line under the word that makes the sentence true. Answer as many as you can on both pages. Ready — Go."** (See that pupils do not stop at the end of the first column or first page.)

Allow 10 minutes; then say: **"Stop. Turn to Test 8, on the next page. Be sure to turn just one leaf."** (Pause until all have found the place.)

TEST 8. PHYSIOLOGY AND HYGIENE

Same as Test 7.

TEST 9. ARITHMETIC REASONING

"Read the directions at the top of the page: *Find all the answers as quickly as you can. Write the answers on the dotted lines. Use the margins of the paper to figure on.* (Pause slightly.) **The test has two pages. As soon as you have finished the first page, go right on to the next. Ready — Go."** (See that pupils do not stop at the end of the first page.)

Allow 20 minutes; then say: **"Stop. Close your books."**

(Third sitting ends here.)

At the beginning of the fourth sitting see that each child has his own booklet.

TEST 10. ARITHMETIC COMPUTATION

"Turn to Test 10." (Pause until all have found the place.)

"Read the directions at the top of the page: *Get answers to these examples as quickly as you can without making mistakes. Look carefully at each example to see what you are to do.* (Pause slightly.) **You may use the margins of the paper to figure on if you need to. There are three pages of this test. As soon as you have finished the first page, go right on to the next. Ready — Go."** (See that pupils do not stop at the end of the first or second page.)

Allow 30 minutes; then say: **"Stop. Close your books."**

VI. DIRECTIONS FOR SCORING

The Directions for Scoring are given in full with the Scoring Keys enclosed in each package of tests.

VII. DIRECTIONS FOR INTERPRETING TEST SCORES[1]

By means of the parallel rows of figures across the bottom of each test of the battery, the pupil's achievement on any test is automatically given an equated value related to the table of norms. For example, the rows of figures across the bottom of the Paragraph Meaning Test in Form V appear as follows:

Sum . .	0	1	2	3	}	39	40	41	42
Score . .	3	13	16	18	}	76	77	78	80

The upper row represents the number of blanks to be filled in the test. The lower row represents the equated value, in terms of the norms, for having satisfactorily completed any number of those blanks. If, for instance, a pupil successfully filled 42 blanks in the examination, the scorer checks the number 42 in the upper row of figures and directly under the 42 is 80, which represents the equated value of the actual achievement. Thus, *80 is the score* (not 42), and is the only score to be used to represent the pupil's achievement in any further reference made to it.

Three types of norms are provided for this test; viz., the normal score for each educational age, chronological age, and school grade. The possibilities for usefulness of the several norms given will be appreciated upon trial.

Grade norms. The total score of each pupil was computed, and his exact age, grade, and the date of testing were recorded. The school grades were turned into numerical values, September 15 being considered as the beginning of the school year. A child in the fourth grade tested on September 15 would be recorded as being in Grade 4.0. One tenth of a grade was added for each month beyond September 15. High and low sections arising from midyear promotions were given grade locations as shown in Table 2 which follows.

TABLE 2

TABLE OF FRACTIONAL PARTS OF GRADES COMPLETED

Date of testing	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15		Feb. 15	Mar. 15	April 15	May 15	June 15
Annual promotions	.0	.1	.2	.3	.4		.5	.6	.7	.8	.9
Grade, a low section	.0	.1	.2	.3	.4	Midyear	.0	.1	.2	.3	.4
Grade, a high section	.5	.6	.7	.8	.9	promotions	.5	.6	.7	.8	.9

Age norms. The age norms were derived by a method of sampling designed to free the norms from the effects of late entrance, elimination, etc. The American Experience Table and an age-grade distribution based on 500,000 cases obtained from the Research Division of the University of California were used.

Educational age norms. On page 2 of the booklet for the Advanced Examination a profile chart is provided. This chart provides a graphic means of representing the results of the pupils' achievements. It is in reality a table of norms.

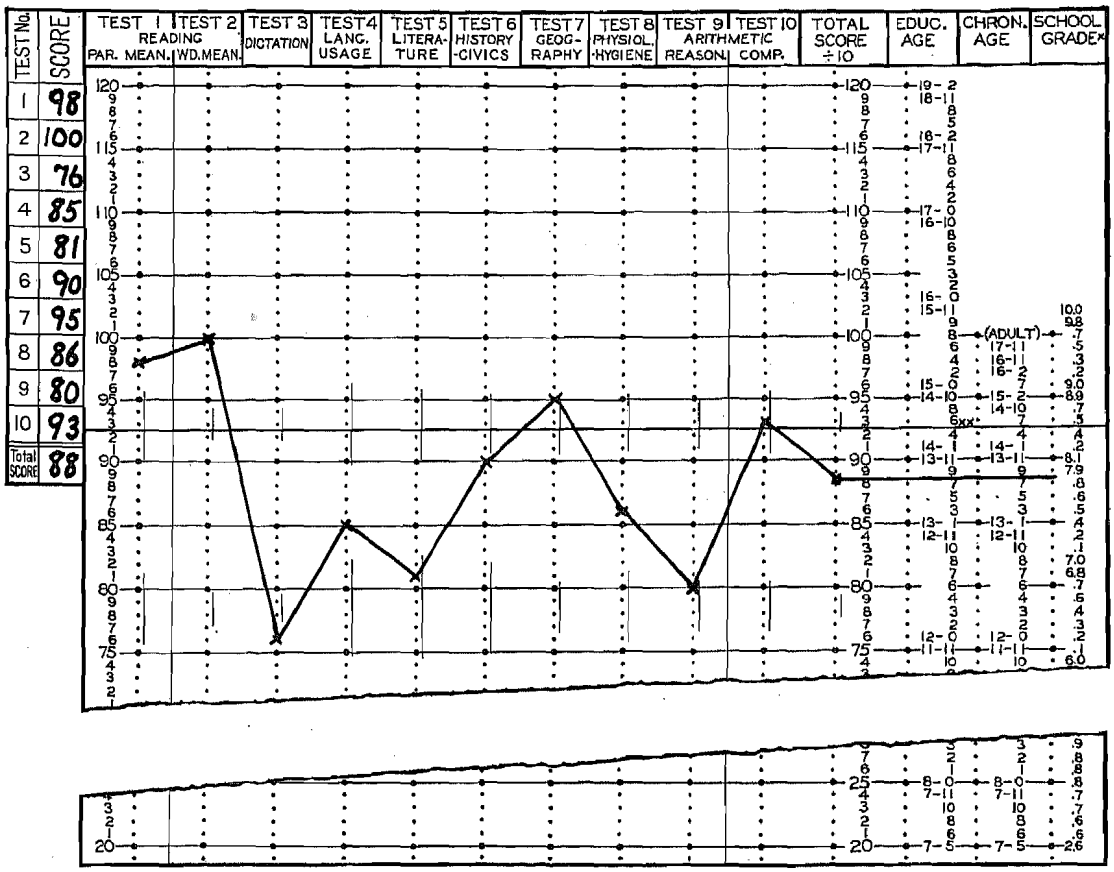
Since all of the test scores have been equated to a common base, it has not been necessary to print numbers in every column. The columns of dots correspond to the numbers given in the first and "total score" columns. The rows of dots across the page represent comparable scores in each of the several tests of the battery and for the corresponding age and grade norms. It will be observed that the chart represents, therefore, the usual coördinate device and that it is conveniently arranged for graphically representing the test results. In order to make the profile, all that is necessary is to draw a line joining the pupil's score on each test to his score on the next test, and extend it through the proper figures in the last three columns on the right of the chart. For

[1] The person in charge of a testing program for a school or school system will need a copy of the complete *Guide for Interpreting the New Stanford Achievement Test* in order to have the test results interpreted and used properly.

example, a pupil 13 years and 5 months old in the low section of the eighth grade made the following record in May:

Paragraph Meaning	98	History and Civics	90
Word Meaning	100	Geography	95
Dictation	76	Physiology and Hygiene	86
Language Usage	85	Arithmetic Reasoning	80
Literature	81	Arithmetic Computation	93

The profile of this record appears on the chart as shown in the following reproduction:



The vertical rules from top to bottom on the profile chart between the two reading scores and also between the two arithmetic scores enable the reader to determine an average composite score for either of these subjects by merely noting the value of the point where the line joining the two scores crosses the vertical rule between them. For example, in the illustration given above the line joining the pupil's score in Paragraph Meaning and his score in Word Meaning crosses the vertical rule opposite the score 99; therefore the average composite score in the two aspects of reading for this pupil is 99.

The heavy horizontal line through the chart indicates that educational ages have been obtained beyond that point by means of extrapolated values as described above.

The short vertical lines parallel to the columns of scores represent the size of the probable error of a score at each of the indicated levels. The size of this P. E. must be considered in making individual comparisons. It is a measure of error caused by chance and the vicissitudes of the particular situation and indicates the amount of credence to be given to the score as determined. It is, of course, to be interpreted just as any other P. E.

Schools planning to make systematic use of the New Stanford Achievement Test will find it convenient to file the first sheet of each pupil's test which contains his profile. Such files become of inestimable value as subsequent records and profiles are added in later testings. There are five forms of the test which have been equated to the same standard; consequently, if a school used one form each year, it would be five years before the first form would need to be repeated. This provides what is really a new test, because the growth of the pupils during a five-year interval will enable them to do exercises far beyond their previous attempts in that form.

There is provided in each package of booklets a Class Record which may be used if it is desired to bring together on one sheet the complete record of scores of the pupils of a grade or class for convenient reference. The names of the pupils may be entered either alphabetically or in order of the total scores, according to preference. An additional sheet is attached to the Class Record, providing forms for tabulating scores on the several tests of the battery, as well as the total scores. (The total score is found by adding the scores for the separate tests and dividing this sum by 10.)

VIII. USES AND TREATMENT OF TEST RESULTS[1]

Uses of the Test Results

The New Stanford Achievement Tests are especially well fitted for the following purposes:

Classification. The New Stanford Achievement Tests have been devised to be especially useful for this purpose, since they supply relatively accurate and readily interpretable measures of progress in the main subjects of the elementary school curriculum, and since they permit comparison of a given score with norms for age and school grade. The authors recommend that whenever possible the tests should be given near the close of the first semester of the school year.

Study of individuals. The New Stanford Achievement Tests have been especially designed with this as one of their major functions. Their coefficients of reliability are nearly all high, that for the total score being in the neighborhood of .95 for the single grade range. This degree of reliability is adequate for the purpose of individual placement.

Junior and senior high school guidance and classification. Many high school principals give the Stanford Achievement Test to all new pupils, including both those who have transferred to them from other schools and those who have come to them through promotion from the grades and from the junior high school. Classification on the basis of the scores obtained has repeatedly been reported to the authors to be of distinct benefit to high school pupils and teachers alike.

The scores have likewise proved of great service in educational and vocational guidance. Whenever it is practicable, the authors recommend that the tests be given to all the eighth-grade pupils (in the case of elementary schools having eight grades) during the last two months of school. The result from this testing should become a part of the records which are sent with the pupil to the high school which he expects to enter.

One function of the junior high school is to provide adequate facilities for its pupils to explore into fields hitherto unknown to them. As part of such a program a battery of achievement tests is indispensable, and the Stanford Achievement Tests satisfy this demand adequately. They furnish a basis for the classification of pupils into homogeneous groups as regards their general scholastic achievements, and at the same time they furnish the tester with valuable information relative to special abilities or special weaknesses of individual pupils.[2]

Treatment of the Test Results

Instructions for the utilization of test results will be found in the standard texts on measurement. One of the authors of this test is editing a series of textbooks on school measurement and adjustment which deal in a practical way with the important problems in this field. The teacher should write to the World Book Company, Yonkers-on-Hudson, New York, for a descriptive circular of this series.

It is assumed that the New Stanford Achievement Test will be given in order that the results may be used, and not merely to gratify an idle curiosity as to how the school stands with reference to other schools. All the pupils from Grades 2 to 9 should be tested, and the results should be recorded and filed in a manner that will make them accessible and convenient for frequent consultation. It should be possible for the teacher or principal to refer without a moment's delay to the record of any individual pupil.

The best single index for grading pupils is the *educational age*, based on the composite score of the complete test. Grade norms are given for reference, but the age norms are far more significant. A given age means something definite, because age differences are fairly constant phenomena except in the higher ages. A given grade, on the other hand, means one thing in one city and something else in another. It is one thing in the city and another thing in the country. Its significance fluctuates with every change in the system of grading or classification. A high grade average in achievement tests does not necessarily indicate satisfactory school conditions. Whether it is to be so interpreted depends on the average age of the pupils in each grade, and also on the amount of elimination. Since it is always necessary to take age into account in appraising grade performances, it is better to base all of our ratings and comparisons directly upon age norms. The school can keep the majority of its children only until the age of 14 or 15, and its efficiency should be judged by what it succeeds in accomplishing by any given age.

It is desirable, of course, that wherever the tests are used arithmetic means be computed for each grade for the sake of comparison with the grade norms herewith provided. Attention is also called to the fact that in the immediate task of reclassification a student's placement should be determined in part by his standing in comparison with the local grade means. However, it is well not to lose sight of the problem of first importance, which is to bring pupils to as high a level of achievement as possible *at each age.*

It is instructive to compute each child's Educational Quotient (EQ); that is, the educational age divided by actual age. In a given school these may be found to range from 60 or 70 to 130 or 140, much as do intelligence quotients. An EQ much above 100 may be regarded as indicating superior intelligence, although industry and interest are contributing factors. It is not so safe, however, to infer low intelligence from low EQ, as the latter may be caused in many ways.

[1] The complete *Guide for Interpreting the New Stanford Achievement Test* should be consulted in order that adequate use and treatment of the results may be made.

[2] See World Book Company *Catalog of Standard Tests* for recommended tests of other types.

For purposes of classifying pupils, determination of promotions, general educational surveys, etc., the composite scores should be used in all cases. This recommendation is based in large part upon the fact that the reliability of the composite score is necessarily much greater than the reliability of the separate subjects. In combining the results of a three-hour examination into an all-round educational age, it is entirely justifiable to place a great deal of confidence in such measures.

The important thing is to reduce the range of educational ages in a given grade or class. Pupils having an educational age as much as ten or twelve months higher than the average for their grade should ordinarily be given one or more extra promotions. Not infrequently a pupil is found whose educational age is two or three years higher than the average for his grade. Such children are done a grave injustice when they are held back to a level of school work which makes no real demands on their abilities.

The solution of the school problem of individual differences will probably be found ultimately in the classification of pupils according to ability and achievement into three to five groups, each with a course of study specially adapted to its needs.

In the reclassification, consideration should be given not only to the pupil's average attainment in all the school subjects taken together, but also to his attainment in the separate subjects. Pupils whose general standing is fairly good, but who have low scores in one or two subjects, should be given special aid where it is most needed. This may be done either by the use of coaching devices or by placing the child temporarily in a lower grade in those subjects in which he is weakest. When the latter is done, every effort should be made to bring a pupil's performance in the subjects in which he is retarded up to his average attainment in other subjects. Although weakness in a single subject may occasionally be due to native disability in certain types of mental processes, it is much more often due to such causes as poor teaching, lack of interest, lack of industry, getting a bad start, etc.

In this connection it is always interesting to compute subject quotients for the eight separate subjects: reading, arithmetic, geography, history and civics, literature, language usage, physiology and hygiene, and spelling, by the formula: $\frac{\text{Subject Age}}{\text{Actual Age}}$. However, it should be remembered that the subject age is never as reliable as the composite educational age, since it is based on much shorter testing time. But the reliability coefficients of the separate tests average around .9. Therefore, the subject ages yielded by most of the tests of this battery may be used with considerable confidence.

It is important to note any marked discrepancy between a pupil's test score and the apparent quality of his daily work. Such discrepancy is sometimes caused by a weakness of memory which prevents the pupil from retaining over any considerable period what he learns for his daily recitations, but more often by the fact that the teacher has rated the quality of daily work too high or too low. Excessive shyness, faults of personality, and evident lack of industry cause a pupil to be marked too low. An exceptionally attractive personality, exemplary conduct, and studiousness lead the teacher to mark too leniently.

It is well to make note of marked discrepancies between educational age, as shown by the New Stanford Achievement Test, and mental age, as shown by an intelligence test, especially when a Binet mental age is available. The comparison between mental and educational ages is less significant when the results of group intelligence tests only are available, because group intelligence test scores are considerably influenced by school attainment. The Binet mental age is relatively independent of schooling, and therefore gives a more reliable indication of what a given pupil's attainment in the school subjects *ought* to be.

In a given case, the educational age may be unduly low because of late entrance, irregular attendance, lack of interest, poor application, or poor teaching. On the other hand, the educational age is sometimes pushed above mental age by exceptional industry, although large discrepancies in this direction occur less often than those in the opposite direction. Whatever the disagreement between the educational age and the mental age may be, its cause should if possible be located. The pupil who is achieving less than the normal for his intellectual development should be stimulated to work more nearly up to the level of his ability. Bright pupils are especially likely to show lower educational ages than their intelligence should warrant, for the reason that they are not, as a rule, promoted as rapidly as they ought to be.

If the educational age is considerably below the mental age for a large majority of the pupils of a given room, school, or city, the fault may lie with the teaching methods. If the average educational age is above the average mental age, it is probably due to exceptionally superior teaching. In no case should the efficiency of the teacher be judged solely by what her pupils achieve. It is also necessary to consider what they are intellectually capable of achieving. Achievement tests should, when possible, be supplemented by intelligence tests.

The comparison between a pupil's educational attainment and his intellectual ability is sometimes made by dividing the Educational Quotient by the Intelligence Quotient. The result is called the Accomplishment Ratio. That is, $\frac{\text{EQ}}{\text{IQ}} = \text{AR}$.[1] In like manner, the Subject Ratios may be computed by dividing the Subject Quotient — e.g., the Reading Quotient, Arithmetic Quotient, etc. — by the Intelligence Quotient.

[1] The AR may also be found by dividing the pupil's educational age by his mental age when the mental age is of the same date as the educational age. When the dates of the two tests are not the same, either a correction must be applied to the mental age or the $\frac{\text{EQ}}{\text{IQ}}$ method must be used.

This method of comparing ability and attainment has a certain amount of value if used with full knowledge of its limitations. These limitations, however, are serious. In the first place, the Accomplishment Ratio has a much higher probable error than either the Educational Quotient or the Intelligence Quotient, since it is affected by the probable error of *both* these quotients. In the second place, the use of AR assumes that the ability involved in mastering any school subject is wholly accounted for by general intelligence. This assumption is probably not entirely true in the case of any subject, and is certainly far from true in the case of spelling, language usage, handwriting, manual training, etc. In the third place, the validity of IQ's derived from group intelligence tests is still undetermined. In the fourth place, the pupil's AR is itself partly a *result* of the grade location he has been given by the school, and does not accurately indicate the effort the pupil is putting forth.

The method just described for calculating Educational Quotients is easy to use when one has determined educational ages, and being of the same type as Intelligence Quotients when determined from Binet mental ages, the Educational Quotients may be compared directly with the Intelligence Quotients.