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A Comparative survey of pupil achievement in rural and city schools in the county of Missoula Montana

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A COMPARATIVE SURVEY OF PUPIL ACHIEVEMENT IN RURAL AND CITY SCHOOLS IN THE COUNTY OF MISSOULA, MONTANA

by

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CHAPTER I

THE PROBLEM, PURPOSE OF THE STUDY AND LIMITATIONS

Introduction to the problem. Not too many years ago a man's informal education, the education he obtained outside of a school, was far more important to him than the education that he obtained in school. If a boy's father was a farmer, the boy learned farming from his father; if the father was a storekeeper the boy learned the operation of the store from his father. Many engineers, masons, ranchers, lumbermen, and others learned, through experience, by starting as an apprentice, rather than by obtaining a foundation in a formal institution. But times and requirements are constantly changing. Today it is difficult to obtain many positions without at least a highschool education, whereas a few years ago even an eighth grade education was not required.

With this constant demand by industry and agriculture for more and better education, more of the young people are spending a greater proportion of their time in schools beyond the elementary level. Due to this demand for more formal education, and the growth in our population, school costs have been on a constant rise, particularly in the last fifteen years. Surveys and studies indicate that these costs are going to continue to rise for a least a decade or two.

People, realizing the need of better schools, a broader curriculum, better qualified teachers, along with rising costs,

are becoming more conscious of the school. The taxpayer would like to know if he is getting a good return on his dollar. One of the important aspects of education is in the teaching and training of the young people to become good citizens. Whereas parents once taught their children citizenship, cooking, homemaking and many other essentials, the school now has to a considerable extent, taken over this job. Much of this general education has been wished upon the schools by the parents for various reasons. One reason may be that many parents are too busy. Another reason could be that the schools have trained personnel and therefore are better qualified than the parent to teach some of these essentials. Butterworth[1] gives the following statement on the importance of education:

> We now realize that, if our national strength is to be fully developed, an educational program must be made available to rural people that approximates in scope and in quality that are provided in cities. This means that the meager offerings of the one-teacher school - the traditional rural scho l in the United States - are not enough. A broader and more vital elementary school and a secondary school that offer varied curriculums are needed.
>
> The nation is realizing that rural citizens and their children are as much in need of special educational services as are our urban areas. By special services, I mean particularly guidance, education of exceptional children, adult education, vocational education in business and industry as well as in agriculture and homemaking, specialized supervision and the like.

Many school systems have enriched their curriculum as

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[1] Julian E. Butterworth, "Rural Education - Past Achievements and Present Problems", National Education Association Journal, 41: 520 - 1, November, 1952.

fast as the public would allow. They have tried to fulfill a child's every need while other schools have remained quite stagnated. Naturally large school systems have advanced much more rapidly than the rural or country schools on the whole. Because of the demands upon the school and the advantages offered by larger schools, consolidation and centralization of small rural schools have slowly been taking place for the past thirty years. Much criticism by parents and taxpayers, and a few educators has raised the question as to which type of school produces superior achievement.

Foote[2], State Supervisor of Rural and Elementary Schools, Louisiana, presented a survey to the National Education Association comparing the results of instruction in one-room and consolidated schools:

> Probably the most significant movement in rural education in recent years is that which establishes the consolidated school in place of the one-teacher or small institution now commonly prevailing.... Justification for the change has been based almost wholly upon the favorable administrative conditions prevailing in the centralized school. The broad assumption has been made and widely accepted that the results of elementary instruction in the large type of school are superior because of the well-known administrative differences.

Pupil achievement should not be the lone criterion by which a school is judged. Many abstract qualities such as character and citizenship help increase the capacity for the

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[2] John M. Foote, "A Comparative Study of Instruction in Consolidated and One-Teacher Schools," National Education Association, Addresses and Proceedings of the Sixty-First Annual Meeting, LXI: 812, 1923.

enjoyment of life. Mort[3], in referring to new evaluation studies, says:

> First, there is the degree to which the effectiveness of school reaches the entire population of children and young people in the schools. Second, there is the degree to which the level of adult living is raised by the School by virtue of the system of popular control of education, on one hand, and by direct adult education efforts, on the other hand.

Changes are slow in improving and regulating education, particularly in rural areas. City school systems tend to more or less keep abreast of the times. They were the first to increase the number of school days in a year and the first with specialized education.

Due to the sparsity of population in Montana, the county high school system is common; Missoula County High School is an example. In this type of a high school system, the high school is usually located at the county seat, which in most cases is the largest city in the county. Most of the children in the county attend this high school in order to obtain their secondary education. This system has many advantages and disadvantages which affect both rural students and urban students, some of which possibly could be compensated for in the elementary schools.

The purpose of the study. The purpose of the study

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[3] Paul R. Mort, Problems and Issues in Public school Finance, (R. L. Johns and E. L. Morphet ed., New York: National Conference of Professors of Educational Administration, 1952), p. 52.

was to compare the achievement of rural eighth grade graduates with urban eighth grade graduates, and to relate this achievement to intelligence, cost per pupil, qualifications of teachers and physical plant conditions in the two groups of schools.

Most of the studies made comparing rural and urban schools have been based upon pupil achievement in the basic skills or 3 "R's". The authors of most of these studies refer to the rural school as a one-room, one-teacher school, and the urban school as any other school which has more than one teacher. While there have been many studies of this type in other states, and some of national scope, few have been made in Montana. These include studies by Reinoehl[4], Sykes[5], and Emmert[6].

Achievement tests alone are not enough to compare schools or quality of education. Mort[7] makes the following statement concerning achievement tests and cost quality relationships:

> Standardized tests by their very nature are limited in realistic characteristics. They pose problems which can

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[4] Charles M. Reinoehl, "A Study of Instruction in Montana's Rural Schools," Intermountain Educator 52: 358-9, May, 1923.

[5] Earl F. Sykes, "An Educational Survey of the School Children of Judith Basin County, Montana," (Unpublished Master's Thesis, Montana State University, Missoula, 1931), p. 114.

[6] W. L. Emmert, "Scholastic Achievement of Urban and Rural Freshman High School Pupils of Equal Intelligence Quotients, as Measured by Certain Tests," (Unpublished Master's Thesis, Montana State University, Missoula, 1938) p. 43.

[7] Mort, op. cit., p. 57.

> be used universally in all schools. Learning the facts and the tasks as they appear in the textbooks will prepare youngsters as well to pass such types of tests as learning those skills in more powerful realistic situations. Accordingly, achievement testing as it has developed at the present stage is both too narrow and too shallow to measure other than the difference in the lower expenditure levels of education.

A new high school student is faced with various problems of adjustment, socially and academically. The number and the intensity of these problems depend to some extent upon the pupils previous education and training.

Definitions and delimitations. United States Census Reports refer to towns of less than twenty-five hundred population as rural. In Montana 43.7 per cent of the population is classified as urban and the remainder as rural or rural non-farm. Many studies comparing rural and urban schools refer to the one-teacher school as a rural school. For the purpose of this study all the elementary schools concerned that were not in Missoula County School District No. 1 are referred to as rural schools. Among the rural schools were six one-teacher schools, seven two-teacher schools, one three-teacher school, two four-teacher schools, and one school of eight teachers with a superintendent and two specialty teachers.

The term, urban school, refers to all the elementary schools which were included in Missoula County School District No. 1 during 1953-54. A few of the elementary schools of School District No. 1 were in rural areas on the edges of the city of Missoula, Montana. All the elementary schools in

Missoula County School District No. 1 were included in one administrative organization. Eleven of the twelve elementary schools had pupils in the eighth grade.

This study was limited to the elementary schools in the area served by Missoula County High School, Missoula, Montana. This area was chosen because it is similar to many of the County High School Districts in the State of Montana, and because of its accessibility to the investigator.

For purposes of greater accuracy and to avoid possible dips or peaks for any one year, the materials and data presented in this study include eighth grade students for a four year period. The data were taken from records of eighth grade students for the school years of 1950-51, 1951-52, 1952-53, and 1953-54. Of a total of 1635 students, 1401 were urban students, and 234 were rural students.

No analysis was made of differences in intelligence or achievement between boys and girls.

CHAPTER II

REVIEW OF RELATED LITERATURE

Previous objective studies. A number of studies have been made relative to comparative achievement of rural students and urban students. Most of these have been in the field of achievement in grade-school subject matter. Also, many of these comparative studies have involved the comparison of the achievement in the rural one-room school and the centralized or city school. Some of these studies date back to 1914, and a large number of them were made in the 1920's and early 1930's.

The authors of these studies varied greatly in their opinions as to the important factors involved in comparing rural-urban achievement. The validity of some of these studies has been questioned for various reasons. Frost[8], in a Teachers College, Columbia University study, points out four reasons why comparison on the basis of school grade classification is invalid:

1. Rural school terms are often shorter and attendance is less regular.
2. In some states, the school system is organized upon the basis of seven grades.
3. Grade standards assume that the tests are given at the same time of the year, which is not the case.
4. In the use of grade standards, retardation is not considered.

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[8] Norman Frost, A Comparative Study of Achievement in County and Town Schools (Teachers College Contributions to Education, No. 111. New York: Teachers College, Columbia University, 1921), p. 15.

Many studies on the educational achievement of pupils in one-room and in larger rural schools were summarized by Covert[9], Assistant Specialist in Rural Education, Bureau of Education. After reviewing the studies, he concluded that three important questions should be kept in mind when comparing the scores on achievement made by pupils of the two types of schools. The questions were:

1. Have the pupil's intelligence ratings been established?
2. Are the pupils accomplishing all that they are capable of doing; that is, has their achievement age been considered in relation to their mental age?
3. Have the pupil's chronological ages always been considered in relation to their mental age?

A few of the more recent studies were for the purpose of evaluating and improving the schools concerned, and meeting the needs of the children. In this type of study, social and physical factors were considered which affect the efficiency of the school and the achievement and adjustment of the child. Hoppock[10] states, "Two aspects to the problem of curriculum development are: to determine what are the needs of the children we are to serve, and to determine how best these needs may be met."

In a study made in Allamakee County, Iowa by Martens[11],

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9 Timon Covert, Educational Achievements of One-Teacher and of Larger Rural Schools (Rural School Circular, No. 18, Department of Interior, Washington D. C.: Bureau of Education, November, 1926), p. 2.

10 Anne S. Hoppock, "A School Program Designed for Rural Children," The National Elementary Principal, 29:43, April, 1950.

11 Clarence C. Martens, "Educational Achievements of Eighth-Grade Pupils in One-Room Rural and Graded Town Schools," The Elementary School Journal, 54: 523-5, May, 1954.

comparing the educational achievements of eighth graders in one-room rural schools and graded town schools, the two main subtests and the total-test scores on each of the three tests of the California Achievement Tests: Intermediate Battery were used. Pupil achievement was compared on the basis of arithmetic reasoning, arithmetic fundamentals, total arithmetic achievement, reading vocabulary, reading comprehension, total reading achievement, mechanics of English and grammar, spelling, and total language achievement. The score made on the Beta form of the Otis Quick-Scoring Mental Ability Tests was used as the controllable variable. In comparing the scores made by the pupils on the achievement tests, the analysis of covariance was used throughout the study.

Martens selected thirty-seven rural boys, thirty-seven rural girls, thirty-seven urban boys and thirty-seven urban girls. They had to have received all of their education in either a rural school or an urban school. There was no significant difference in chronological age between the two groups, but there was a highly significant difference between the two groups in mental ability. The mean score on each of the achievement tests was adjusted to compensate for the difference in mental ability.

The results of this study by Martens show that, for the pupils used in this study, the pupils who had received all of their elementary education in one-teacher per grade city

schools had higher achievement scores in relationship to their mental ability than did a comparable group of pupils who had received all of their elementary education in one-room rural schools.

Table 1. ADJUSTED MEAN SCORES OF 74 TOWN PUPILS AND 74 RURAL PUPILS[12]

Test	Adjusted Mean Scores		Difference	T
	Town Pupils	Rural Pupils		
Arithmetic:				
Comprehension	30.84	28.16	2.68	3.44
Fundamentals	51.96	47.40	4.56	2.58
Total Achievement	83.23	75.65	7.58	2.90
Reading:				
Vocabulary	55.46	50.73	4.73	3.30
Comprehension	37.61	30.88	6.73	4.17
Total Achievement	89.38	81.64	7.76	4.76
Language:				
Mechanics	52.10	48.45	3.65	3.27
Spelling	20.92	19.63	1.29	1.77
Total Achievement	72.96	68.09	4.87	3.39

An extensive investigative study was directed by the Department of Rural Education of the National Education Association[13], in 1921-22, to determine the comparative results of instruction in one-teacher and consolidated schools. From the

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[12] Martens, ibid, p. 524.

[13] John M. Foote, "A Comparative Study of Instruction in Consolidated and One-Teacher Schools," National Education Association, Addresses and Proceedings of the Sixty-First Annual Meeting, LXI: 812-817, 1923.

findings of this study, it was assumed that the elementary instruction in the centralized schools was superior to the instruction in the one-teacher type of school, due to more favorable administrative conditions.

Kennedy[14] made a study for determining the comparative success in first-year high school work of the pupils who entered from the consolidated schools and those who came from one-room rural schools. The comparison was made in terms of teacher's marks expressed in percentages. During the five year period reviewed, there were 177 graduates from the consolidated schools and 150 from the one-room schools whose records were available for both semesters of their Freshman high school year. Averaging the marks of the two groups in their first year of high school work, Mr. Kennedy reports the rating of the consolidated school group as about six percentage points higher than the average attained by graduates of one-room rural schools. Comparing the records of the consolidated and the one-room school groups on the basis of average marks for the first and the second semesters separately, Mr. Kennedy found that both groups showed improvement in the second semester and that the increase in the rating was greater for the graduates of the one-room schools. It was concluded from these findings that the graduates of the one-room schools probably face more

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[14] Floyd Kennedy, "Success in High School of Pupils from Differently Organized Rural Schools," Elementary School Journal, 42: 92-93, October, 1941.

difficult adjustments when they enter high school, and that these adjustments might be facilitated by appropriate guidance procedures.

A study for the purpose of determining what differences, if any, existed between the achievement of rural children from graded and ungraded elementary schools in reading, language, arithmetic and spelling at the sixth, ninth, and twelfth grade levels was conducted by Dreier[15]. The tests used were the Stanford Achievement Test; Intermediate Partial Battery for reading, language, arithmetic and spelling for the sixth graders; the Progressive Achievement Tests: Advance Battery Form A, for pupils of grades nine and twelve; Otis Quick-Scoring Mental Ability Tests: Form Beta for grade six and Form Gamma for grades nine and twelve. The study shows that the graded school seems more likely to provide a better background for high school achievement in reading than in any of the three other basic skills measured. The reading differences in favor of the graded school were significant in both the ninth and twelfth grades, even when the mental ability and socio-economic status of the graded an ungraded groups were statistically controlled.

Frost[16], in a study conducted in Madison County, Kentucky, found that the six-month country schools of Madison County were

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[15] William H. Dreier, "The Differential Achievement of Rural Graded and Ungraded School Pupils," Journal of Educational Research, 43: 175-185, November, 1949.

[16] Frost, op. cit., p. 66.

lowest and the nine month country schools of Madison County were second lowest in comparing these schools to selected city schools in achievement of basic skills. The median 13-year old child of the six-month country schools could neither add, subtract, nor multiply as well as the median 10-year old child of the selected city schools. The median 13-year old child of the nine-month country school was below the median 11-year old child of a selected city school in addition, subtraction, multiplication and division.

In a study on comparative scholastic achievement of Freshman high school students from one-teacher schools and Freshman high school students from graded schools, Emmert[17] found no significant differences between the two groups. The groups were selected on the basis of equal intelligence quotients and equal chronological ages. The following chart shows the comparisons of the two groups in achievement in English Correctness, algebra and general science, the only scholastic achievement tests used by Emmert. Factors affecting achievement, other than mental ability and chronological age, were not considered in this study.

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[17] W. L. Emmert, "Scholastic Achievement of Urban and Rural Freshman High School Pupils of Equal Intelligence Quotients, as Measured by Certain Tests," (Unpublished Master's Thesis, Montana State University, Missoula, 1938) p. 25-48.

Table No. 2 COMPARISON OF THE SCORES OF URBAN AND RURAL PUPILS[18]

	No.	Mean	(Ave.)	(Diff)	Mdn.	P.E.	σ
ENGLISH CORRECTNESS							
Urban	112	132.59	2.67	3.70	126.88	2.76	3.66
Rural	115	129.52	2.57	(C.R.= .829)	127.50	2.40	(C.R.= .169)
Difference		3.07 Favor of Urban			.62 Favor of Rural		
ALGEBRA							
Urban	74	16.22	.88	1.21	15.5	.85	1.05
Rural	66	15.75	.84	(C.R.= .404)	14.06	.62	(C.R.= .137)
Difference		.49 Favor of Urban			1.44 Favor of Urban		
GENERAL SCIENCE							
Urban	22	34.91	2.09	2.8	36.00	2.02	2.8
Rural	33	39.41	1.86	(C.R.= 1.607)	38.63	1.94	(C.R.= .94)
Difference		4.50 Favor of Rural			2.63 Favor of Rural		

In a comparative study conducted by Van Wagenen[19] in Minnesota in which he compared scholastic achievement of rural town and city schools, he found the rural schools ranking far below the other two types of schools. This was a state-wide

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[18] Emmert, ibid., p. 33.

[19] James Marvin Van Wagenen, Comparative Pupil Achievement in Rural, Town and City Schools, (Minnesota State Department of Education. Minneapolis: The University of Minnesota Press, 1929), pp. 144.

study for the purpose of studying the merits of consolidation and centralization of schools. The pupils in the upper grades of the rural schools were two years behind the pupils in the corresponding grades of the city schools. The town or village schools ranked better in comparison but were still one year to six months behind the city schools in corresponding grades.

Wahlquist[20] found that children from the schools in Salt Lake City were far superior in intelligence and achievement compared to those from the rural schools in the county. In comparing the scores of the children tested on paragraph meaning, sentence meaning, word meaning, arithmetic computation, arithmetic reasoning and diction, of the third, fourth and seventh grades for the county school districts with those from the Salt Lake City district, it was observed that the average difference in educational achievement was twelve and two-thirds school months in favor of the Salt Lake City District.

Sykes[21] found in an educational survey of Judith Basin County, Montana that the urban or centralized school was far advanced in scholastic achievement when compared to the rural type school. This particular survey shows the marked superiority of the town or large school, because in this study the

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[20] John T. Wahlquist, "Intelligence of Rural and Urban Children," Elementary School Journal, 27: 682-691, May, 1927.

[21] Earl F. Sykes, "An Educational Survey of the School Children of Judith Basin County, Montana," (Unpublished Master's Thesis, Montana State University, Missoula, 1931), p. 123.

students were of nearly equal chronological and mental ages, but due apparently to a difference in educational facilities under which they received their training, they have widely different educational ages. Sykes suggests that wide differences that were shown between rural and urban students might partially be corrected by better supervision and administration, but also that better qualified teachers were needed in the rural schools.

Another study was conducted in Spokane County, Washington by Stone and Curtis[22]. The results obtained from the use of the standardized tests in graded and one-room rural schools, and the grades earned in the State Eighth-Grade Examinations by pupils of the two types of schools seemed to warrant the following conclusions:

1. Ninth-grade pupils who came from graded schools in Spokane County were better prepared than the pupils with whom they were paired, who had come through one-room schools; so also were the eighth-grade pupils and the seventh-grade pupils in the graded schools. The eighth-grade pupils also made better marks in the Washington State Examinations than the pupils with whom they were paired from the rural schools.

2. On the basis of results obtained from the standardized tests used, the advantage held by pupils of graded schools over the pupils with whom they were paired from the rural schools may be expressed as follows:

	Months School Time
9th Grade Pupils	3.8
8th Grade Pupils	4.5
7th Grade Pupils	5.6

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[22] C. W. Stone and J. W. Curtis, "Progress of Equivalent One-Room and Graded School Pupils," Journal of Educational Research, 16: 260-264, November, 1927.

3. The results of the grades made by equivalent pupils in the state examinations showed a difference of 5.2 per cent in favor of the graded schools.

In a study by the Research and Statistical Standards Section of the United States Office of Education[23] conducted in 1947 and 1948 comparing education in rural and urban school systems the following conclusion was reached.

> The indices presented, both financial and non-financial, show the public elementary and secondary schools in city systems to be on the average somewhat better than those in rural systems. Urban schools pay higher salaries to their teachers; they spend more per pupil for education; they have a longer school term. All these factors suggest more adequate educational services. The slightly smaller pupil-teacher ratio in the rural schools indicates smaller schools rather than higher educational standards.

This study covered thirty-six states; Montana was excluded because of the county high school system in Montana. "Urban" in this study include all cities and incorporated places having twenty-five hundred or more inhabitants; "Rural" includes all other areas.

Although most of the studies which have been reviewed refer to a rural school as a one-teacher school, they indicate that the larger school and school systems offer children more adequate educational services as indicated by the various achievement tests. The studies have been mostly statistical with little or no reference to the influence of environment, social structure or school finances upon pupil achievement.

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23 Rose Marie Smith, "Education in Rural and City School Systems," Office of Education, Circular No. 329, November, 1951.

Bruswell[24] made a study dealing with the relationship between the social structure of the classroom and the academic success of pupils. The conclusions of the study show a direct relationship between achievement and social relationships. This relationship should be constantly in the minds of all teachers and educators in Montana County high school systems, and other school systems where rural and urban children are intermingled. This study is presented here to illustrate that some factors other than mental ability may affect scholastic achievement.

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[24] Margaret M. Bruswell, "The Relationship Between the Social Structure of the classroom and the Academic Success of the Pupils," Journal of Experimental Education, 22: 37-52, September, 1952.

CHAPTER III

TYPES AND SOURCES OF DATA

In this chapter the objective factors and the subjective factors that were used in this study will be discussed. The sources of the data will also be described briefly.

THE OBJECTIVE DATA

Three different sources furnished the objective data for this study; the first source being the Missoula County High School. From here scores were obtained for four different types of standardized tests. These tests were the Otis Self-Administering Test of Mental Ability, the Iowa Algebra Aptitude Test, the Unit Scales of Attainment: Reading - Comprehension, and the Cooperative English Test: Form PM. These tests were administered to eighth-grade graduates in Missoula County who were prospective freshmen of Missoula County High School.

The Superintendent's office of Missoula County School District No. 1 was the second source of data. This material consisted of the placement of the eighth-grade pupils of the various schools in the subject fields of the Stanford Achievement Tests: Advanced Battery. The third source of data procured was from individual pupil permanent records in the office of the Missoula County Superintendent of Schools. These records contained scores for rural pupils made in the various subject fields on the Coordinated Scales of Attainment. The general

fund budgets of the school districts considered in this study were obtained from the Missoula County Treasurer's Office.

Otis Self-Administering Test of Mental Ability is one of the oldest and one of the most popular of intelligence tests that is on the market today. The test was first published in 1922, and is distributed by the World Book Company.

General classifications of the test are verbal, arithmetical and spatial. Included in the general classifications are vocabulary, sentence meaning, proverbs, numerical series and analogies. Thirty minutes is the suggested time limit for administering the entire test.

Norms of the test are based on the distribution of scores for approximately one hundred twenty thousand persons. Large samplings of various sections of the United States were taken. The method of standardization provides the best indication of the test's validity. The reliability of the test is about .92 based upon the comparison of results on the "A" and "B" forms of the test.

Unit Scales of Attainment: Reading - Comprehension was developed by M. J. Van Wagenen of the University of Minnesota. The copyright date is 1933, and it is published by the Educational Test Bureau, Educational Publishers Inc. This test is intended to measure the ability of the pupil in reading. Although the test has no time limit, everyone is expected to finish the test within forty-five minutes.

The test consists of eight paragraphs which are arranged

according to difficulty. These paragraphs measure the ability of the pupil in grasping the general meaning of the paragraphs, the ability to determine if a definite idea is stated, the ability to identify details, and the ability to make simple inferences from the material presented.

Interpretation of the raw score may be by the C-Score which is based upon a C-Score unit being one-tenth of a quartile deviation, or upon Reading Age which corresponds to the C-Score.

Cooperative English Test: Form PM is divided into three main divisions. First of the main divisions is English usage, which is subdivided into grammar and diction, punctuation, capitalization, and sentence structure. Spelling is the second main division, and the third main division is vocabulary. Seventy minutes is the time limit for the entire test; each division and subdivision has a time limit.

Educational Testing Service is the publisher of this test. The copyright date of the test is 1939. Reliabilities of the test are given as about .98. No validity coefficients are given for this test.

Iowa Algebra Aptitude Test consists of four main parts: arithmetic, abstract computation, numerical series, and dependence and variation. Fundamentals (addition, substraction, multiplication, division, and use of percentage) are stressed in the arithmetic portion of the test, which consists of thirty examples requiring twelve minutes. Part two is abstract

computation and makes application of fundamentals to written problems. There are twenty-five problems requiring eight minutes of working time. Part three is composed of numerical series, and measures students' ability to group sequence of a series of numbers. The number of series test has forty exercises and a total time limit of twelve minutes. Part four, dependence and variations test, consists of ten exercises requiring three minutes of working time. The purpose of this part of the test is to measure student's ability to grasp the relationship of the variables in simple algebraic equations.

Coordinated Scales of Attainment is an achievement test published by Educational Test Bureau, Educational Publishers, Inc. The test is divided into nine subject fields which are spelling, English, reading, history, geography, science, literature, arithmetic computation, and arithmetic reasoning. The English division is further subdivided into puntuation, usuage and capitalization. Each division and subdivision are timed for a total of 256 minutes. There are two forms of the test for each grade level.

Stanford Achievement Test is an achievement test published by the World Book Company. There are five forms of the advanced battery; they are matched for content and difficulty, represent equally good measures of the respective subjects, and yield directly comparable results.

The test is divided into nine subject fields: paragraph meaning, word meaning, spelling, language, arithmetic reasoning,

arithmetic computation, social studies, science, and study skills.

No correlation of the two achievement tests was available, but for all practical purposes they are suitable for the comparison to be presented in this study. In this study it is pertinent that all aspects affecting achievement be presented, without attempting to evaluate tests.

Achievement tests are not the only criteria by which a pupils success in school should be judged. In relation to achievement tests, Travers[25] states:

> During the past fifteen years over one thousand studies have appeared which have attempted to evaluate one or more tests for the purpose of predicting some aspect of scholastic achievement.... It should be noted that a multitude of the studies under consideration are based upon the belief that the main reason for the inadequacies of present predictions is that the tests do not adequately measure the factors within the individual which make for success.

The Elementary School General Fund Budget used by school districts in Montana is standardized to conform to Montana State law. This budget included: general control, instructional costs, maintenance of plant, operation of plant, auxiliary agencies, current capital outlay, and total maintenance and operation. Per pupil costs were determined by dividing the total of the General Fund Budgets for the four year period by the total of the average belonging (ANB) for the four year period. Per pupil cost and other financial aspects are presented in the next chapter.

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[25] Robert M. W. Travers, "The Prediction of Achievement," School and Society, 70:293, November 5, 1949.

THE SUBJECTIVE DATA

Subjective evaluations were obtained by observation, and by talking to many teachers, supervisors, and superintendents. These evaluations included such items as school facilities, the school plant, teacher turnover, teacher training, and the general physical environment of the school and community. Some consideration will be given to the relationship between these subjective data and academic achievement and pupil growth in the following chapters.

CHAPTER IV

PRESENTATION AND INTERPRETATION OF THE DATA

This chapter presents all of the objective and subjective data of the study. The first part of the chapter deals with standardized tests and their interpretations, followed by school costs. The last part of the chapter includes information dealing with teachers and the school plants. Code letters rather than the names of the schools are used throughout this study by request of superintendents, principals and teachers.

STANDARDIZED TESTS

Otis Self-Administering Test of Mental Ability. For the four year period covered by this study, the intelligence quotients of 1594 pupils were procured; of this number, 1365 were urban pupils and 229 were rural pupils. As noted in Table 3, the mean score of all schools concerned was 104.10 with a standard error (σM) of .23. The mean intelligence quotient score of all of the urban pupils was 104.47 with a standard error of .32. For all of the rural pupils the mean intelligence quotient score was 100.31 with a standard error of .74.

Whatever the degree of importance might be, the urban pupils' mean score was 4.16 points higher than the mean score of the rural pupils. A more graphic representation is shown

Table III COMPARISON OF INTELLIGENCE QUOTIENTS OF RURAL AND URBAN EIGHTH GRADE PUPILS IN MISSOULA COUNTY, 1951-54.

	No. Pupils	Median Score	Q Score	Mean Score	σ_M	σ
All Schools	1594	104.27	7.85	104.10	.28	11.10
All Urban Schools	1365	105.22	7.815	104.47	.32	11.70
All Rural Schools	229	100.79	7.105	100.31	.74	11.20
Difference of Scores Favor of Urban		4.43		4.16		
diff. Critical Ratio		1.01 4.38		.806 5.16		
All Rural Schools Less Rural School "A"	147	100.32	6.665	98.90	.85	10.35
Difference of Scores of Urban and Rural Schools Less Rural School "A" Favor of Urban		4.90		5.57		
diff. Critical Ratio		1.138 4.30		.908 6.13		

in Figure 1.

Estimating the reliability of the obtained difference of the means, further evidence indicates that the difference is significant. The significance of the difference is shown

by the standard error of the difference of the two means, 4.16, which was .806. The critical ratio was 5.16. When the critical ratio, which is the ratio of the difference of the two means and its standard error, is more than three, it is practically certain that the difference in the means is a real and true one.

The standard error of the difference of two medians substantiates the significance of the difference of the two groups. The difference of the medians for the two groups was 4.43 favoring the urban pupils. The standard error of the difference of the medians was 1.01, and the critical ratio was 4.38.

Rural school "A" was the only rural school that was completely graded, that is, one teacher per grade. It was also the only rural school that had specialty teachers. Hence, it was very similar to the urban schools in this study. Comparisons of urban and rural students were made both with and without the pupils of rural school "A".

According to Table III, the mean intelligence quotient score for all rural pupils minus the pupils from rural school "A" was 98.9. This mean score was 5.57 points less than the mean intelligence quotient score for all urban pupils. The difference was highly reliable; the critical ratio was 6.13. Figure 2 illustrates the difference between the urban pupils and the rural pupils minus rural school "A". Figures 1 and 2 also show that the range of urban pupils' scores was greater

Figure 1

PERCENTILE GRAPH

RURAL AND URBAN
Intelligence Quotients
Otis Self-Administering Test of Mental Ability
~~Percentile Graph~~

Score	Urban T	Urban ST	Rural T	Rural ST
No.	1365		229	
149 145	1	1365		
144 140			1	229
139 135				
134 130	6	1364		
129 125	29	1358	3	228
124 120	70	1329	10	225
119 115	129	1259	7	215
114 110	204	1130	19	208
109 105	254	926	26	189
104 100	216	672	57	163
99 95	178	456	29	106
94 90	113	278	39	77
89 85	82	147	19	38
84 80	33	65	11	19
79 75	27	32	8	8
74 70	5	5		
Med.	105.2		100.8	

Figure 2

PERCENTILE GRAPH

Urban & Rural (Minus Rural School "A")

Intelligence Quotients

Otis Self-Administering Test of Mental Ability

Percentile Graph

Urban 1365 ——— Rural 147 - - - -

Score	Urban T	Urban ST	Rural T	Rural ST
149 145	1	1365		
144 140				
139 135				
134 130	6	1364		
129 125	29	1358		
124 120	70	1329	5	147
119 115	129	1259	3	142
114 110	204	1130	11	139
109 105	254	926	18	128
104 100	216	672	39	110
99 95	178	456	16	71
94 90	113	278	28	55
89 85	82	147	12	27
84 80	33	65	8	15
79 75	27	32	7	7
74 70	5	5		
Med.	105.2		98.9	

Table IV INTELLIGENCE TEST DATA, RURAL AND URBAN IN MISSOULA COUNTY, 1951-54.

School	No. Pupils	Median Score	Q Score	Mean Score	σ_M	σ
Urban						
A	133	101.8	7.93	101.1	.98	11.3
B	153	105.97	7.0	105.47	.925	11.45
C	89	108.57	7.02	108.4	1.02	9.65
D	126	107.31	7.67	106.75	.93	10.45
E	87	107.33	7.29	106.18	1.30	12.15
F	112	100.45	8.20	101.6	1.20	11.6
G	201	109.64	6.17	109.3	.68	9.6
H	101	100.25	8.35	98.89	.856	8.6
I	80	103.44	7.06	103.63	.81	7.25
J	178	102.0	8.03	102.55	.85	11.3
K	105	104.17	8.4	103.0	1.13	11.55
Rural						
A	82	101.67	7.99	103.48	1.34	12.15
B	44	97.0	3.54	97.05	1.296	8.6
C	28	97.5	6.37	97.86	2.004	10.6
All Other Rural Schools	75	101.9	7.78	100.59	1.27	11.1

than the range of the rural pupils's scores.

In order to avoid misunderstandings, and possibly the

idea that just one or two schools were responsible for the difference in the rural and urban scores, Table IV lists each school seperately. Of the urban schools, Table IV shows school "G" with a high mean intelligence score of 109.3 followed by school "C" with a mean score of 108.4. School "H" had the lowest mean score of the urban schools with a score of 100.25, which is within .06 points of the rural schools' mean. Of the rural schools, school "A" had a high mean score of 103.48 which was almost a point less than the mean of all urban schools.

Figure 3 shows the range and the middle fifty per cent for each school. The urban school with the greatest range was school "B" with a high schore of 150.0 and a low score of 74.0. Incidently the score of 150.0 was high for all schools, and the lowest score of all schools was held by urban school "K" with a low score of 71.0. Rural school "A" had the greatest range of the rural schools with a high score of 144.0 and a low of 78.0.

The wide range of the mental abilities of pupils has always presented a problem to the teacher. Bond[26] says, "If pupils of wide variances in mental capacity must be placed in the same class, the teacher needs to be aware of the likelihood that there also will be a wide diversity of ability to study."

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[26] Jess A. Bond, "Analysis of Factors Adversely Affecting Scholarship of High School Pupils," Journal of Educational Research, 46: 1-15, September, 1952.

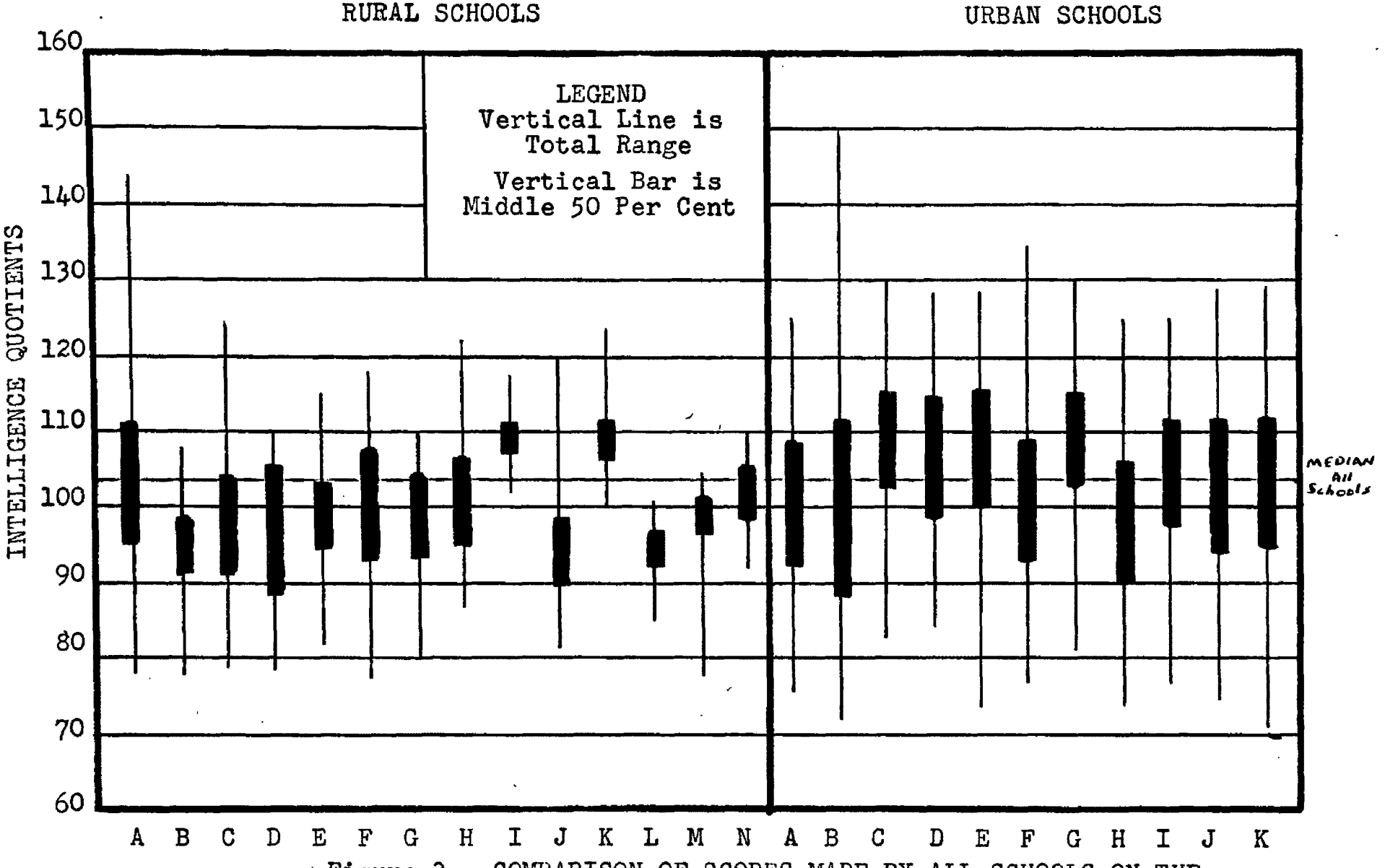

Figure 3. COMPARISON OF SCORES MADE BY ALL SCHOOLS ON THE OTIS SELF-ADMINISTERING TEST OF MENTAL ABILITY

Many large school systems have met this problem by dividing classes into ability levels.

Unit Scales of Attainment: Reading - Comprehension. Of the 1589 pupils whose reading test scores were procured, 1364 were urban and 225 were rural. The mean score of all of the test scores, as indicated on Table V, was 14-10.0. The score is represented as reading age; 14-10.0 means fourteen years, ten months. The reading age limits in this test were nine years to twenty years. As shown by Table V, the mean score of the urban pupils was 8.7 months higher than the mean score of the rural pupils. This difference is illustrated in Figure 4. The difference of 8.7 months was significant because the critical ratio was 3.78.

All rural pupils, minus the pupils of rural school "A" had a mean reading score of 13-10.3. By omitting rural school "A", the difference of the mean score of all of the urban schools was 12.1 months in favor of the urban schools. The critical ratio for this difference was 4.44 indicating that the difference was significant. Figure 5 illustrates the difference between the two groups.

The reading test median and mean scores, expressed in terms of reading age, of each school are listed seperately in Table VI. From the data in Table VI it is noted that urban school "C" had a high score of 16 years 3.2 months. Urban school "H" had the lowest score for all of the urban schools. Rural school "A" had the highest mean score for all of the rural

Table V COMPARISON OF READING TEST SCORES OF RURAL AND URBAN PUPILS IN MISSOULA COUNTY, 1951-54.

	No. Pupils	Median Age Equiv.	Q Score	Mean Age Equiv.	σ_M	σ
All Schools	1589	14-9.9	1-11.4	14-10.0	0.85	2-9.6
All Urban Schools	1364	14-10.3	2-0.0	14-10.4	0.94	2-10.7
All Rural Schools	225	14-3.6	1-9.4	14-1.7	2.10	2-7.5
Difference of Scores Favor Urban		0-6.7		0-8.7		
diff. Critical Ratio		2.881 2.32		2.3 3.78		
All Rural Schools Less Rural School "A"	144	13-10.5	3-2.6	13-10.3	2.56	2-6.8
Difference of Scores of Urban and Rural Schools Less Rural School "A"		0-11.8		1-0.1		
diff. Critical Ratio		3.42 3.30		2.73 4.44		

schools.

Figure 6 illustrates, by the vertical bars, the middle

Figure 4

PERCENTILE GRAPH

Reading Test Scores in Years and Months
Unit Scales of Attainment: Reading-Comprehension
Percentile Graph

Score	Urban T	Urban ST	Rural T	Rural ST
No.	1364		225	
Over 20	68	1364	5	225
20 19	58	1296	6	220
19 18	103	1238	9	215
18 17	55	1135	8	206
17 16	185	1080	17	198
16 15	181	895	46	181
15 14	220	714	32	135
14 13	98	494	21	103
13 12	183	396	41	82
12 11	79	213	13	41
11 10	49	134	7	28
10 9	85	85	21	21
Below 9				
Med.				

Figure 5.

PERCENTILE GRAPH

Urban & Rural (Minus Rural School "A")

Reading Test Scores in Years and Months

Unit Scales of Attainment: Reading-Comprehension

Percentile Graph

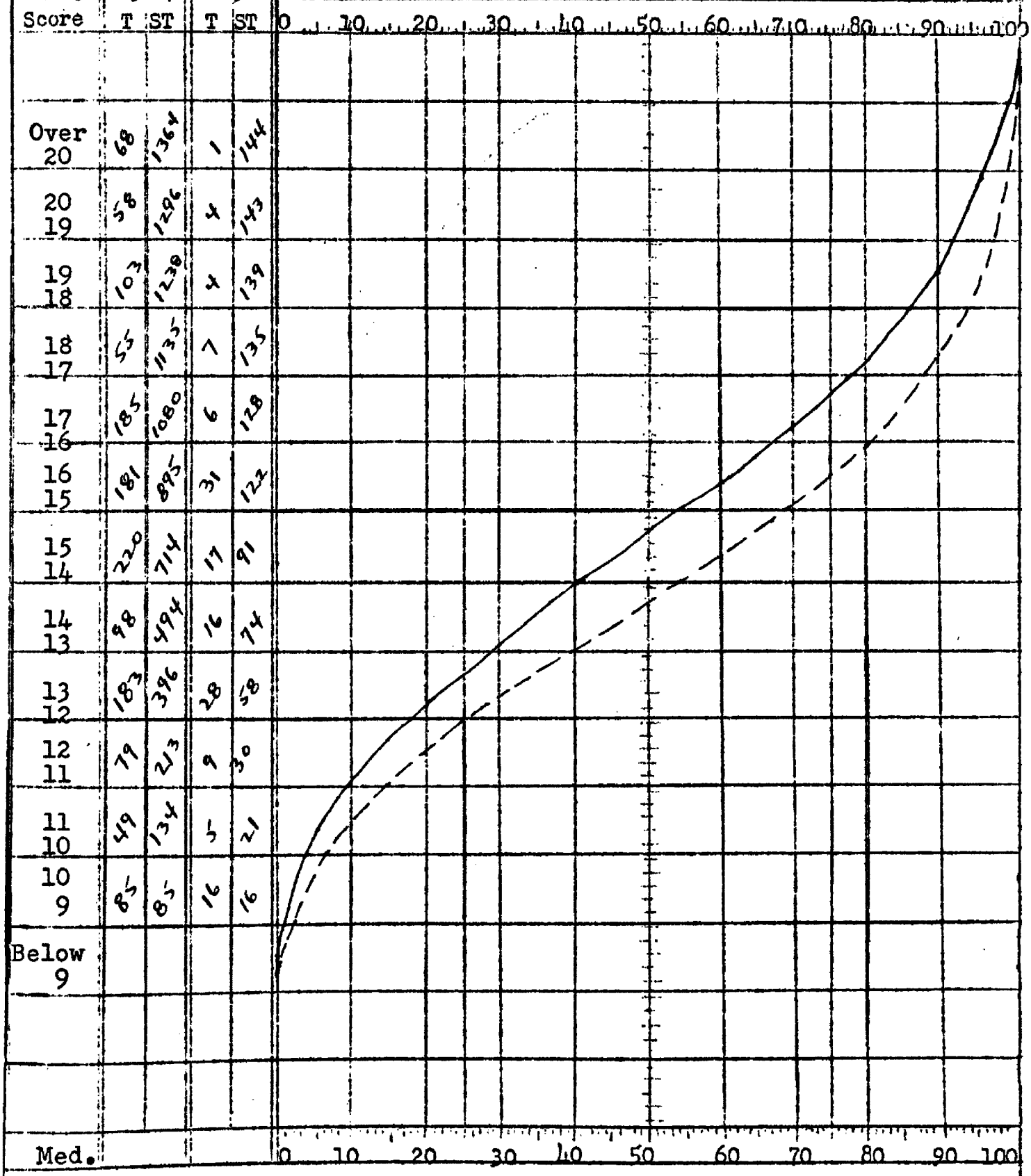

Table VI READING TEST DATA, RURAL AND URBAN SCHOOLS IN MISSOULA COUNTY, 1951-54.

School	No. Pupils	Median Score	Q Score	Mean Score	σ_M	σ
Urban						
A	134	14-1.9	1-8.7	13-11.6	2.51	2-5.0
B	152	15-4.5	1-5.2	15-6.7	2.47	2-6.5
C	90	16-2.4	2-1.5	16-3.2	3.70	2-11.2
D	129	15-5.3	2-2.5	15-5.6	3.05	2.10.6
E	85	14-7.5	1-11.0	14-8.5	3.71	2-10.2
F	114	14-8.2	2-0.1	14-7.8	3.07	2-8.8
G	198	15-5.8	2-8.6	15-6.2	2.52	2-11.4
H	98	13-9.2	1-9.6	13-10.0	3.29	2-8.5
I	79	14-8.4	1-11.7	14-6.0	3.73	2-9.1
J	170	14-8.6	1-10.3	14-8.4	2.37	2-7.0
K	107	14-6.8	2-1.1	14-6.6	3.38	2-11.0
Rural						
A	81	14-9.2	1-8.5	14-7.9	3.52	2-7.7
B	44	13-8.0	1-7.2	13-11.2	4.77	2-7.6
C	29	14-3.0	1-7.9	14-3.1	5.08	2-3.4
All Other Rural Schools	80	14-5.1	1-10.1	13-11.6	3.51	2-7.4

fifty per cent of the scores made by the various schools. The vertical lines represent the total range of scores for each

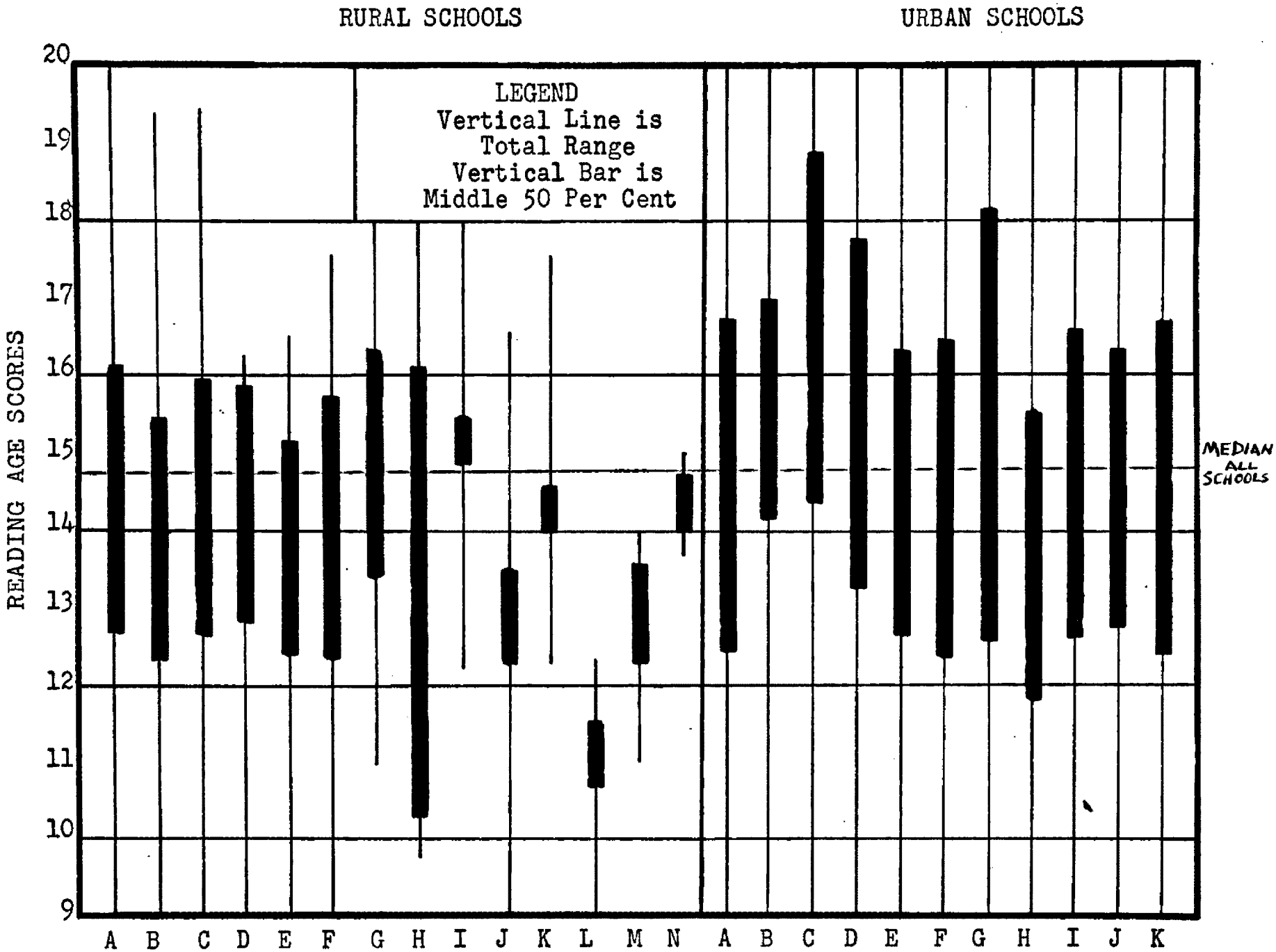

Figure 6. COMPARISON OF SCORES MADE BY ALL SCHOOLS ON THE UNIT SCALES OF ATTAINMENT: READING-COMPREHENSION

school. It will be noted that the range of the test and of the graph is from 9 years to 20 years, expressed as reading age equivalents. The ranges of all urban schools were bound by these limits. Many of the rural schools were bound by the lower limit, and a few were bound by the upper limit. The median score for all schools is represented by a horizontal brown line in Figure 6.

Cooperative English Test: Form PM. Of the 1593 English test scores obtained, 1361 were from urban schools, and 232 were from rural schools. Table VII shows that the mean score of all schools was 141.14 and the standard error was .824. Of the 1361 urban English test scores, the mean score was 141.96; the standard error was .906. The mean score for the rural schools was 138.02.

In comparing rural and urban mean scores, the urban pupils exceeded the rural pupils by 3.92 points. An illustration of the difference can be seen in Figure 7. The critical ratio of this difference was 1.79.

There was a greater difference in the means of the urban schools and the rural schools when rural school "A" was excluded. The difference was 7.47 points favoring the urban pupils. The 7.47 points difference was significant as indicated by a critical ratio of 3.268. This difference is illustrated graphically in Figure 8.

A consideration of each individual school is represented in Table VIII. The mean and median English test scores for

Table VII COMPARISON OF ENGLISH TEST SCORES OF RURAL AND URBAN EIGHTH GRADE PUPILS IN MISSOULA COUNTY, 1951-54.

	No. Pupils	Median Score	Q Score	Mean Score	σ_M	σ
All Schools	1593	139.55	24.98	141.14	.824	32.85
All Urban Schools	1361	140.53	22.07	141.94	.906	33.62
All Rural Schools	232	138.38	18.52	138.02	1.989	30.3
Difference of Scores of Rural and Urban Favor of Urban		2.15		3.92		
diff. Critical Ratio		2.74 .79		2.19 1.79		
All Rural Schools Less Rural School "A"	150	133.57	18.09	134.47	2.099	25.71
Difference of Scores of Urban Schools Less Rural School "A" Favor of Urban		6.96		7.47		
diff. Critical Ratio		2.86 2.43		2.29 3.27		

each school is listed in this table. Urban school "G" had a high mean score of 155.57 points, and urban school "H" had the

Figure 7. PERCENTILE GRAPH

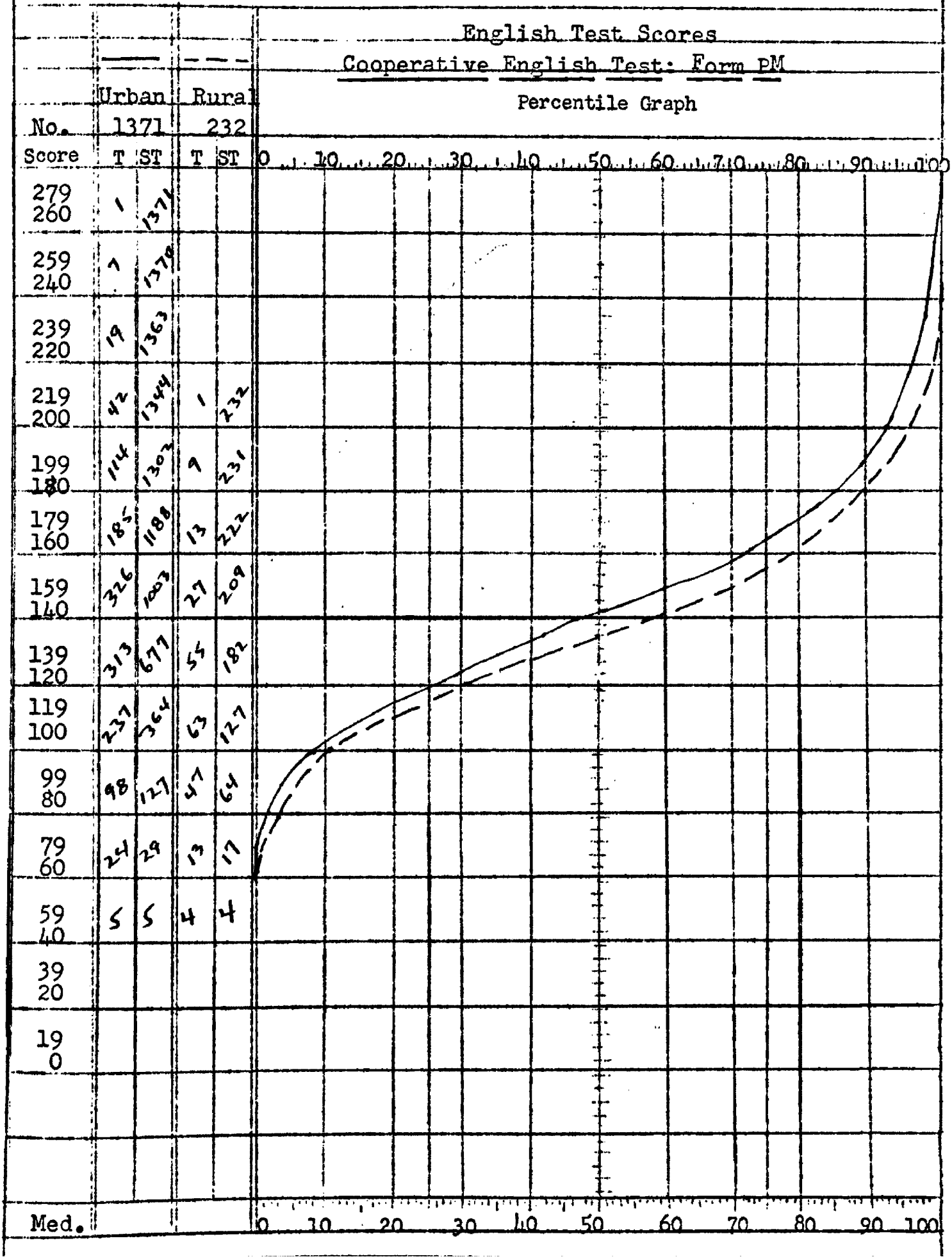

Figure 8

PERCENTILE GRAPH

Urban and Rural (Minus Rural School "A")

English Test Scores

Cooperative English Test: Form PM

Percentile Graph

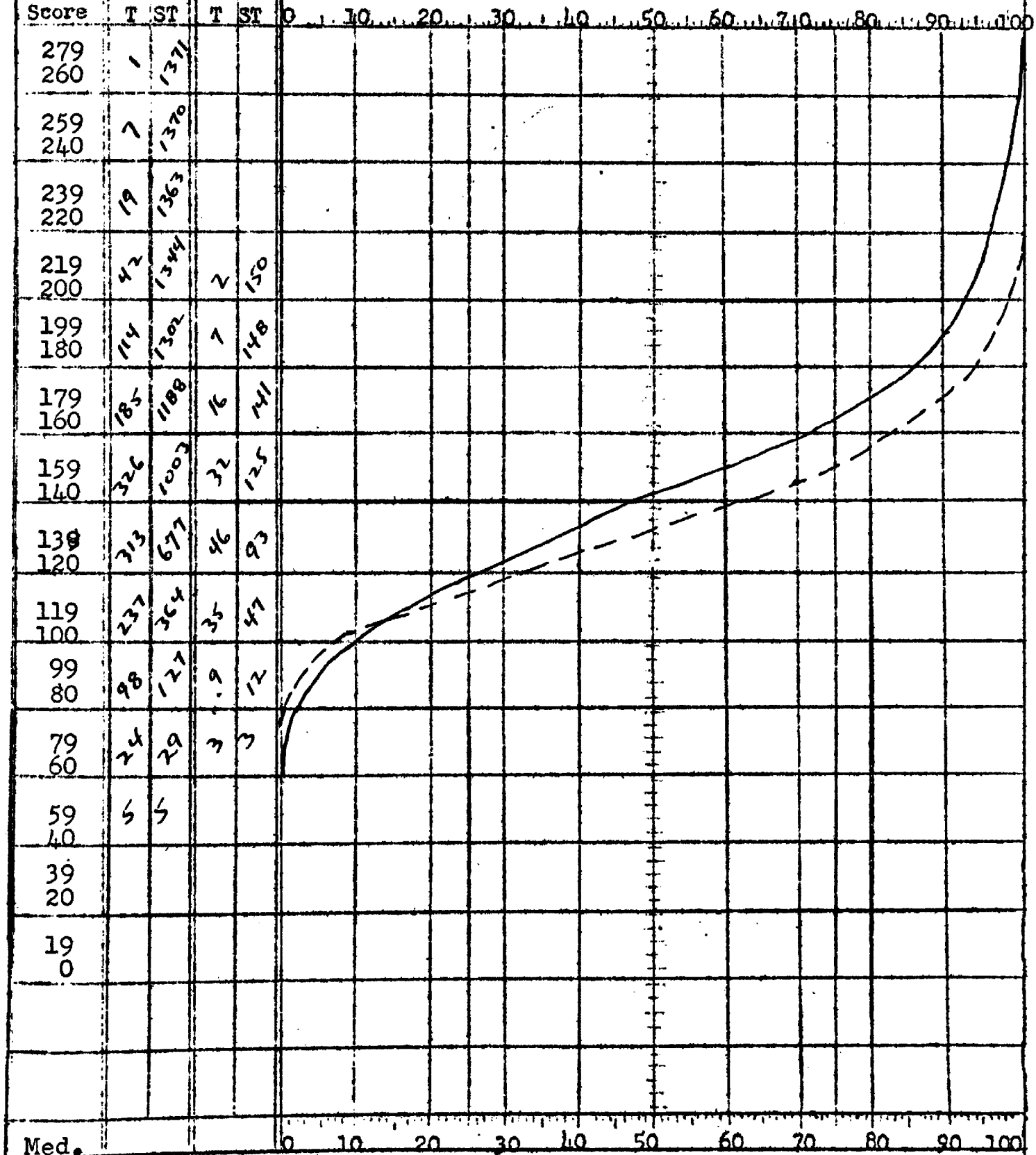

Table VIII ENGLISH TEST DATA, RURAL AND URBAN SCHOOLS IN MISSOULA COUNTY, 1951-54.

School	No. Pupils	Median Score	Q-Score	Mean Score	σ_M	σ
Urban						
A	133	131.18	20.89	131.47	2.56	29.56
B	152	136.67	19.25	138.29	2.52	31.05
C	91	154.17	23.00	153.90	3.53	33.70
D	129	149.50	24.36	146.43	3.04	34.50
E	87	139.50	19.63	140.52	3.56	33.17
F	114	128.57	22.23	130.70	2.95	31.45
G	201	153.33	24.62	155.57	2.52	35.70
H	102	128.46	20.12	130.20	2.79	28.20
I	80	140.71	22.75	136.50	3.56	31.80
J	172	139.50	19.48	142.67	2.24	29.42
K	107	136.67	20.56	138.46	3.11	32.20
Rural						
A	82	144.67	21.56	147.81	3.96	32.56
B	44	132.00	17.0	133.86	3.90	25.86
C	28	131.67	15.34	133.57	4.99	26.42
All Other Rural Schools	78	135.83	18.80	135.13	3.15	27.80

lowest mean score, 130.196 points, of all urban schools. Rural school "A" had the highest mean score of all of the rural schools.

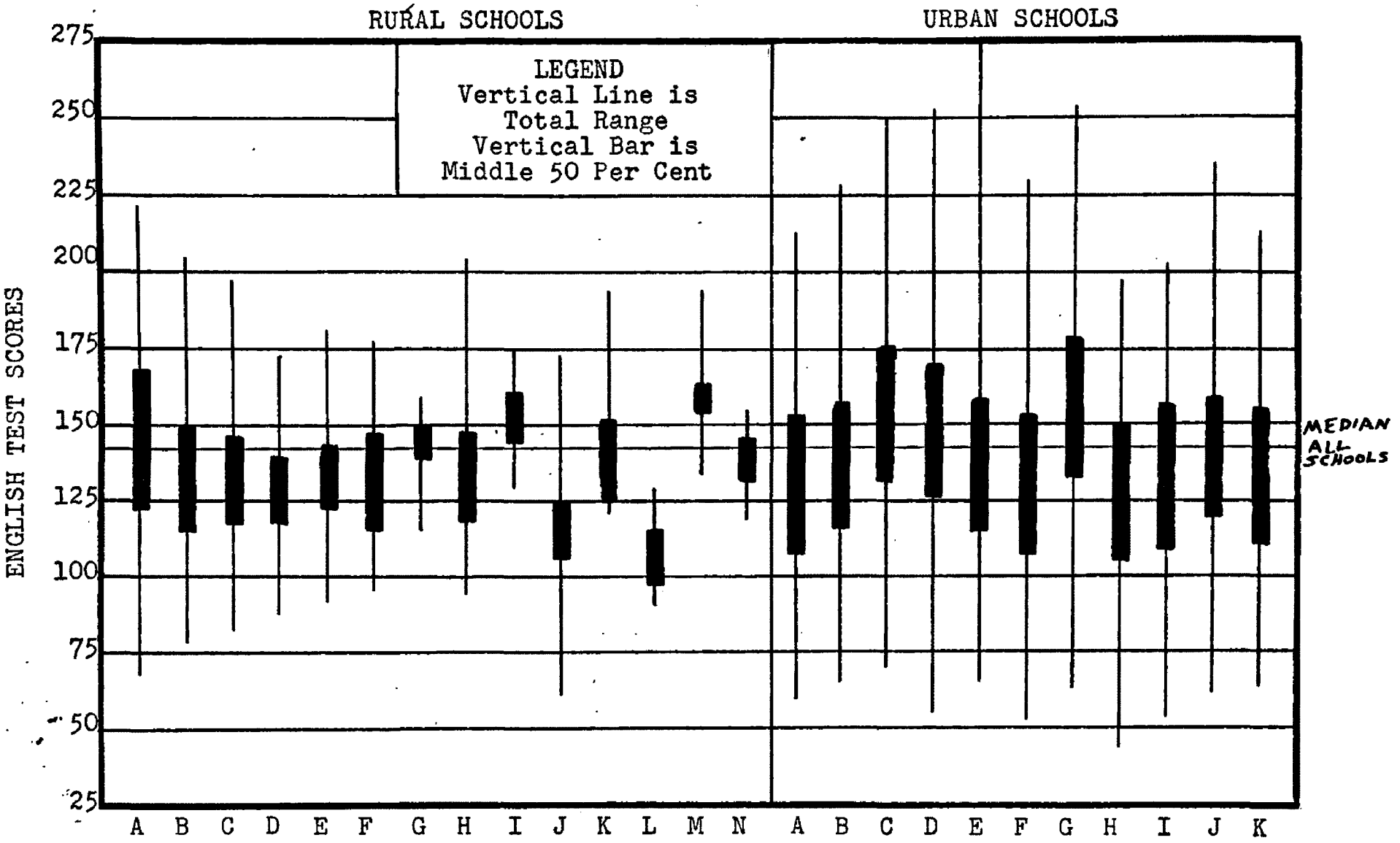

Figure 9. COMPARISON OF SCORES MADE BY ALL SCHOOLS ON THE COOPERATIVE ENGLISH TEST, FORM PM.

All schools are graphically presented in Figure 9. The black vertical lines are the total ranges of each school, and the vertical bars are the middle fifty per cent of the scores for each school. The number of pupils in a school has little or no bearing on the length of the vertical bar. The brown horizontal line represents the median score for all of the schools concerned.

Iowa Algebra Aptitude Test. Algebra test scores of 1602 pupils were obtained; of this number, 1367 were urban pupils' scores, and 235 were rural pupils' scores. For all of the scores procured, the mean score was 54.208 and the median score was 54.274. Table IX indicates the mean score for all rural pupils was 50.99 and the median score was 50.92 points. The mean score for all urban pupils was 54.15 points and the median score was 54.38 points. When rural school "A" was excluded the mean score of the rural schools was 50.99 points.

The difference in mean scores of all urban schools and all rural schools was .14 points. This difference is not significant because the critical ratio was .148 points. The difference is illustrated in Figure 10. The difference of 3.16 points in mean scores of all urban schools and of all rural schools except rural school "A" was not significant as indicated by a critical ratio of 2.86. A comparison of this difference is illustrated in Figure 11.

Algebra test data are shown for each individual school in Table X. Reference to this table shows urban school "C" with

Table IX COMPARISON OF ALGEBRA TEST SCORES OF RURAL AND URBAN EIGHTH GRADE PUPILS IN MISSOULA COUNTY, 1951-54.

	No. Pupils	Median Score	Q Score	Mean Score	σ_M	σ
All Schools	1602	54.27	9.37	54.21	.33	13.31
All Urban Schools	1367	54.38	9.51	54.15	.35	13.10
All Rural Schools	235	53.24	9.03	54.01	.88	13.47
Difference of Scores of Urban and Rural Favor of Urban		1.14		.14		
diff. / Critical Ratio		1.19 .96		.95 .15		
All Rural Schools Less Rural School "A"	149	50.92	8.39	50.99	1.11	13.5
Difference of Scores of Urban and Rural Schools Less Rural School "A" Favor of Urban		3.46		3.16		
diff. / Critical Ratio		1.38 2.51		1.10 2.86		

a high mean score of 60.31 points, and urban school "H" with a low mean score of 46.96 points for all urban schools. Rural

Figure 10. PERCENTILE GRAPH

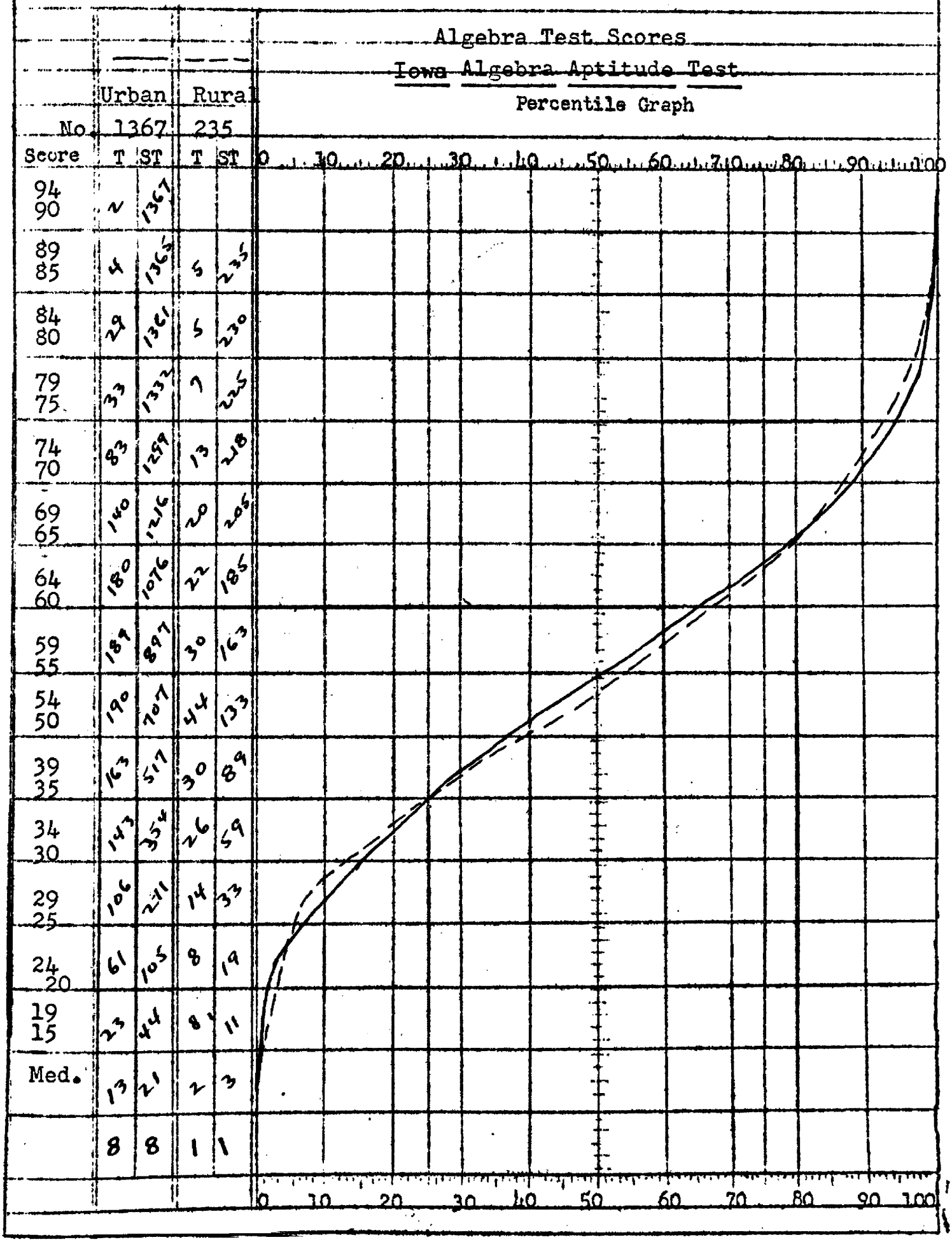

Figure 11.

PERCENTILE GRAPH
Urban and Rural (Minus Rural School "A")
Algebra Test Scores
Iowa Algebra Aptitude Test
Percentile Graph

Score	Urban T	Urban ST	Rural T	Rural ST
No.	1367		149	
94 90	2	1367		
89 85	4	1365	1	149
84 80	29	1361	4	148
79 75	33	1332	3	144
74 70	83	1299	5	141
69 65	140	1216	8	136
64 60	180	1076	13	128
59 55	189	897	16	115
54 50	190	707	30	99
49 45	163	517	20	69
44 40	143	354	21	49
39 35	106	211	11	28
34 30	61	105	7	17
29 25	23	44	7	10
24 20	13	21	2	3
19 15	8	8	1	1
Med.				

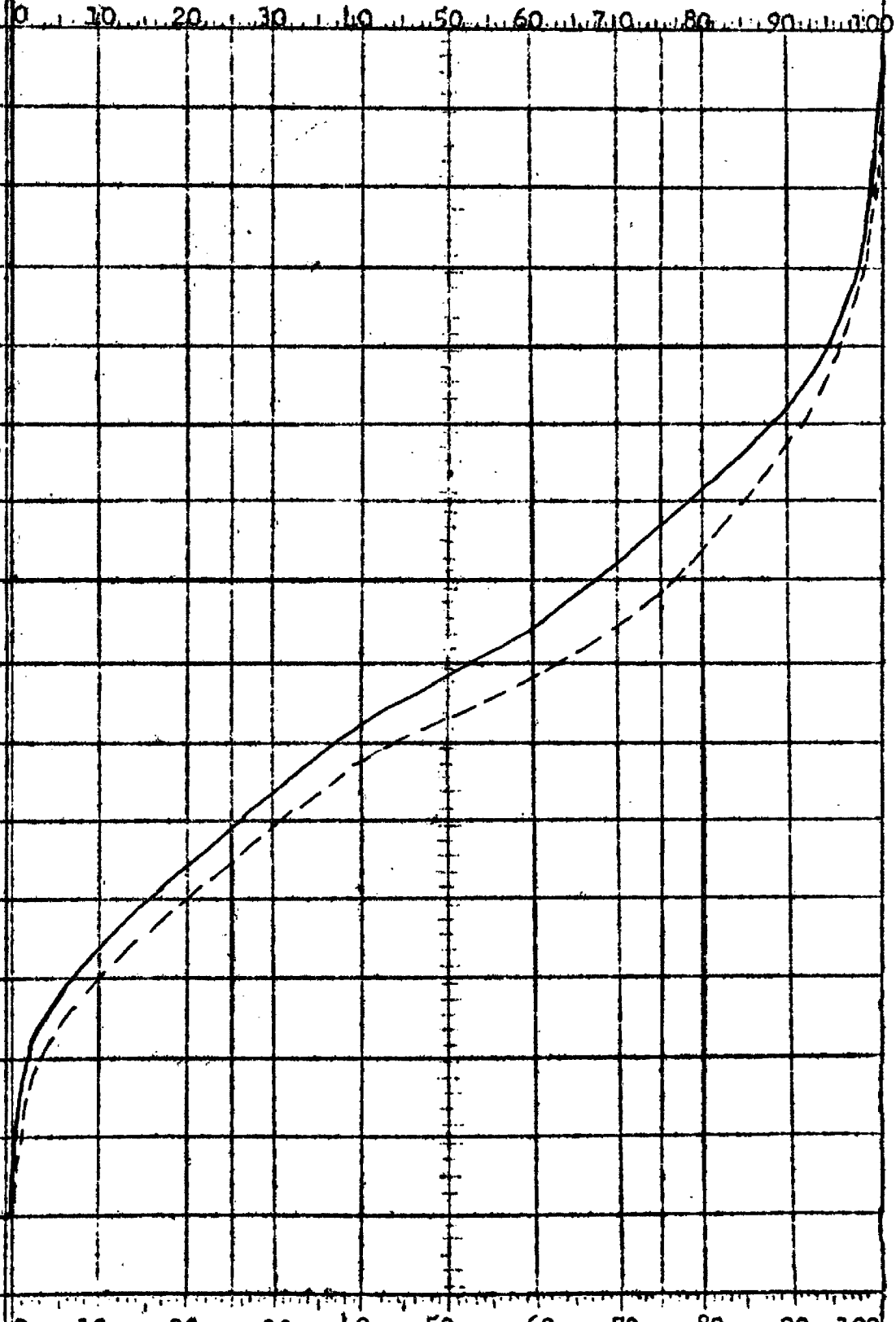

Table X ALGEBRA TEST DATA, RURAL AND URBAN SCHOOLS IN MISSOULA COUNTY, 1951-54.

School	No. Pupils	Median Score	Q Score	Mean Score	σ_M	σ
Urban						
A	132	50.71	9.83	50.38	1.25	14.41
B	152	56.52	7.24	55.79	1.03	12.69
C	89	59.81	9.01	60.31	1.33	12.56
D	130	55.44	8.20	54.66	1.04	11.82
E	90	53.33	11.45	51.83	1.49	14.13
F	114	52.92	10.29	52.89	1.30	13.83
G	197	55.87	9.69	55.60	.97	13.64
H	99	46.96	7.69	47.00	1.37	13.60
I	81	50.78	9.20	51.39	1.36	12.25
J	176	54.07	8.31	55.12	.79	10.52
K	107	59.50	8.90	58.44	1.29	13.35
Rural						
A	86	58.21	8.80	59.25	1.33	12.76
B	44	51.5	10.75	49.32	1.96	12.97
C	28	51.43	8.54	52.32	2.78	14.73
All Other Rural Schools	77	50.19	7.53	50.82	1.37	12.00

school "A" had the highest mean score of the rural schools which was 59.25 points. A pictorial illustration of each school's standing is shown in Figure 12. The black vertical

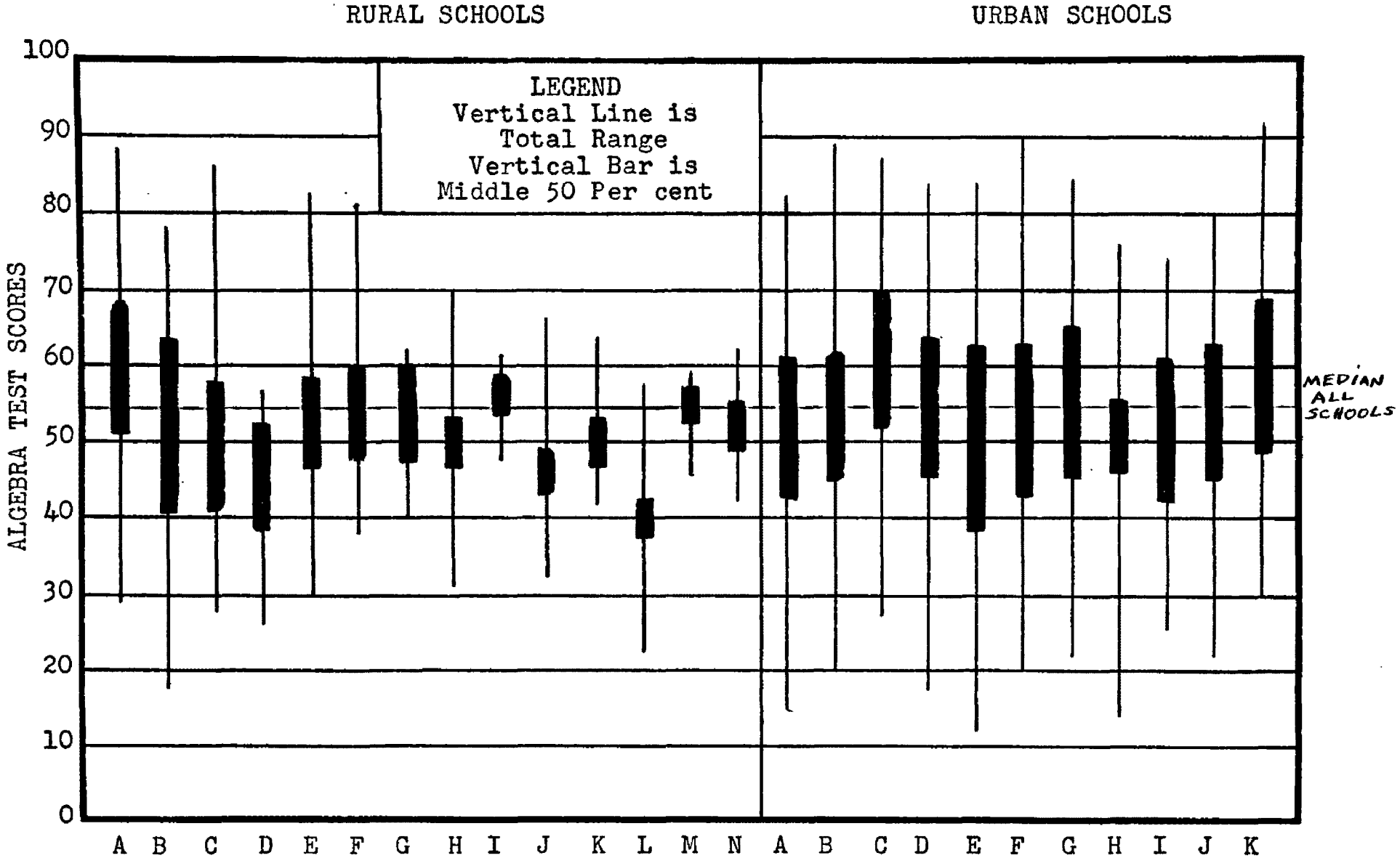

Figure 12. COMPARISON OF SCORES MADE BY ALL SCHOOLS ON THE IOWA ALGEBRA APTITUDE TEST

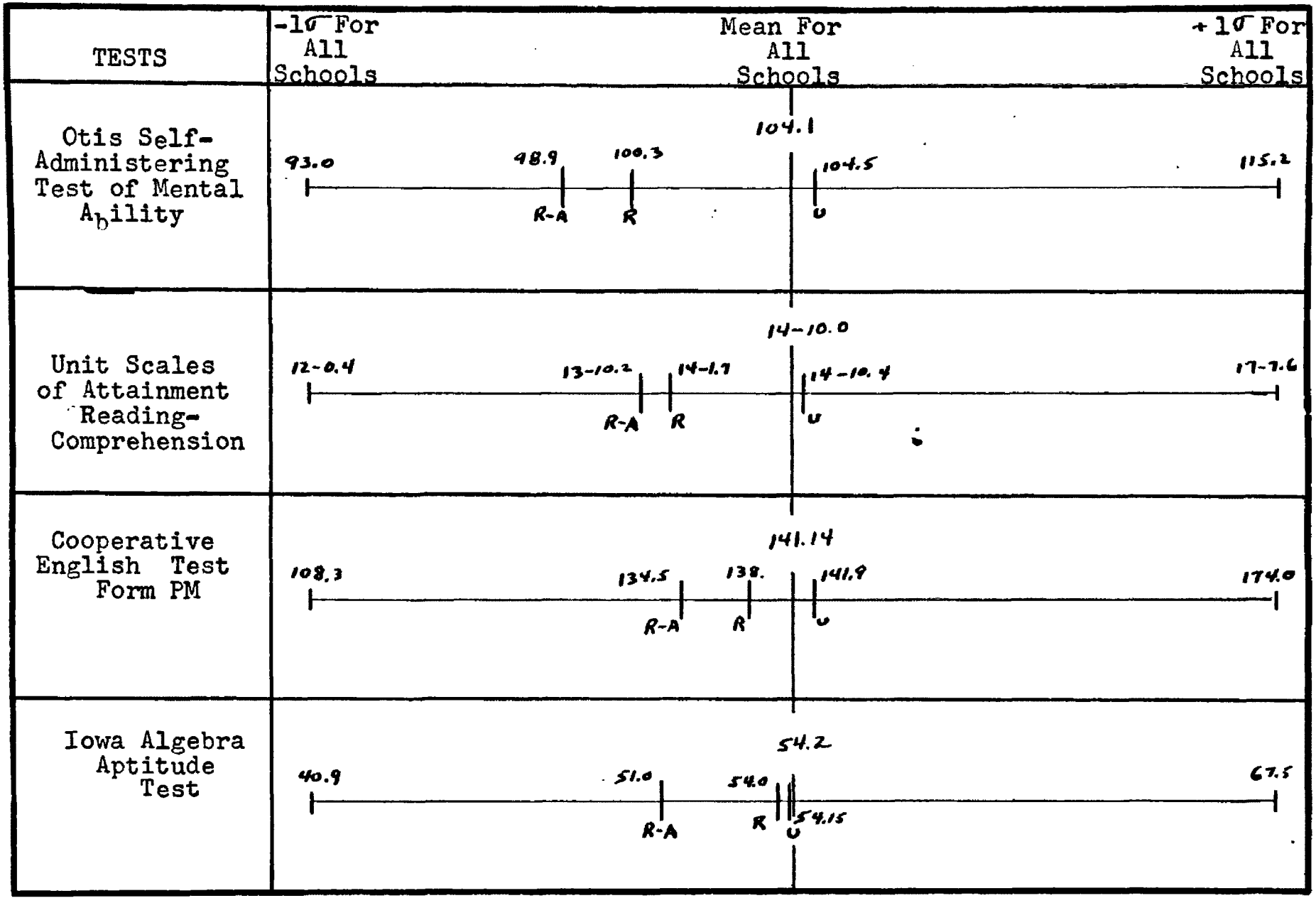

Figure 13. RELATIONSHIP OF THE MEAN SCORE FOR ALL SCHOOLS WITH THE MEAN SCORES OF ALL URBAN SCHOOLS, OF ALL RURAL SCHOOLS, AND OF ALL RURAL SCHOOLS MINUS RURAL SCHOOL "A", AS OBTAINED FROM VARIOUS TESTS.

line for each school is its total range of test scores. The vertical bar is the middle fifty per cent of scores for each school. The brown horizontal line represents the median for all schools.

The mean scores for all of the schools on each of the tests, Otis Self-Administering Test of Mental Ability, Unit Scales of Attainment: Reading Comprehension, Cooperative English Test: Form PM, and the Iowa Algebra Aptitude Test, are illustrated by the broken, vertical, brown line on Figure 13. The mean scores as established by these tests for the different groups, urban, all rural, and all rural minus rural school "A", are shown by the short, black, vertical lines on Figure 13. As elucidated by this graph, the rural children's achievement on these tests was probably greater in relation to their mental ability than the achievement of the urban children in relation to their mental ability.

Achievement Test Data. The material from the achievement tests are presented first by subject fields, referred to as subtests. These subtests are Paragraph Meaning, Spelling, Arithmetic Reasoning, Arithmetic Computation, Language, and Science. Secondly, the composite median achievement test scores of each school is represented and discussed. All scores are given in terms of grade equivalents. Again it is necessary to keep the schools' anonymous, and to use a code letter for each school.

Reference to Figure 14 shows the median grade equivalent of each school for the Paragraph Meaning subtest. The horizontal brown line represents the median grade equivalent for all schools. The all school median grade equivalent was 8-8, meaning eight-tenths of the school year of the eighth grade. The two horizontal blue lines represents the median scores of the urban group and the rural gourp. The median grade equivalent for all urban schools was 9-6 meaning six-tenths of the school year of the ninth grade. Urban school "C" had a high median grade equivalent of 10-6 and urban school "H" had the lowest grade equivalent of 8-6 for all of the urban schools. Rural school "B" had the highest median grade equivalent of the rural schools with a score of 9-1. Rural school "E" had the lowest median grade equivalent of 7-8 for all of the schools.

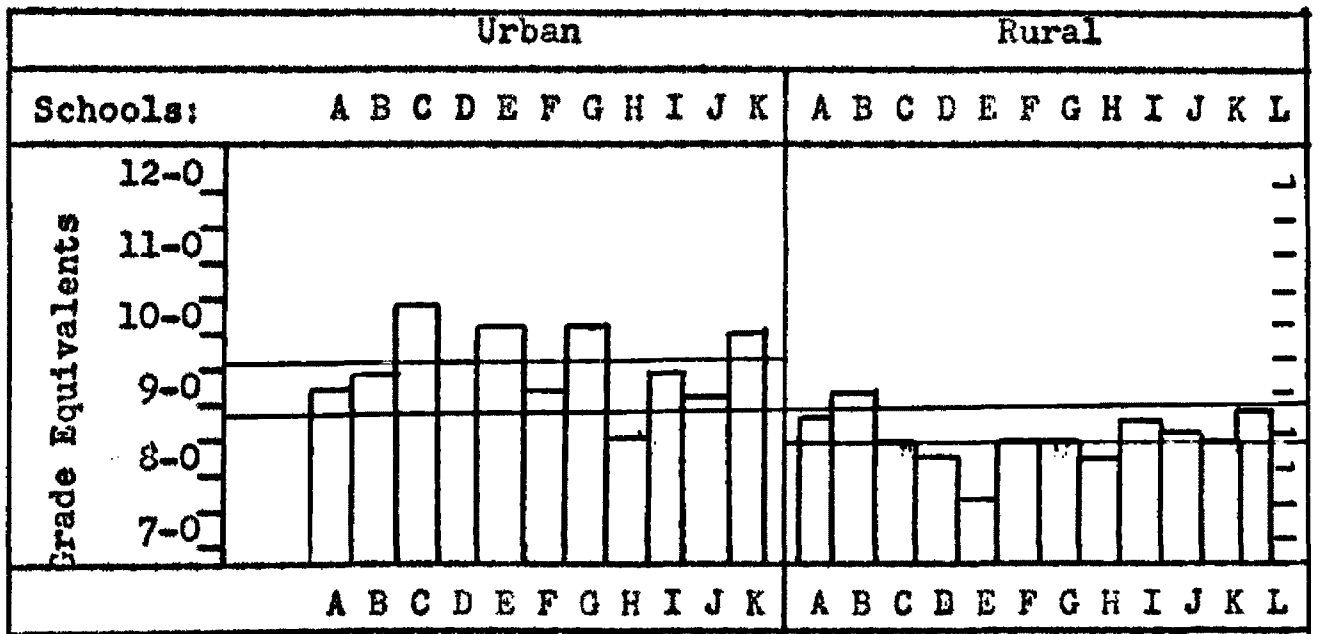

Figure 14 COMPARISON OF MEDIAN ACHIEVEMENT, GRADE EQUIVALENTS IN PARAGRAPH-MEANING ACCORDING TO SCHOOLS

When comparing the median grade equivalent of all urban

schools with the median grade equivalent of all rural schools it was found that the urban schools exceeded the rural schools by 1.2 school years. This corresponds with the difference of 12.1 months as shown by the data of the Unit Scales of Attainment: Reading, Comprehension.

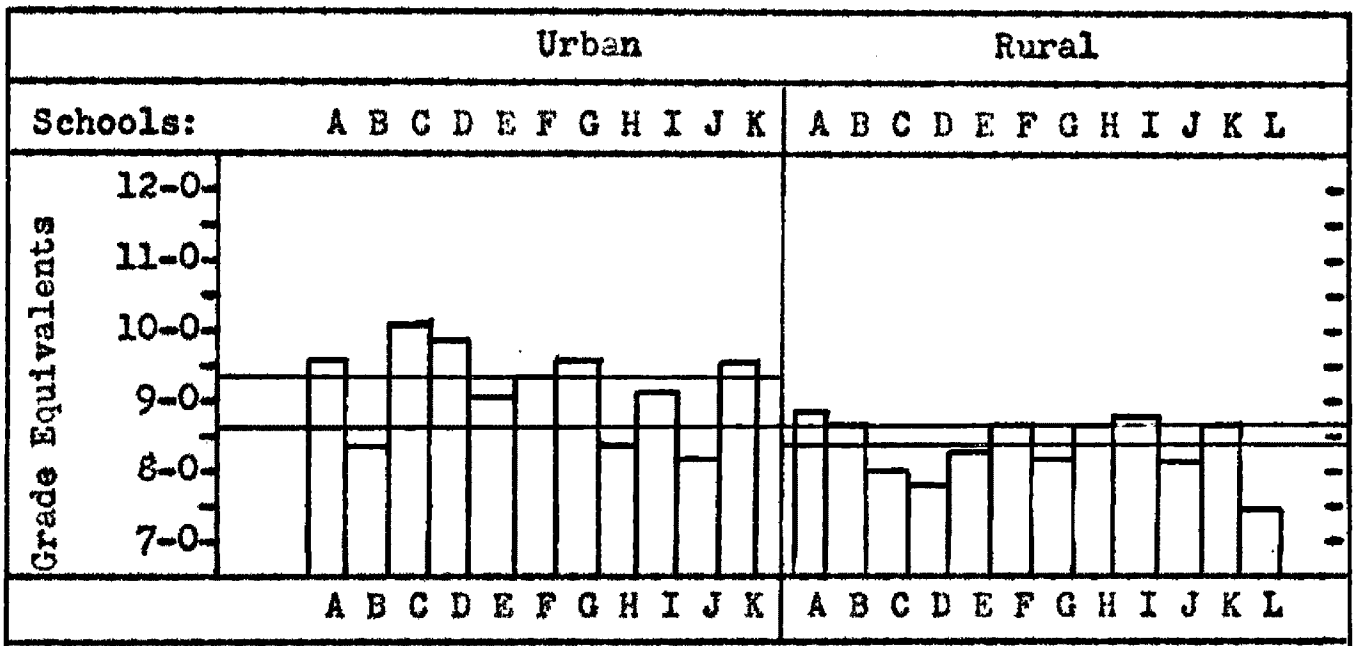

Figure 15. COMPARISON OF ACHIEVEMENT BY MEDIAN GRADE EQUIVALENTS IN SPELLING ACCORDING TO SCHOOLS

Figure 15 gives a comparative picture of the median grade equivalent for eighth grade pupils of each school for four years on the Spelling subtest. The median grade equivalent of 8-6 for all schools is represented by the brown horizontal line on the diagram. The median grade equivalent of all urban schools, which was 9-3, is represented by the horizontal blue line on the left half of Figure 15. All rural schools had a median grade equivalent of 8-4; this median is represented by the horizontal blue

line on the right half of Figure 15. The difference in the median grade equivalents of the two groups, favored the urban group by .9 of a school year. The importance of this difference depends upon the importance placed upon spelling. There are varying opinions as to the need of knowledge of correct spelling.

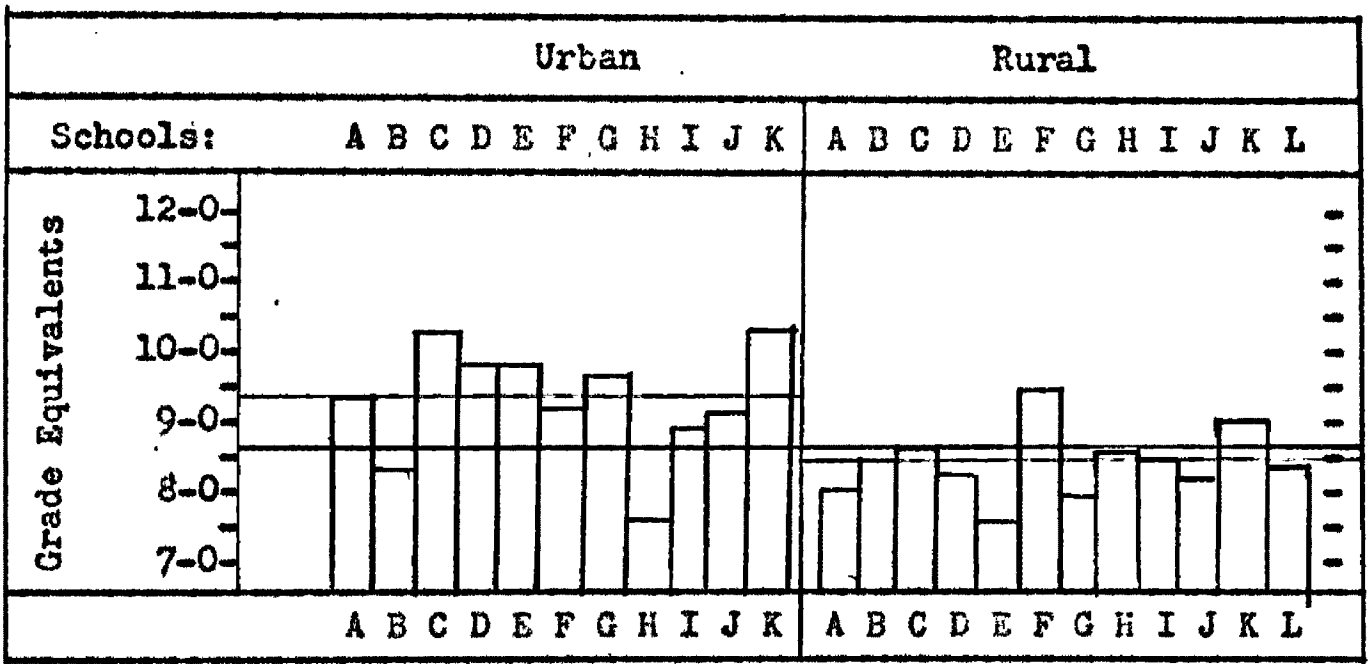

Figure 16. COMPARISON OF ACHIEVEMENT BY MEDIAN GRADE EQUIVALENTS IN ARITHMETIC REASONING ACCORDING TO SCHOOLS

Median grade equivalents for all schools in Arithmetic Reasoning are shown in Figure 16. The all school median grade equivalent was 8-6 as represented by the horizontal brown line in Figure 16. All urban schools had a median grade equivalent of 9-4; this is represented by the horizontal blue line on the left of the diagram. The median grade equivalent for all rural schools was 8-5. The horizontal blue line on the right of the diagram represents the median grade equivalent for all rural schools. When comparing the median grade equivalent of the urban

schools and the median grade equivalent of the rural schools, there was a difference of eight-tenths of a school year favoring the urban group.

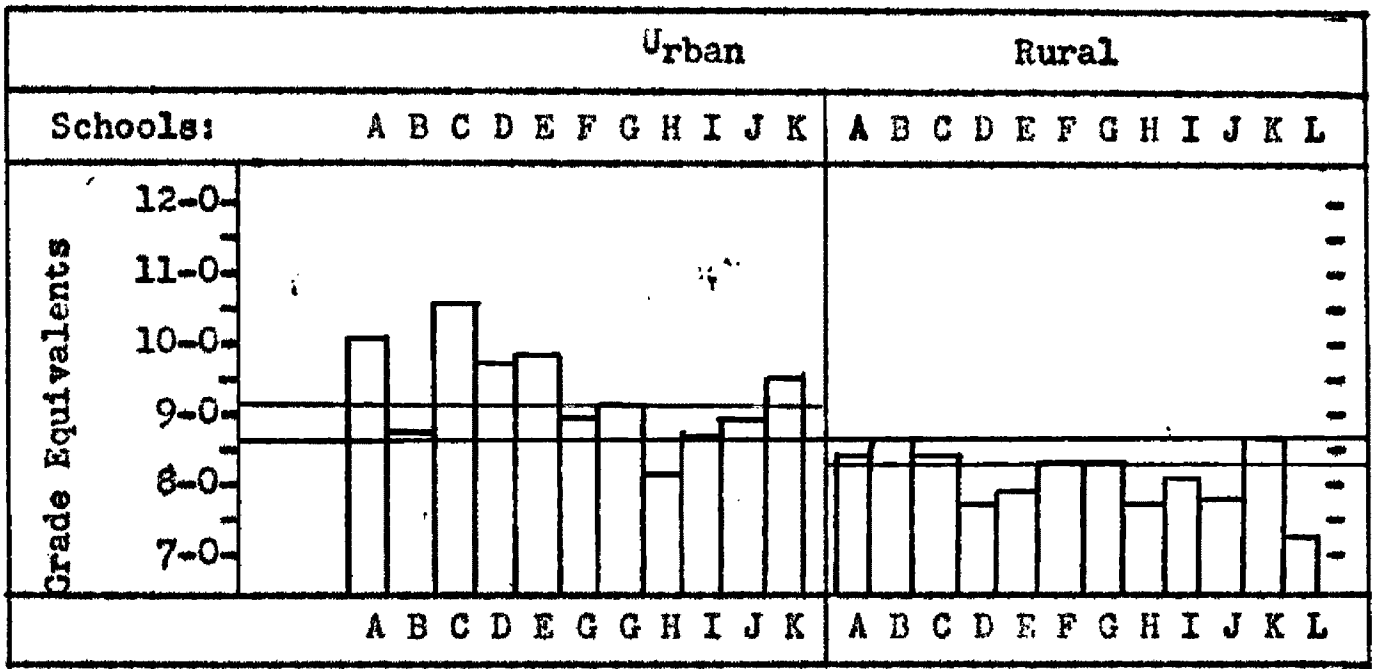

Figure 17. COMPARISON OF ACHIEVEMENT BY MEDIAN GRADE EQUIVALENTS IN ARITHMETIC COMPUTATION ACCORDING TO SCHOOLS

Figure 17 illustrates the median grade equivalents of all schools in Arithmetic Computation. The median grade equivalent for all schools was 8-6. The urban schools had a median grade equivalent of 9-1, while the median grade equivalent for all of the rural schools was 8-2. As indicated by Figure 17, there was a difference of .9 of a school year in Arithmetic Computation between the two groups favoring the urban group.

Although the Iowa Algebra Aptitude Test showed no significant difference between the rural and urban students, the Arithmetic Computation and Arithmetic Reasoning subtests of the achievement tests indicate that there may have been a real

difference favoring the urban pupils.

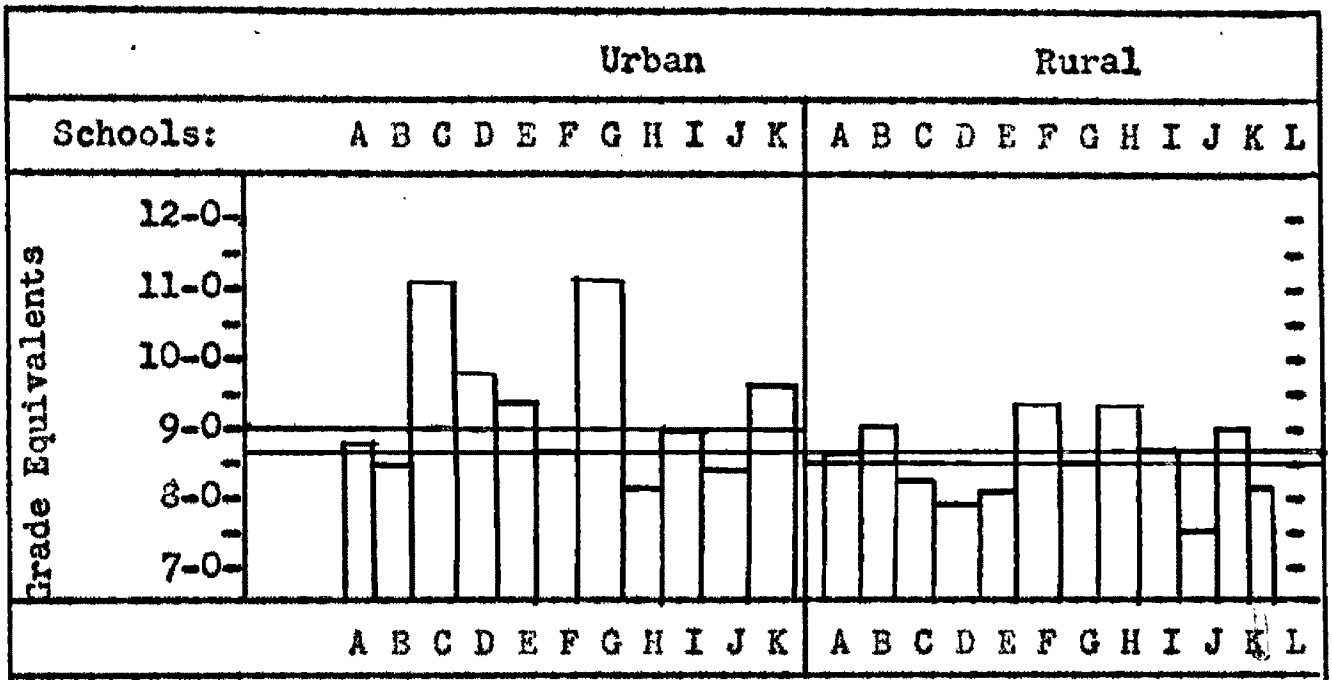

Figure 18. COMPARISON OF ACHIEVEMENT BY MEDIAN GRADE EQUIVALENT IN LANGUAGE ACCORDING TO SCHOOLS

As illustrated by Figure 18, comparison of Language subtest median grade equivalents of all the schools concerned can be made. The median grade equivalent for all schools was 8-7. The median grade equivalent for all urban schools was 9-0, and the median grade equivalent for all rural schools was 8-6. The difference of the median grade equivalents of the two groups was .4 of a school year favoring the urban group. This small difference corresponds to the small, and probably not significant, difference of the two groups on the Cooperative English Test.

Figure 19 illustrates the median grade equivalent for each school for the Science subtest. The median grade equivalent for all schools was 9-0. All urban schools had a median

grade equivalent of 10-3. The rural schools had a median grade equivalent of 8-6. The difference of the urban schools and the rural schools was 1-7, one and seven-tenths school years, favoring the urban schools. Although this difference was quite large, the rural schools median grade equivalent was comparable to national norms.

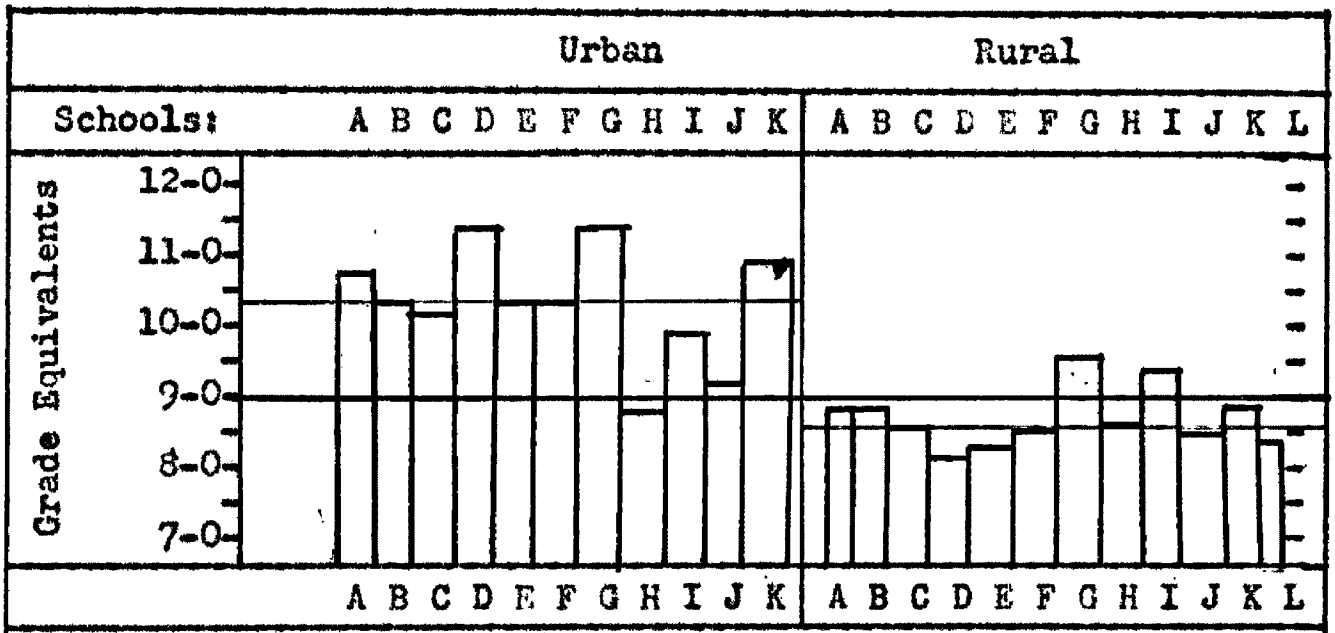

Figure 19. COMPARISON OF ACHIEVEMENT BY MEDIAN GRADE EQUIVALENT IN SCIENCE ACCORDING TO SCHOOLS

Median grade equivalents for the schools of the composite of all the subtests of the achievement tests are shown in Figure 20. The composite grade equivalent for all of the schools was 8-7.

The composite median grade equivalent for all urban schools was 9-3. The rural schools had a composite median grade equivalent of 8-5. The difference of the rural and urban

groups was .8 of a school year.

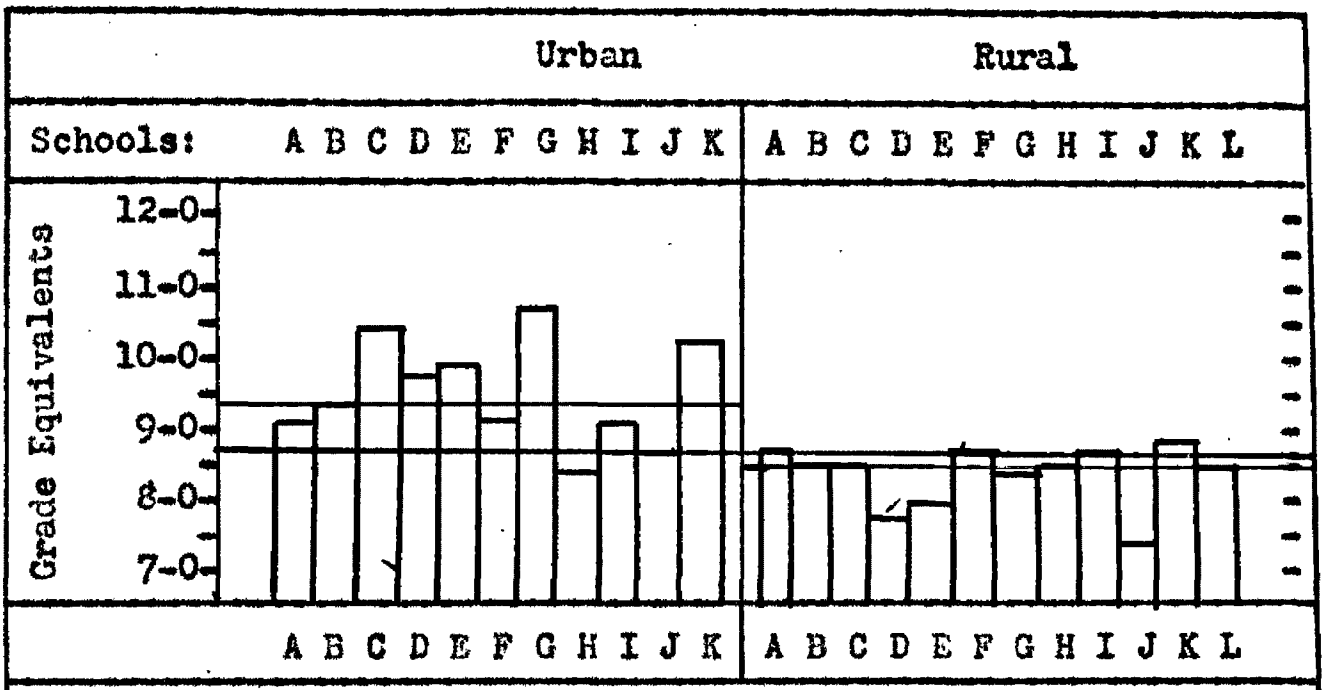

Figure 20. COMPARISON OF COMPOSITE ACHIEVEMENT BY GRADE EQUIVALENTS ACCORDING TO SCHOOLS

Figure 21 is a composite picture of rural and urban median grade equivalents according to the subtests and total test achievement. As shown by this diagram the greatest difference favoring the urban group was in science, and the smallest difference favoring the urban group was in language.

Figure 22 shows the median scores obtained on the subtests of the achievement tests of the rural schools and of the urban schools, and their respective median scores obtained on the Otis Self-Administering Test of Mental Ability. The broken, vertical, brown line represents the median score for all of the schools on the Otis Self-Administering Test of Mental Ability.

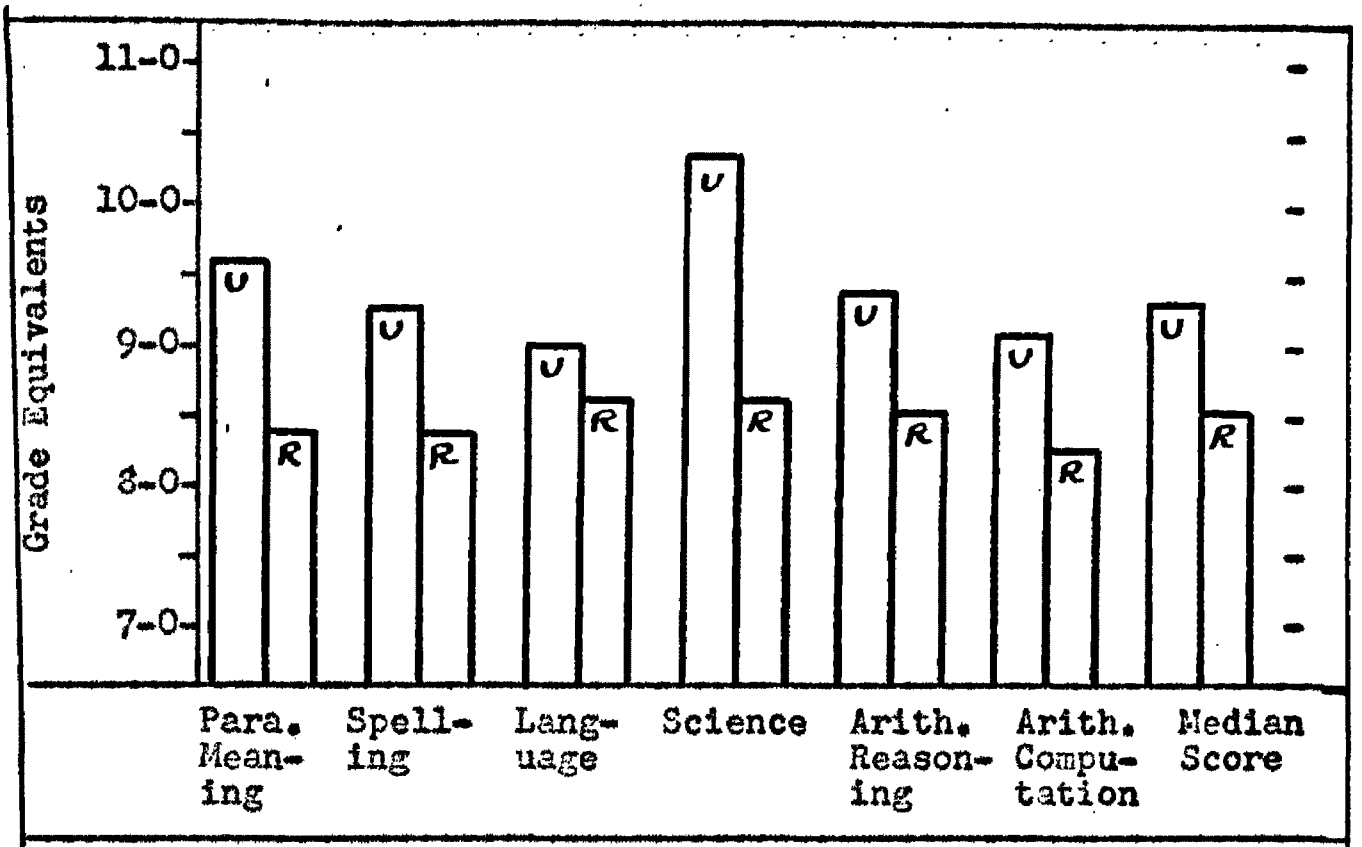

Figure 21. COMPARISON OF ACHIEVEMENT BY MEDIAN GRADE EQUIVALENT ACCORDING TO SUBTESTS AND TOTAL TEST ACHIEVEMENT URBAN-RURAL

on the Paragraph Meaning subtest, on the spelling subtest, on the Language subtest, on the Science subtest, on the Arithmetic Reasoning subtest, on the Arithmetic Computation subtest, and on the total of all the subtests of the achievement tests. The median scores made by the rural schools and by the urban schools is represented by the small, vertical, black lines on Figure 22. This graph illustrates that the rural pupils probably achieved more in relation to their mental ability on the subtests: Spelling, Language, Arithmetic, Reasoning, Arithmetic Computation, and on the total of the subtests than the urban children. The rural children achieved less in relation

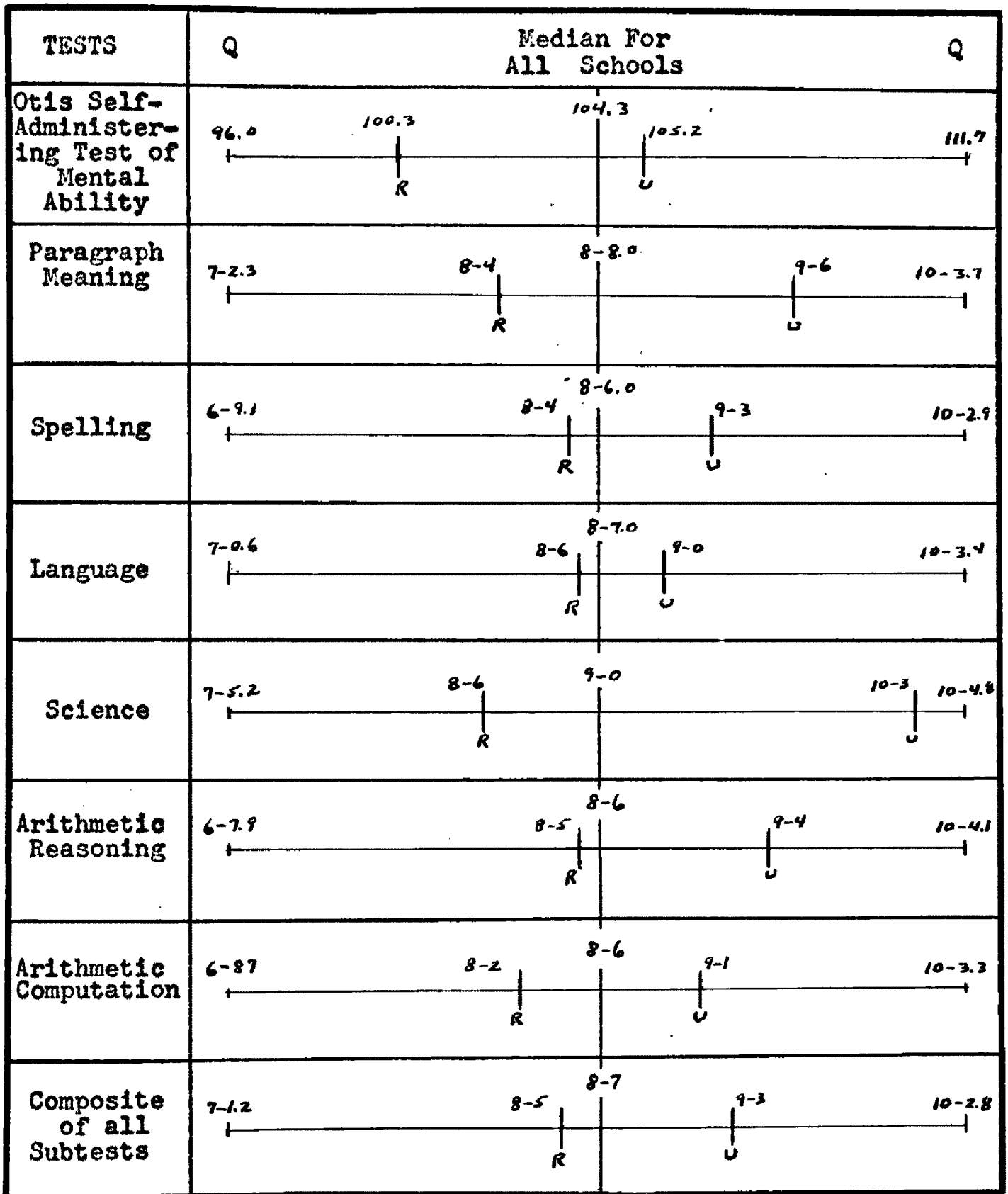

Figure 22. RELATIONSHIP OF THE MEDIAN SCORES OF THE VARIOUS SUBTESTS OF THE ACHIEVEMENT TESTS WITH THE MEDIAN SCORE OF THE OTIS SELF-ADMINISTERING TEST OF MENTAL ABILITY

to their mental ability on the subtests: Paragraph Meaning and Science than the urban children as illustrated on Figure 22.

One factor that many educators believe effects achievement test scores is chronological age. It is questionable as to what degree, if at all, chronological age may effect test scores. For the purpose of avoiding any possible misconceptions the median chronological age of all urban students was fourteen years, one month, and the median chronological age for all rural students was fourteen years, two months. The difference of the age medians for the two groups was so small that it was doubtful that it was an important factor.

Mental ability certainly plays an important part in pupils' achievement in basic skills, but it should not be the only factor considered. As to the degree of importance of mental ability upon achievement, Clark[27] stated:

> Numerous studies have shown the positive correlations of achievement of individuals in the basic skills with mental ability. The correlations, when corrected for normal range, are ordinarily in the vicinity of .70 which is properly interpreted to mean that fifty per cent (r^2=.49) of the variance, or common elements, is accounted for.... Having determined the typical effect of mental ability on achievement, one may then endeavor to determine what such other circumstances as effectiveness of teaching, assignment of content to the curriculum, and the like, may have added to or detracted from pupil success in attaining these basic skill objectives of education.

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[27] Willis W. Clark, "Evaluating School Achievement in Basic Skills in Relation to Mental Ability," Journal of Educational Research, 46:180, November, 1952.

The fact that one adolescent is inspired by a particular teacher, or bored by another, distracted by a love affair, or by parents who are having trouble, may all be highly important determiners of what he accomplishes. These are uncontrollable factors, but there are many controllable factors with which teachers and administrators should be concerned. Some of these will now be discussed.

PER-PUPIL COST

Educators are constantly asking for more money in order to supply pupils with better schools, better teaching devices, and better teachers. Do new schools, up-to-date teaching devices and better trained teachers assist a pupil in achievement? The general assumption is yes; all of these do help. Today, in many schools, special supervisors and specialized personnel are on hand to care for a child's every need. Do these speciality people help the student to become better adjusted to himself and his society, or become a better citizen? It is assumed that they do help. If a student is well adjusted to his surroundings, will he be able to achieve more in basic skills? It is reasonable to believe that adjustment and achievement are related. If special training and assistance with specialized education is necessary to enrich children's general education, then higher educational expenditures are necessary.

Mort[28] agrees by stating:

> Every empirical study of the relationship between expenditure level and quality of education adds its bit to the presumption that the cost-quality relationship is strong. Studies of the relationship in acceptable organized districts suggest schools that spend more contribute more tothe lifelong personal happiness of their charges and to the social and economic strength of Americans as a people. The more limited studies of the relationship in outmoded small districts suggest the same conclusions.

Copies of the general fund budget for each school district involved in this study were procured for the four year period covered by this study. All urban schools were included in School District No. 1. The rural schools were in School District Numbers 3,4,5,7,11,14,18,20,23,30,32,33, and 34. Table XI gives the four year period average cost per pupil based upon the ANB and the general fund budget for each school district. The school districts containing the rural schools are designated by the letters assigned each respective rural school; the district containing all of the urban schools is designated by its number.

According to Table XI the urban school district has a lower per pupil cost than most of the other districts. This is very understandable because operational costs and administrative costs are cheaper on a large scale. This illustrates one reason for the consolidation of schools and school

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[28] Paul R. Mort, Problems and Issues in Public School Finance, (R. L. Johns and E. L. Morphet ed., New York: National Conference of Professors of Educational Administration, 1952), p. 52.

Table XI PER-PUPIL COST AND MEDIAN SCORES ON VARIOUS TESTS

School	Per-Pupil Cost	Otis Self-Administering Test of Mental Ability: I.Q.	Cooperative English Test Scores	Unit Scales of Attainment Reading Comprehensions Reading Age	Iowa Algebra Aptitude Test Scores	Composite Achievement Test Scores: Grade Levels
1 (Urban)	$264.19	105.22	140.53	14-10.3	54.38	9-3
All Rural Rural Schools		100.32	138.38	14-3.6	53.24	8-5
A	287.31	101.67	144.67	14-9.2	58.21	8-7
B	295.93	97.0	132.00	13-8.0	51.5	8-6
C	270.38	97.5	131.67	14-3.0	51.43	8-5
D & L	268.08	96.32	123.43	13-7.2	44.64	8-2
E & M	259.22	98.86	141.94	13-5.4	54.59	8-4
F	288.50	100.15	136.47	13-10.4	54.21	8-6
G	376.21	98.7	147.3	14-10.0	54.17	8-4
H	480.29	101.2	135.28	13-3.4	49.72	8-5
I	447.19	108.78	153.63	15-1.8	57.2	8-6
J	304.79	94.1	119.85	12-7.6	47.25	7-6
K	356.50	107.89	137.57	14-2.0	49.13	8-7
N	317.40	102.1	138.67	14-3.8	52.32	8-5

districts. The cost per-pupil, according to this study, appears to have had little or no effect upon median test scores. Although per-pupil costs are higher for rural than for urban in Missoula County, this is not true everywhere. Kolb and Brunner[29] state that: "Per-pupil cost of school operations in rural America in 1947-48 was $128, and in cities $199." Another point to be kept in mind is that if a teacher is paid $3,000.00 and has two pupils in her class, this does not mean each pupil is receiving $1,500.00 worth of education. Possibly per-pupil cost in rural school areas should double or triple in order to have facilities equal to urban schools.

TEACHERS

It has often been said "Children learn in spite of the teacher." This statement may be true, but how much do they learn and how well do they learn? Some school boards may hire teachers not by qualifications but by the salary the teachers will accept. One school in this study paid a teacher an annual salary of $1,700.00. For the amount of time required of the teacher, this salary would hardly be appropriate for a baby-sitter. Some schools do not want teachers with more than two years of college training because the salary scale would be too high.

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[29] John H. Kolb and Edmund S. Brunner, A Study of Rural Society (Cambridge: Houghton-Mifflin, 1952), p. 314.

When comparing rural and urban teachers and the effect they have on a pupil's achievement, it must be realized that the data used for comparison are quite subjective. On the whole urban teachers had more training than rural teachers, but less experience. The average rural teacher was older than the average urban teacher. Many of the rural teachers lived in the rural areas because of their husbands' work. There was approximately one-third greater turnover of rural teachers than of urban teachers. A few of the rural teachers had retired from city school systems for one reason or another. According to Kolb and Brunner[30], "The inexperienced teachers and poorer teachers gravitate to the rural school."

Many people believe rural teachers have the advantage of knowing their pupils better and being able to provide more individual attention to the pupils therefore doing a more effective job of teaching. Tallman[31] disagrees with these people.

> How can the one-teacher rural school meet the competition of the multiple-teacher urban school? The defenders of the rural school often claim "more individual attention" is given the pupils then in graded or city schools. Undoubtedly the teachers in rural schools know their little flocks better than do teachers in departmentalized schools. That the rural teacher can give the pupils more individual attention seems unlikely in view of the fact the teacher in a graded school has only one age group demanding her attentions whereas the rural teacher has a number of children representing several age groups with their different assignments.

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[30] Kolb and Brunner, op. cit. p. 315.

[31] Russell W. Tallman, "Just More Money Won't Do It," American School Board Journal, 115; 25, October, 1947.

Actually teachers in rural schools should be better trained and demand more money than urban teachers. Urban teachers are generally specialized as to subject matter or grade. A rural teacher should have a general knowledge of all subjects. In a study conducted by McGuffey[32] forty-eight different topics were listed in which a rural teacher should receive training other than subject matter that would not be required of urban teachers. Rural teachers were expected to be mother, psychologist, nurse, in some cases janitor, lawyer, and even carpenter. With all her extra duties, a rural teacher is expected to teach most of the subjects that are required of eight urban teachers. Kreitlow[33] describes a rural school and teacher by saying:

> Midwestern one-room schools are much the same as they were when most of us were children. A busy teacher in her early thirties, with two years of college training and ten years of teaching experience, is matching wits with twenty lively boys and girls from six to sixteen years of age.

Are city teachers taking advantage of all of the facilities at hand? Are the urban pupils achieving as much as they should with so many advantages? Tallman[34] does not believe that urban teachers are doing the teaching job that they should.

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32 Verne McGuffey, Differences in the Activities of Teachers in Rural One-Teacher Schools and of Grade Teachers in Cities. (Teachers College Contributions to Education, No. 346, New York: Teachers College, Columbia University, 1929), p.64.

33 Burton W. Kreitlow, "Do Rural Teachers Take Time To Think About Objectives?" Elementary School Journal, 5:280, January, 1952.

34 Tallman, op. cit. p. 25.

One cannot account for the comparatively favorable results obtained by rural teachers on the basis of their training since they do not as a group rate as high professionally as urban teachers, and actually many of the most successful gravitate to the city schools.

SCHOOL AND COMMUNITY

A factor that was not considered in many comparative studies of achievement was the school plant and its surroundings. If the physical aspects of a school have no influence on pupil growth and adjustment, taxpayers are throwing away millions upon millions of dollars every year.

Most of the school buildings in School District No. 1 were in very good condition. They were on the whole well lighted, well ventilated, and properly heated. Most of the buildings were bright and had a cheerful appearance. The grounds surrounding the buildings may not have been as large as recommended, but they were fairly well equipped with playground equipment. Each school had a gymnasium. Although these schools were overcrowded, measures were being taken to relieve the situation.

The urban schools were located near and in Missoula, Montana. A large public library is easily available for all pupils. Plays, concerts, theatres, and park facilities are near for all to appreciate. Schools are close enough to each other for a limited amount of interscholastic activity.

Rural pupils on the whole were not as fortunate as the urban pupils when considering the school plant. A few of the

rural school buildings were comparable to the older school buildings in the City of Missoula. Only two of the rural schools had gymnasiums. The heating systems in some of the schools were inadequate, and lighting was poor. Most of the rural schools had a drab appearance. The atmosphere of some rural schools was depressing. Many of the schools were lacking proper playground equipment and space. The grounds surrounding the schools were rough, dusty in dry weather, and muddy in wet weather. A few of the schools were poorly equipped with teaching aids. Like most of the city schools, the rural schools were also overcrowded.

Most of the rural schools were located in small villages or settlements. In order for the rural pupils to see a play or hear a concert they had to commute to the City of Missoula. Library service was available through the County Library Extension Service, but this was limited in most cases. Rural children did have the facilities of the wide open spaces, they could ride horseback, go swimming in a nearby creek or river, and learn to shoot a gun at an early age.

Transportation was a problem for the rural student. In many cases he was transported to and from school by bus. If he wished to play with other children he had to walk for miles or encroach upon uncooperative parents or friends for a ride. When the rural students entered high school, sometimes they had to ride a bus for an hour going to school, and an hour going home again. A few rural students were forced to leave home

and move into the city in order to attend high school. Many times the rural students had chores to do upon arrival at home, limiting his time for play and study.

Rural people had a tendency of moving more often from one area to another than urban folk. Many of these moves were made during the school year. A study of rural schools in Connecticut showed that 34.7 per cent of the total registration in one-room schools transfered to or from other schools during the year, while in consolidated schools the transfers were 18.3 per cent of the total registration[35].

When considering the obstacles that confront rural pupils it was more understandable why they may seem more independent than the urban students. Through necessity the rural teacher had to plan the day's work so as to keep the rest of the children studying while she works with the others. Consequently, rural pupils may have learned to work more independently. In large classes students may feel less responsibility for the entire lesson. Urban students, on the other hand, were used to competing with large groups, whereas many rural students were competing with small groups of two, three or possibly ten. School attendance of urban pupils was more regular than that of rural pupils. Bad winter weather may have kept some rural pupils

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35 Emil Leonard Larson, One-Room and Consolidated Schools of Connecticut. (Teachers College Contributions to Education No. 182. New York: Teachers College, Columbia University, 1925), p. 55.

out of school for three or four days at a time. In the spring and fall of the year a farm boy may have been kept home from school for a few days to assist with planting or harvesting. All in all, the rural child did not have as much time to devote to school and school activities as the urban child.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to compare the achievement of rural eighth grade graduates with urban eighth grade graduates, and to relate this achievement to intelligence, cost per pupil, qualifications of teachers and physical plant conditions in the two groups of schools. All of the schools that participated in this study lie within the area served by Missoula County High School. Twenty-five schools participated in all; the eleven schools in Missoula County School District No. 1 were classified as urban schools, and all of the other schools were classified as rural. The testing program was for a four year period, from 1951 to 1954, and test results were obtained for 1635 pupils. Test used for comparing the rural pupils and the urban were the Otis Self-Administering Test of Mental Ability, Cooperative English Test, Iowa Algebra Aptitude Test, Unit Scales of Attainment: Reading-Comprehension, Stanford Achievement Test, and the Coordinated Scales of Attainment.

Both the difference in means and the difference in medians of all the tests except the two achievement tests were compared. The median scores by schools were used for comparison on the achievement tests.

The mean scores obtained from the Otis Self-Administering Test of Mental Ability indicate that the mean intelligence quotient of urban pupils exceeded that of the rural pupils by

4.16. This difference in means was a significant difference because the critical ratio was 5.16. All urban pupils had a mean score of 104.47, and the mean score for all rural pupils was 100.31.

The paragraph-meaning subtest of the achievement tests and the Unit Scales of Attainment: Reading-Comprehension both show that the urban students were about nine-tenths of a school year more advanced than the rural children. The mean score on Reading-Comprehension favored the urban children by .87 of a school year. The median score on the paragraph-meaning subtest favored the urban students by 1.01 of a school year.

In English and language the urban pupils may also hold a slight edge over rural pupils. By comparing mean scores of the English Cooperative Test, the urban students excelled by a difference of 3.92, which was not of considered significance. The language subtest shows a difference of median scores of four-tenths of a school year favoring the urban students.

The difference of 3.06 on the Algebra Aptitude Test again favoring the urban pupils was found not to be significant. As indicated by the median scores on the subtests: arithmetic computation and arithmetic reasoning, the urban pupils held an advantage of eight-tenths of a school year in each case. The largest difference of median scores was in science. The urban pupils held an advantage of one and seven-tenths of a school year with a median score of 10-3 years. The rural pupils

had a median score of 8-7 years.

Rural per-pupil cost, based upon the general fund budgets of the school districts involved and ANB, was slightly higher than the per-pupil cost of city children. Teachers' salaries were low in the rural schools, and rural teachers had less training than urban teachers. The average rural teacher was older and had more teaching experience than the urban teacher. Rural teachers had fewer teaching aids, and the rural schools were not as well equipped. More was required of the rural teacher in matters other than teaching than was required of the urban teacher. Rural pupils had fewer educational and cultural facilities at hand than the urban pupils.

CONCLUSIONS

The conclusions of this study were that, on the average, the urban children had significantly greater mental ability than the rural children. There was a significant difference in reading ability favoring the urban children, but the rural children were achieving more in comparison to their mental ability than the urban children as illustrated by Figure 13, page 52. According to the English test scores the urban children again exceeded the rural children, but the difference was not significant. Also on the English test, the rural children showed greater achievement with comparison to their mental ability than the urban children according to Figure 13.

On the Algebra test the urban pupils had a higher mean than the rural pupils but the difference was not significant. The urban pupils did not achieve as well in relation to their mental ability as did the rural children, as shown by Figure 13.

The urban pupils surpassed the rural children on all of the subtests of the achievement tests. In relation to mental ability, the rural children showed greater achievement than the urban children on the subtests: Spelling, Language, Arithmetic Reasoning, Arithmetic Computation and also on the total of the subtests of the achievement tests. The urban children exceeded the rural children on the Paragraph Meaning and the Science subtests in relationship to their respective mental abilities as illustrated by Figure 22, page 62.

As measured by the various tests used in this study, the rural children's achievement was lower than the urban children's achievement. When considering the intelligence factor, the rural children may have achieved more in relation to their mental ability than the urban children. The rural children on the whole had teachers with less training, but with more experience than the urban children. Regardless of the fact that the urban children had better school facilities and school plants than the rural children, the cost per-pupil was higher for the rural children.

RECOMMENDATIONS

There is a need of knowledge on the extent to which

commonly occurring variations in the student's environment affects the achievement of various outcomes. School faculties should thoroughly understand the psychological reactions of pupils who consistently fail to do good work. Teachers must have a better understanding of the developement in pupils of fears about their work and of the gradual formation by pupils of an apparent attitude of satisfaction with mediocre success. If a child's achievement may be improved even if his basic intelligence may not, might this not make him a more successful person?

If rural children are not to be deprived of their right to equality of educational opportunity in accordance with their abilities, it will mean that just as the modern urban school should have adequate equipment for a variety of instruction and for recreational acitivity, so the rural school should have corresponding equipment adapted to its needs. Qualifications of rural teachers should be raised and their pay should be at least equivalent to that of the urban teachers. In order to provide equal educational opportunities to all, it may be necessary to pool resources in order to compensate for uneven resources.

Urban schools may be failing to adjust their programs to an individual basis with each student carrying reasonable responsibility for using to good advantage the amount of time allotted to his studies. A suggestion that might apply to the

urban schools in this study was made by Tallman[36].

> If city schools will organize their instructional services in the upper grades on the basis of individual programs to which the children are committed, we shall see a wide disparsity between the educational achievement of the children of the typical city school and the typical rural school.

Secondary schools should recognize the fact that the students entering the school vary in training received, educational background, abilities, interests, and socio-economic backgrounds. Possibly studies comparing the high school success of students with varied socio-economic backgrounds may be helpful to teachers and administrators in understanding and assisting the students.

A study similar to this study on a state-wide scale may be helpful to all educators. The testing of rural pupils personality may be of assistence in the helping of the children to become adjusted to life in a relatively large high school. Finally, a scale or a chart should be prepared for all teachers for the purpose of identifying differences in achievement. Such a chart would facilitate a more adequate interpretation of standardized test data in the basic skills.

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