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REPORT
of
COMMITTEE ON EXAMINATION

This is to certify that we the undersigned, as a Committee of the Graduate School, have given Lester Wells Dooley final oral examination for the degree of Master of Arts. We recommend that the degree of Master of Arts be conferred upon the candidate.

Minneapolis, Minnesota

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REPORT
of
COMMITTEE ON THESIS

The undersigned, acting as a Committee of the Graduate School, have read the accompanying thesis submitted by Lester Wells Dooley for the degree of Master of Arts. They approve it as a thesis meeting the requirements of the Graduate School of the University of Minnesota, and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts.

Minneapolis, Minnesota

May 1917

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Minneapolis, Minnesota

May 1917

Chairman

The Improvement in Language Abilities of Elementary
School Children from the Third to Eighth Grade, Inclusive.

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A Thesis submitted to the

Faculty of the Graduate School of the

University of Minnesota

by

Lester Wells Dooley

In partial fulfillment of the requirements

for the degree of

Master of Arts in Education

June

1917

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Chapter I.

INTRODUCTION

1. The Problem.

This study was undertaken for the purpose of measuring the improvement in language abilities of elementary school children from the third to the eighth grade, inclusive. By language abilities, I mean the ability of pupils to comprehend the meaning of the words and sentences they read or hear and the ability to express their own thoughts and ideas, correctly and clearly, in spoken or written form. The problem then divides itself into the fields of reading, spelling, handwriting, composition, language and grammar.

I propose to answer the following questions as far as possible: What were the initial abilities in September, 1916? What were the scores in February, 1917? How much improvement was made? Was there improvement in every field? Were there variations in the language abilities of different grades of the same school? Of the same grades in different schools? Were there any sex differences in language abilities? What are the standards for the State of Minnesota?

2. The Method.

The initial abilities of over five thousand elementary school children, in twenty-six Minnesota schools, were determined by giving tests in reading, spelling, handwriting, composition, language and grammar in September, 1916. Comparative tests, of equal difficulty, were then given in February, 1917, to the same pupils in a part of these schools so that the data are expected to show the results of one semester's work by these pupils. The giving of the second set of tests was not obligatory upon the schools and, consequently, there were fewer schools taking the February tests than took them in September. However, the results of only those pupils who took both the September and February tests are used for the purpose of comparison in showing improvement.

Review of Literature.

In general, there is not much literature published showing improvement in language abilities. That such work is considered of great importance is evidenced by the numerous experiments being carried on all over the country and by the many efforts being made by schools to improve the conditions without actually measuring the improvement. These latter efforts, however, are of but little or no scientific value because they are merely expressions of personal opinions.

Typical of the latter type is that effort made by Supt. E. J. Llewelyn,¹ Mt. Vernon, Indiana, to improve the reading ability of his elementary school pupils. He discovered that the poorest reading in that city was done in the fourth, fifth and sixth grades. From an address, he got the idea that pupils in these grades begin to think more rapidly than they are able to articulate words; also that silent reading should be emphasized in these grades because adults read that way almost entirely. After four months experimenting, he concluded that "much more reading had been done and better done than under the old system." While he is probably justified in saying that more reading has been done, the latter part of his conclusion may be properly questioned as he uses no objective standards but bases his conclusion entirely upon subjective standards.

Of the other type, where efforts are made to improve conditions by use of objective standards, we have several experiments which are in striking contrast with Supt. Llewelyn's. One of these was conducted by W. L. Uhl in connection with a course in educational measurements at the Oshkosh Normal School during the summer of 1916. Mr. Uhl used the results in reading as bases upon which to plan remedial work for defects in reading but the experiment serves to show that rate and quality of reading may be improved through training. Soon after the opening of the summer school, Mr. Uhl gave the Kansas silent reading tests to all training school pupils of grades 3 to 8 inclusive. These were largely pupils either conditioned or retarded in their school work or who were beginning new grades. In order to assist in selecting those pupils who were in greatest need of attention, he gave individual tests with the Gray oral-reading scale, those pupils having the lowest scores in the Kelley tests being tested first.

1. Reading in Mt. Vernon City Schools. Elem. School Journal, Oct. 1916, p 123.
2. Use of Results of Reading Tests etc. " " " Dec. 1916, p 266

He then used these results as a basis for planning remedial work and made assignments to student-teachers for specific treatment of defects. Individual drill periods of fifteen minutes per day were used for each of the pupils showing marked defects. The drill was continued for a period of from two to three weeks.

At the end of the term all pupils in the school were given the Kelly tests for the second time, and all those trained individually, together with a random sampling of the others, were give the Gray oral-reading test for the second time. The following table shows the results for the first and second trials, the tests coming about four weeks apart:

	Grade	Standard	First Test Median	Second test Median
Kelly Tests	IV	9.9	4.2	7.7
	V	13.7	10.3	14.6
	VI	13.4	8.9	15.4
	VII	16.5	12.8	15.8
Gray Tests	VIII	18.8	17.8	25.1
	IV	47.0	31.0	37.5
	V	48.0	37.8	42.5
	VI	49.0	38.3	38.8
Tests	VII	47.0	37.5	41.3
	VIII	48.0	41.2	46.9

From these tables, Uhl concludes that ability to comprehend can be improved by training. He also shows by tables that those drilled individually made greater gains than those who were not given individual help even though they were the poorest readers in the school and were, presumably, not as bright as those who were not selected for the special drill.

An experiment to show improvement in the rate of reading extending over a period of six months was one made by Supt. K. D. Waldo¹ at Sycamore, Illinois. He used the first issue of Current Events, 1913-14, for the tests in grades five to eight inclusive and a story of Daniel Boone for grades three and four. An assignment was made and when all were at attention the signal was given to begin, and for five minutes there was no interruption of any kind while all were reading. When the signal to stop was given, each pupil checked the last word read and wrote his or her name on the paper. The children were then supplied with paper and were then asked to write a complete account of what they had just read. They were allowed all the time desired, except in a few cases where individuals wrote an unusual amount. After these papers were collected, a set of ten questions

1. Tests in Reading in Sycamore Schools. Elem. School Journal, Vol. 15, p 251.

covering the subject matter just read, was placed on the blackboard and the children were asked to answer them briefly. The attempts to reproduce an account of what was read, or the word tests, were recorded by counting the total number of words written. So there were two tests of reproduction, one for words reproduced in a narrative form and one graded by percentage on the answers to questions. Late in March, after nearly six months of school work, the second set of tests were given in the same manner. The upper grades were given an assignment in the same paper and the third and fourth grades an assignment in the story of Audobon. In the judgement of Mr. Waldo, the tests in both cases were of equal value but since they had never been standardized this equality is unknown and constitutes the weakest part of his experiment. The following table shows the per cent of increase in the reading rate, according to the experiment:

Grade	Fall rate	Spring rate	% of increase
3	76.4	149.1	95.2
4	92.7	163.3	76.1
5	113.0	129.2	14.3
6	128.0	130.1	1.2
7	122.7	142.8	16.4
8	147.2	158.9	8.0

One would expect to find an increase both in speed and reproduction from the lower to the higher grades. This increase is not shown here because of the difference in the material used in the tests. The figures show that the lower grades are very important in the development of reading, for there were made the greatest gains. The third and fourth grades nearly doubled their reading rates from September to March. In careful reading, the rate increases but slowly after the fifth grade.

From these studies made by Mr. Uhl and Mr. Waldo, it can be concluded that both rate and quality of silent reading may be improved by training.

Under the direction of W. S. Gray, eleven cities of northern Illinois carried on a comparative study of reading. Mr. Gray uses the results of this study in a report wherein he compares the average rates of silent reading for 1,831 pupils of Cleveland, for 8,928 pupils of St. Louis, for 2,654 pupils of thirteen cities of the central States and for the 1,983 pupils of the eleven cities of northern Illinois. He illustrates the progress in a diagram and since three selections were used in the silent reading tests, two readjustments were necessary.
1. A Co-Operative Study of Reading. Elem. School Journal, Vol. 17, p 250.
2. Relation of Silent Reading to Economy in Eduo. 17th Yearbook, p 26.

in the diagram. The points of these are between the 3rd and 4th grades and between the 6th and 7th grades. The figure shows that progress in rate of silent reading is most rapid during the 2nd, 3rd and 4th grades. Progress continues in the upper grades of the elementary school, although this is not marked beyond the 6th grade. Gray, therefore, concludes that "rate of silent reading increases rapidly during the lower grades and approximates a maximum in the upper grades." He adds: "Since silent reading is the chief means by which the pupil secures ideas for himself during the intermediate grades, it stands to reason that the school which attains a relatively rapid rate in the lower grades, will have a distinct advantage, other things being equal, over the schools which do not attain an equal rate until the 6th or 7th grades. Economy in education demands, therefore, that effective habits of silent reading be acquired as early in life as possible."

In this same report, Mr. Gray presents a figure (4) which shows the average quality scores in silent reading for 8,928 pupils of St. Louis, for 1,831 pupils of Cleveland, and for 2,654 pupils of thirteen cities. In this figure, he also made the necessary readjustments to account for the difference in the reading test. His figure shows that progress in ability to secure meaning from the printed page is made throughout the grades, that the progress is less marked in the lower grades and more marked in the upper grades. Rapid improvement in quality of silent reading at the outset is due to the fact that pupils rapidly acquire skill in using reading as a tool for securing ideas. Habits of attention are developed and methods of study are refined. During the intermediate and grammar grades, a pupil reads widely and with a purpose. The result is his world of meanings is greatly enlarged. The figure also shows that pupils of different cities vary widely on the average in their ability to comprehend what they read. These variations may be due to a number of factors, one of which is that different schools place emphasis upon certain phases of instruction. Some emphasize the mechanical phases at the sacrifice of an intelligent grasp of the meaning; others reverse the emphasis. The result is that pupils differ widely in their ability to secure the meaning of what they read. Economy in education demands that the relative importance of various phases of instruction should be carefully considered and that emphasis should be placed where most needed.

That Korean students are not as capable as American pupils is a fact shown by an experiment made on Korean pupils at Songdo, Korea, by Alfred W. Wasson.¹ He translated the Kelly tests for grades 3, 4, and 5 into Korean and gave them to students in the first and second years of the Kodung grade of the Anglo Korean School, Songdo. Pupils of the first year of the Kodung grade are spending their fifth year in school. Proper substitution of names of articles or persons were made and each pupil was then given five minutes to read and answer the questions. The Median scores were 3.8 and 5.2 which were far below the Kansas standard, but shows improvement from grade to grade. Reasons for the striking differences are the difference in language--no juvenile literature in Korean--and the excessive use of the lecture method of teaching in Korea.

All of these experiments are closely related to each other and to my own study in that they are definite attempts to measure objectively the reading ability of elementary school pupils and to show their improvement. Like my study, these experiments show that ability to comprehend the meaning of what is read improves from grade to grade and that pupils in different cities vary widely in their ability to comprehend. I found this variation to be greatest in the third grade and to become less as we advanced through the grades. This was probably true of the other experiments but the figures did not show the fact. Mr. Gray also showed the facts for rate of reading, something which my study makes no attempt to discover.

In the field of Spelling, there have been several important studies made for the purpose of measuring spelling ability and for improving methods of teaching spelling. Among these are the studies by Rice, Cornman, Wallin, Pearson, Buckingham and Ayres. Dr. Rice tested the pupils from the fourth to eighth grade in 21 school systems using column, sentence and composition tests. Dr. Cornman used the same tests at Philadelphia and in addition "lists of spontaneously selected words--the maximum number that could be written in 15 minutes by pupils from the 3rd to the 8th grade inclusive". Table XXI, found on page 88 of Cornman's study,² shows the results of the column, sentence and composition tests of the Northwest School, 1898, in comparison with those obtained by Dr. Rice with the same tests. The table is as follows:

1. Use of Kansas Silent Reading Test with Students. Educ. Admin. and Supervision,
2. Cornman: Spelling in the Elementary School. (Vol. III, pp 98-101.)

School	Rice	'N.W.'	Rice	'N.W.'	Rice	'N.W.
Year	No.	CoI.	No.	Sent.	No.	Comp.
	'Classes'	'Test'	'Test'	'Classes'	'Test'	'Classes'
8th	14	87.6	93.7	28	86.4	90.6
7th	21	83.0	81.2	28	78.8	78.7
6th a	16	80.0	78.0	17	72.8	77.5
6th b	9	75.0	74.7	18	70.3	71.7
5th a	13	69.0	68.2	20	78.1	76.9
5th b	4	65.5	67.3	19	73.6	79.2
4th a	15	59.6	66.5	18	68.5	80.7
Medians		75.0	74.7		73.6	78.7
						98.4 98.0

Dr. Rice's results in the above table were taken from Table II, p 168, of the Forum, April, 1897, and the different classes received from ten to fifty minutes drill in spelling per day. The above table shows that their results differ but very little from those of the 1898 tests of the Northwest School of Philadelphia. Rice concluded from his study that fifteen minutes per day was a long enough period and that pupils would accomplish as much in that time as they would in a longer period. As a result of his three years study, Cornman decided that the controlling factors of spelling proficiency were: 1. The age and mental status of the pupils; 2. The incidental influence of home, street, and school life; 3. The "personal equation" of the teacher. He went further than Dr. Rice and said that we might dispense with the spelling altogether without prejudice to the educational interests of the pupils. As a result of the tests in which the pupils were required to write as many words as they could in fifteen minutes, Dr. Cornman concludes that "pupils of the elementary school increase regularly from grade to grade in accuracy of spelling." While this statement is undoubtedly true, yet it might be taken for granted as well as being a result of this test because under the conditions pupils would only write those words with which they were familiar. His Table VIII shows that the range of ability of 3rd and 8th grade pupils is only from 93% to 97.9% and any educator knows that this difference is too small. But the most serious fault of both Cornman and Rice was that they considered all words used as equal measures of spelling ability. They simply used the usual method of deducting from 100% the same per cent for each word, consequently their statements of amounts of difference are misleading and not necessarily true.

Dr. Cornman's conclusion that spelling could be taught incidentally evidently had its effect upon the schools of this country for J. E. Wallace Wallin in his Spelling Efficiency in Relation to Age, Grade and Sex, 1911, states that "two stock methods of teaching spelling are in current use, the incidental and the drill methods." He showed by experiments in the Cleveland Schools that proper drill methods were more effective in teaching spelling than incidental teaching. He showed that the "general spelling efficiency was 25.48% higher than the results in Rice's column test and 22.42% higher than the results from his sentence test. It excelled by 25.7% Cornman's average in three term examinations during three years for eighty Philadelphia schools and is 27% higher than the results of these examinations in his two experimental schools in which the spelling instruction was incidental." Wallin thinks that the "results are comparable because they are based upon the same fundamental method: an arbitrarily selected list of words unannounced to the pupils." But in this assumption, Wallin made the same mistake that Rice and Cornman made, he assumed that one error equaled another and that to spell one word was the same as to spell another.

In 1912, Henry C. Pearson, Principal of the Horace Mann Elementary School, published his report of "Experimental Studies in The Teaching of Spelling." The first experiment sought to determine the best method of teaching homonyms, together or separate. Ten pairs of homonyms were first given in twenty sentences and from these five pairs were selected for each grade. With certain other words, these homonyms were taught to one class of each grade by the together method and to the other class by the separate method. After ten days had passed since the last spelling lesson, the pupils were examined again and the results showed the superiority of the together method. But Pearson's recognition of the difficulty is here evident for he said: "Owing to the inequality in the units of measurement, it is impossible to determine accurately whether the together method is superior to the separate method. One can not decide whether an improvement from 3.78 errors to 2.86 errors is greater or less than an improvement from 5.6 errors to 3.3 errors. Of course, the gain in the latter case expressed numerically is greater, but this is offset, partially at least, but how much we do not know, by the fact that improvement was easier to secure when the median of the first test was 5.6 than when it was 3.78." In other words, Pearson saw that words differed in difficulty and that he could not express how much improvement each grade had made.

While Mr. Pearson recognized the fact that words differed in difficulty, he suggested no remedy. It remained for B. R. Buckingham to evaluate words by means of a scientifically constructed scale. He first tested 8,791 elementary pupils from the third to eight grade in several schools located in and near New York City. As a preliminary test, he used a list of 270 words, called the Original List, and had them given to the pupils in the form of sentences. From the results of this test, he chose a group of 100 words. These were again put into sentences and given to the pupils and from the data obtained he was able to select words which showed reasonably regular increase from grade to grade in the per cent of times they were spelled correctly. In this way, two lists of twenty-five words each were made up known as the "First Preferred List" and the "Second Preferred List." To scale the words, he assumed that the normal surface of frequency represented the distribution of spelling ability in each grade. Using the per cent value, he placed the fifty words along the x-axis or base line of the normal frequency surface at the proper points. For example, the word "even" which was rated 59% for the third grade, was placed at a point below the median between whose ordinate and the median ordinate there was 9% of the area of the surface. By reference to a given table, 9% of the cases corresponded to a value of P. E. which lies between .30 and .35 and by interpolation this value is found to be .338. Therefore the position of "even" will be at -.338 P. E. on the scale. In like manner, the position of the other words were found and he was then able to arrange them in the order of their difficulty. The following table shows the fifty words arranged in the order of difficulty according to the scale and their P. E. values:

No.	Word	P.E. × 100	No.	Word	P.E. × 100	No.	Word	P. E. × 100
3	only	57	15	Cousin	168	33	quarrel	207
1	even	70	50	beautiful	168	44	against	211
4	smoke	84	22	touch	171	50	circus	214
28	chicken	90	21	freeze	174	20	sword	219
5	front	106	10	forty	176	23	whistle	219
9	another	108	48	instead	176	19	stopping	221
2	lesson	114	12	wear	184	24	carriage	234
8	bought	117	35	tailor	187	47	guess	236
11	pretty	131	42	tying	187	37	telephone	241
16	nails	158	14	minute	194	29	choose	250
46	butcher	147	7	pear	196	36	telegram	255
41	Tuesday	155	40	towel	198	18	saucer	260
6	sure	157	38	tobacco	199	34	saucy	267
45	answer	159	43	whole	202	26	already	270
25	nor	165	13	button	203	32	pigeons	274
49	raise	165	17	janitor	205	27	beginning	292
						31	grease	329
						39	tpe	349

In order to measure progress, Buckingham arranged thirty of these words into six groups of five words each so that the groups would be of equal difficulty. The sum of the P. E. values in each group is 976 or 977. The following lists show the groups and in using them the words may be weighted as shown or each may be given a credit of one:

No. Group A Weight

41	Tuesday	16
10	forty	18
40	towel	20
44	against	22
47	guess	24

No. Group B Weight

45	answer	16
48	instead	18
43	whole	21
17	janitor	21
24	carriage	24

Group C

49	raise	17
22	touch	17
42	tying	19
14	minute	20
18	saucer	27

Group D

21	freeze	18
12	wear	19
7	pear	20
13	button	21
20	sword	22

Group E

16	nails	14
46	butcher	15
15	cousin	17
29	choose	26
32	pigeons	28

Group F

8	bought	12
11	pretty	13
19	stopping	23
37	telephone	25
54	saucy	27

By thus placing these words in groups of equal difficulty, Buckingham has avoided the difficulties and mistakes made by Rice, Cornman, Wallin and Pearson and has given us a scientific means of measuring improvement in spelling.

However, Buckingham points out that the span from 3rd to 8th grade is too great for any list of words to be in all respects satisfactory. We need several lists each of which shall be given to three or four consecutive grades and overlapping on one another. He attempted to do this but his effort was not as satisfactory as that of Mr. Ayres in 1914 and 1915.

As a basis for his study, Mr. Ayres selected the 1,000 commonest words as shown by combining the the four most extensive studies that had been made for the purpose of determining the words most commonly used in different sorts of English writing--studies by Knowles, Eldridge, Ayres, and Cook and O'Shea. The list of 1,000 words was determined upon by finding the frequency with which each word appeared in the tabulations of each study, weighting that frequency according to the size of the base of which it was a part, adding the four frequencies thus obtained, and finding their average.

These 1,000 words were made up into fifty lists of twenty words each and, in the middle of the school year, were submitted to pupils in 84 cities. As a control check, words were next taken from each of the 50 lists and recombined into new sets of 20 words each and sent out as tests in each of four consecutive grades in the different cities. An aggregate of 1,400,000 spellings were secured from 70,000 children in the 84 cities and from these results the scale was made. In constructing the scale, Ayres considered words of equal difficulty if they were correctly spelled by an equal proportion of children who have had the same amount of training in spelling, which is to say, by children of the same school grade. After the degree of difficulty of each word for pupils of a given grade had been ascertained, his next problem was to arrange the words in groups so that the steps in difficulty from one group to the next would be equal steps. His method assumed the normal distribution of spelling ability. He formed scales for each grade and then combined them into one, putting one below the other so that the third grade scale extends three steps beyond the second grade one; the fourth grade one three steps beyond the third; and each of the others two steps beyond its predecessor. In this way, he takes care of the overlapping spoken of by Buckingham. The scale also shows the progress which pupils should make from grade to grade and enables the teacher or supervisor to measure the spelling ability of any class or grade scientifically. For example, if the spelling ability of a school is measured by Line O the improvement from the third to eighth grade should be as follows: 50%, 73%, 84%, 92%, 96% and 99%. Instead of using but one line to measure a system, it is probably better to use several lines or rather a selection of words from several lines. In my study, words were used from Lines J and Q to test Minnesota pupils. In no case did the Minnesota median equal the Ayres standard although the sixth and eighth grade medians for Line Q approached the standard median closely.

There are two scales in common use for measuring handwriting--the Ayres and the Thorndike. The latter appeared in March 1910 and is based on the principle of "equally often noticed differences are equal." He had one thousand samples of writing from the sixth, seventh, and eighth grades judged by forty competent judges who were asked to rank them on their "general merit." These samples were placed in eleven groups and by a process of elimination, based on the above principle, were reduced to eleven samples which were separated by equal steps of merit.

The scale was increased to include fifteen classes ranging from one just not having any merit to one of very superior merit. By means of this scale, schools can set a definite standard for their pupils to meet and can accurately measure improvement in writing ability. In his Review of the Rockford Schools, 1915-16, Supt. Jones reports the measurement of 2,223 samples of writing of pupils from the fourth to eighth grades. The following table shows the result:

	Fourth	Fifth	Sixth	Seventh	Eighth
Total papers	559	608	193	470	393
Median quality	8.5.	8.8	9.8	10.5	11.1

He points out that this shows an irregularity of progress from grade to grade. Of the 2.6 points made between the fourth and eighth grades, one point is made between the fifth and sixth. The Butte Survey notes that greatest progress is made between these two grades and suggests that since habits of handwriting can be most easily fixed at this period greater stress should be put on writing then. Supt. Jones has set quality 13 as the standard to be attained by the Rockford schools but does not indicate the speed to be acquired in each grade. To show improvement in quality, Supt. Jones had 414 samples of writing written in Sept. 1914 selected at random from pupils in the fifth to eighth grades and judged on the Thorndike scale. Samples were written six month later by these same pupils and again judged. The median score changed from 11.6 to 13.6 for the entire group. He did not indicate the amount of improvement for the pupils of each grade. However, grade standards in both speed and quality have been determined. The following shows the standard scores based on over 6,000 pupils in 28 schools:

Grades	1	2	3	4	5	6	7	8
Speed per min.20	31	38	47	57	65	75	83	
Quality (T)	6.5	7.5	8.2	8.7	9.3	9.8	10.4	10.9

Mr. F. S. Breed and E. F. Down of the University of Michigan, carried on an experiment¹ at Highland Park, Mich., for the purpose of establishing a standard of measure for the writing work of the several grades. They secured samples of the handwriting of 1,267 pupils in grades 3B to 6A inclusive and had them rated by five persons on the Thorndike scale. The method used for the selection of samples to be used in the scale was to locate the median, then measure equal

1. Measuring and Standardizing Handwriting. EL. Sch. Journal, March 1917, p 470

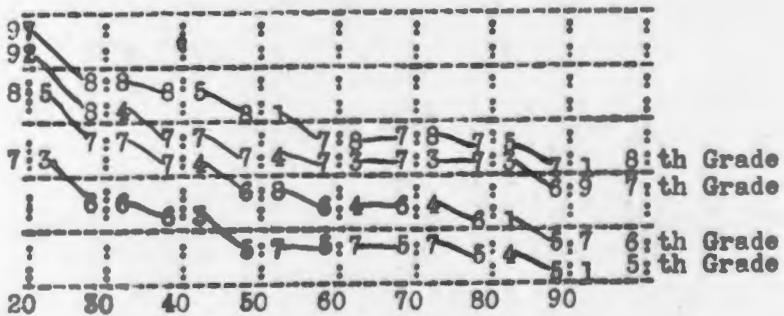
steps in Thorndike-scale units either way from the median. It was found that five qualities would satisfactorily represent the range of variation in the grades studied. The speed at which the samples of various degrees of merit were written was determined and the median speed per minute for each grade found. The resulting five-grade scale samples range from 6.2 to 11.8 on the Thorndike scale. This range was sufficient for nearly all the Highland Park pupils. If a wider range is necessary for a few pupils, the Thorndike scale can be used.

The authors found that there was a general tendency toward decrease of speed as quality improved within each grade. The curves submitted showed that: (1) in all grades speed averaged fairly constant at the three intermediate qualities; (2) in all grades speed decreased as quality improved from the fourth to the highest step.

Ayres scale is based on legibility. By using this standard he substitutes function for appearance. He decides on the legibility of a sample of writing by finding the time it takes to read it. In constructing his scale, he obtained samples of writing from grade children in 38 states which he turned over to ten paid assistants who read them and recorded the time of reading for each sample. The words in the samples were thrown out of their natural context. The average time was found for each sample and then the samples were arranged in a long series from the one taking the longest time to the one taking the shortest. A count was then made half way through the samples and this sample was given a value of fifty. Then samples .1, .2,.3, etc. of the way through the series were taken and given values of 10, 20, 30, etc. In this way the scale was given steps of equal value, that is, 40 is as much better than 30 as 30 is better than 20. Since this corresponds to the per cent system with which teachers are familiar, it is more popular with some teachers than the Thorndike tho latter is better in some respects because of the greater range. The limits of the Ayres scale lie within qualities 7 and 14 on the Thorndike. Experiments show that the convenience and accuracy of both scales are about the same. Ayres gives the following standards with his new scale--the Gettysburg Edition:

Grades	2	3	4	5	6	7	8
Speed	31	44	55	64	71	76	79
Quality	38	42	46	50	54	58	62
Stark Quality	27	33	37	43	53	57	

In the Cleveland Survey, Dr. Judd used the Ayres scale for measuring ability in handwriting and found that Cleveland pupils in the fifth and sixth grades excelled the pupils in 12 other cities (Starch, 1914) in the same grades but that the seventh and eighth grades were lower in quality and speed than the same grades in the 12 cities. The Cleveland pupils made improvement from grade to grade in both speed and quality but did not exceed the Ayres standard for any grade. Dr. Judd also gives the following diagram to show that a consistent average decrease of speed accompanies improvement from quality 20 to 90, within all grades from five to eight, inclusive:



In this diagram, the facts for the 10,528 specimens carefully studied are given. The different speeds are represented in the vertical axis while the various grades of quality are in the horizontal axis. The results from each grade are represented separately. The diagram shows that there is a general area between qualities 60 and 80, and between speeds 60 and 80, where all the grades above the fifth may be said to reach a level. Greater speed seems to be purchased at an undue sacrifice of quality, and higher quality seems to result in much lower speeds. Dr. Judd points out that this may indicate the probable area within which teachers will find a desirable balance between speed and quality.

The results which I found in Minnesota schools differed considerably from the results in Cleveland. Minnesota pupils approached the Ayres standard in speed very much closer than did the Cleveland pupils even excelling the standard in the seventh and eighth grades in February. In quality, however, Minnesota pupils fell far below both the Ayres standard and the Cleveland scores.

1. Judd; Measuring the work of the Public Schools, Survey Committee of the Cleveland Foundation, 1916, pages 70 to 72.

The point which Dr. Judd makes above about the desirable balance between speed and quality is also emphasized by Dr. Freeman in his report on Handwriting.¹ Freeman said in this report: "In order to answer the question which pupils are above standard it is necessary to define what we mean by standard. Must a pupil be above the average in both speed and form, or is unusually high ability in one quality to be allowed to balance deficiency in the other. In a final standard of attainment the pupil ought not to be deficient in either quality, but for the purpose of forming a preliminary judgment of a pupil's ability, a combination score is useful. Such a combination score may be obtained by multiplying the score for speed and the score for form. A pupil's combination score may then be compared with the standard combination score." He then presents tables and figures showing the scores from a school in each of 55 cities and the results of a thorough survey of the writing in three large cities where the papers were graded by a single, trained grader. From these, he concludes: "It would seem to be a reasonable conclusion that at least a quarter of the children from the sixth grade up have under present conditions sufficient skill in writing to make it more profitable for them to spend the handwriting time either in perfecting some other formal subject in which they are deficient or in studying some content subject. But the saving possible is still greater than this. There are about 40% who would fall into the same class as those just mentioned, if some of them could only exchange their excessive speed for a little better form, and if others could reduce their score in form somewhat for the purpose of gaining greater speed. Other facts show that the emphasis upon the one or the other of the two characteristics varies greatly from grade to grade, from school to school, and from system. Therefore, the balance between the two qualities is susceptible to the influence of training."

These conclusions by Dr. Judd and Dr. Freeman should be given careful consideration by the schools of Minnesota for my study shows that the present relationship between speed and form is a lop-sided one with emphasis on speed. If "the balance between the two qualities is susceptible to the influence of training," then the present methods of teaching handwriting in Minnesota schools should be modified to bring about this balance.

1. Freeman: Handwriting. 16th Yearbook, Society for Study of Educ. pp 60-72.

In 1916, M. R. Trabue published his monograph called the Completion-Test Language Scales--a report of an attempt to derive one or more scales for the measurement of ability along certain lines closely related to language." The method was invented by Ebbinghaus who characterized it as "a real test of intelligence."

During the last three months of the school year, 1914, Mr. Trabue tested 855 pupils in New York City with a preliminary list of 56 completion-test sentences. Arranging these in the order of their difficulty for the 855 children and dropping some and adding other sentences, he formed what are known as the "Graded Series." These sentences were then submitted to some 5,000 children in New York and New Jersey and from the results twenty-four sentences were selected and are known as "Language Scale A." The author then decided to arrange a number of shorter scales in which the intervals between the steps were more nearly equal. Scales B and C were chosen from the evaluated sentences of the Graded Series and each consists of ten steps or sentences with each step being about 1 P. E. above the previous step. With these and other short scales which he developed, improvement can be measured by giving the tests from time to time. The author gives tentative scores but the following scores were obtained by testing thirty-one Minneapolis schools with Scale B: in 1916:

Third Fourth Fifth Sixth Seventh Eighth

3.61 4.27 4.802 5.03 5.42 5.645

A second test was not given so that improvement was not shown but these scores are probably better than the tentative standards given by the author. My own study, using the results from schools in Minnesota but outside of Minneapolis, gave slightly higher results but the number of cases studied were considerably less--about 400 in each grade.

The Hillegas Scale for the "Measurement of Quality in English Composition by Young People" consists of ten samples arranged in the order of increasing merit. The principle involved in the construction of this scale is the same as used in the Thorndike Handwriting Scale, namely, equally often noticed differences are equal. About 7,000 samples of compositions were obtained and these were thrown into ten classes by Mr. Hillegas and an assistant. Seventy-five were selected from these ten piles and enough artificial samples were added to make 83.

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These were then judged and ranked in the order of merit by 100 judges and the number of samples reduced to 27. These were in turn ranked in order of merit by competent judges and ten samples selected for the scale on the principle mentioned above. The compositions range by equal steps from 0, which is the poorest composition, to 9 which has real literary merit. Thorndike extended this scale so that it now consists of a series of steps ranging in quality from 0 to 95 with one or more samples for each quality. The following scores were determined by rating compositions written by over 5,000 pupils:

Grades	4	5	6	7	8
Scores	26.0	31.0	36.0	41.0	46.0

Teachers have found this scale difficult to use because of the different types of compositions found in it and because of an unwillingness to become thoroughly familiar with the scale and its use.

In order to have a more definite means of measuring the composition work of a definite grade, F. S. Breed and F. W. Frostic,¹ of the University of Michigan constructed a scale "For Measuring the General Merit of English Composition in the Sixth Grade." The construction of the scale was the result of an attempt to survey the instruction in English in a selected sixth grade in each of ten Michigan cities. They secured 481 samples of compositions on the same subject and obtained under relatively similar conditions in the ten cities. These were graded on their general merit by three competent judges and placed in ten piles. From these, 70 samples were selected which represented the total range of composition ability of the grade. By a series of judgments, these were reduced to nine samples which constitute the scale. The unit of difference between the samples is the difference which 75% of the judges were able to distinguish and 25% failed to distinguish. Therefore, a unit on the scale is 1 P. E. A grade may be measured by this scale by comparing each composition with those on the scale, giving it the numerical value of the sample resembling it most and averaging the scores thus obtained. The authors give the scores obtained in the ten Michigan cities so that schools using the scale may make comparison and have a definite notion ~~of the~~ concerning the standing of the grade tested. Improvement can be measured by using the scale on compositions written at different times.

1. English Composition in Sixth Grade. Elem. Sch. Journal, Vol. 17, p 307.

The Harvard-Newton scales consist of four scales, one for each type of composition-narration, description, exposition and argumentation. They were derived by obtaining a large number of samples, written by eighth grade pupils, and graded by 24 teachers on the per centile basis. The values assigned to the six steps in each scale range from 45% to 95%. While these scales were not constructed as scientifically as the Hillegas scale, yet they seem to be more practical than the Hillegas. This is probably due to the fact that a statement of the defects and the merits of the compositions is given so that teachers can make a comparison more readily.

The use of these scales by Minnesota teachers was very unsatisfactory as shown by my results. However, this dissatisfaction with these scales seems to be general as shown by the fact that in some of the more recent surveys, a new scale is developed for the particular work at hand. An example of this is found in the Denver survey where this statement is found: "Such a scale might be somewhat more crude in a scientific sense than the Hillegas-Thorndike scale but it promised to be more serviceable for the purpose."

Buckingham points out three methods of measuring improvement in his Survey¹ of the Gary and Prevocational Schools of New York. The first is by the number of pupils whose scores were better in the final than in the initial test. Second, the increase in the average number of questions answered correctly by each pupil in each grade. The third is on the basis of the ratio between the actual and the possible improvement. The following table shows the percentage of pupils showing improvement after three months in spelling and grammar:

	Gary	P. V.	Regular
Spelling	52.8	65.7	63.0
Grammar	55.8	65.8	62.9

While this method indicates that some improvement has been made, it does not indicate the amount of improvement clearly. It does indicate that instruction in Grammar and Spelling is unsatisfactory for only about 60% of the pupils make any improvement. My own study showed that instruction in Grammar was not any better in Minnesota for very little improvement was shown and in one school the tests showed a definite loss.

1. 17th Annual Report, City Supt. of Schools, New York City, N. Y.

Chapter III.

1. The Material Used.

In August, 1916, the Bureau of Co-operative Research sent out Bulletin No. 44 in which it announced a program for the study of the development of language abilities. This program involved giving language tests--spelling, reading, language, composition, grammar and handwriting--at the beginning of the semester and comparable tests in the same subjects at the end of the first semester. Definite dates were given in this bulletin for taking the tests and the following methods were suggested:

a. A limited portion of the tests may be given throughout a school or city system. This has the advantage of giving a measure of the entire system and tends to correct conclusions drawn from the measurement of too narrow a group. Where this plan is followed, it is suggested that reading be put first on the list of tests and that this be supplemented by such other tests as seem desirable to the person in charge of the testing.

b. The second method is to choose a smaller number of classes and give the entire group of tests in the order indicated above. This method has the advantage of giving a wider range of information concerning the individuals studied.

This bulletin was sent out to school officers and as a result twenty-six Minnesota schools of various sizes gave the tests suggested. Some schools followed one of the methods suggested above and some followed the other. Nearly all gave the reading and spelling tests in September and as a result over five thousand papers were obtained. The number taking the other tests were considerably less.

2. The Tests.

The tests selected by the Bureau of Co-operative Research for use in this work were as follows:

a. M. E. Haggerty's Understanding of Sentences

This test consists of six different paragraphs designated as Set I, Set III, Set IV, Set V, Set VI, and Set VII. They have been given a value of 10, 30, 40, 50, 60 and 70 respectively. Three questions are asked about Set I and five about each of the other sets. The pupil's answers to these questions show how well he understands what he has read. A preliminary test was given each child in order to prepare him for the real test which followed.

Directions for Giving the Tests.

1. See that each child has one, preferably two, well sharpened lead pencils.

2. Distribute to each child a copy of the test.

3. Have each child write at the proper place on the first cover page his name, sex, age in years and month, city, school, grade, teacher and date of test. Make certain that this is properly done.

4. Direct the children to turn to the test and say: "On this page are some selections to be read and below each selection are some questions to be answered. Read the selection and write answers to the questions. Your answers need not make complete sentences but they must be clear and definite. Read the selections and questions as often as necessary but work continuously until you have finished. When you have finished bring your paper to me at the desk. At the signal, 'get ready,' take up your pencil and look at me. At the signal 'start,' begin work."

5. Have each child as he completes his work bring the paper forward. Keep the time for each pupil.

Directions for Scoring the Tests.

The teachers were directed to read through each paper and note each omission and wrong response as shown by a key¹ furnished each teacher.

1. Form 9, Directions for Giving and Scoring Tests in Reading,
Bureau of Co-operative Research, University of Minnesota.

After determining the individual scores, the teacher was directed to find the class score as follows:

1. Use Record Sheet No. 2.

2. Copy from individual score sheet upon Record Sheet No. 2, the name of each pupil and the number of errors made by him in each element of each set.

3. Total the figures for each set in the broad column immediately at the right of the set in question.

4. Total these results at the bottom of the page in the line marked "Total number wrong." Divide the several totals by the product of the number of individuals times the number of questions in the set. Thus in Set I, let the total number of errors be twelve and the number of individuals in the class twenty. Since the chances of error in Set I are three, you multiply 3 by 20 which gives 60. This 60 you divide into 12 which gives .20 or 20%, the per cent of error made by the entire class in Set I. Set I is then the score for the class if, as is likely, the following set gives a higher percentage of error. In any case, the class score is the number of the set which gives nearest 20% of error.

5. If no single set gives exactly 20% of error, the actual class score will be intermediate between the two sets which give nearest 20% of error. By means of a table this intermediate value may be calculated.

Checking and Computing of Scores.

In making returns to the Bureau of Co-operative Research, the schools were asked to include the children's papers and the class record sheets complete. The answers on the children's papers were then carefully checked by the writer to determine whether the work had been accurately done by the teachers. The papers from some school showed very careful corrections, others showed careless and hasty work while the papers from certain grades in a few schools would almost seem to indicate intentional efforts, on the part of the teachers, to give their pupils high scores by not correcting all errors.

1. Haggerty, M. E., "The Ability to Read: Its Measurement and Some Factors Conditioning It." Indiana University Studies, No. 34, pp. 62-63.

This was particularly evident from the returns for one grade in a certain school where the score of every pupil was found to be too high. More corrections had to be made in the Understanding of Sentences test than any other given. This meant that many class scores as well as individual scores had to be computed a second time.

The Initial or September Abilities.

The initial abilities of the 5,261 pupils who took the September test in Understanding of Sentences are shown in Table 1. The schools listed in this table are arranged in the order of size of community with the exception of No. 26 which should come between No. 22 and No. 23 to fulfill this condition. The scores are scale values.

This table gives the number of pupils and the class scores for each grade in each school. A careful study of this shows that good progress was made from grade to grade in nearly every school. However, one fourth, one fifth, one sixth and five eighth grades failed to make better scores than the next lower grade in the respective schools. This occurred in schools numbered 9, 18, 8, 3, 7, 11, 13 and 26. That is, the failure to make progress from grade to grade happened most often in the smaller schools of the State and may be due to lack of proper supervision and classification of the pupils.

The medians for each grade, ranging from 15 in the third grade to 46.7 in the eighth grade, show that progress was made and that the ability to understand and comprehend the meaning of what is read improves through the ² grades. This agrees with the finding of W. S. Gray, University of Chicago, but Table 1 does not show the further fact which Mr. Gray points out, namely, progress is less marked in the lower grades and more marked in the upper grades.

Figure 1, which is compiled from Table 1, shows the variation of the different grades of the same school and also that of the same grades in different schools. The red lines indicate the median for each grade while the numbers stand for the different schools as shown in Table 1. A study of Fig. 1 shows that the schools in grade three vary most widely in their ability to comprehend what they read; those in grade six vary the least. These variations in every grade are probably due to several factors but seem to indicate clearly

2. Gray, W. S., Relation of Silent Reading to Economy in Education.
16th Yearbook, National Soc. Study of Education, p 28.

that more emphasis has been put upon the mechanics of reading than upon the proper understanding of what was read. Another inspection of Fig. 1 shows that No. 19 is the only school that persists in remaining above the median in all grades while No. 1 is just as persistent in remaining below the median. This lack of persistence in holding a position above or below the median in the different grades, seems to me to indicate a lack of uniform practice in the same school systems as far as the teaching of reading is concerned.

Improvement in Reading.

Of the twenty-three schools that took the Understanding of Sentences test in September, only twelve took the February test. In order to get comparable results, it was necessary to re-check all the September score sheets to be certain the same pupils took both tests. After discarding those not common to both tests, I found there would be an average of about 500 pupils for each grade. Table 2 gives the number of pupils and the class scores for each grade and school both in September and February. An inspection of this table shows that considerable variation in the scores for each grade exists but that, in general, the variation is greater in September than in February. A study of the medians shows that progress was made from grade to grade in both tests; that the median scores were higher, in grades five, six, seven and eight, in February than in September but were lower in grades three and four. Fig. 2 shows that the loss was greater in grade three than in four and that the improvement in each of the other grades was about the same.

Table 1.
READING--UNDERSTANDING OF SENTENCES

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Sept. 1916.

City	Third Gr.	Pupils	Fourth Gr.	Pupils	Fifth Gr.	Pupils	Sixth Gr.	Pupils	Seventh Gr.	Pupils	Eighth Gr.	Pupils
	So.	So.	So.	So.	So.	So.	So.	So.	So.	So.	So.	So.
1.Medford	21	12.3	23	22.6	21	27.2	20	31.	20	41.7	11	45.8
2.Manterville	14	1.8	9	19.	10	23.6	16	37.5	15	38.	8	52.9
3.Norwood	20	2.5	14	9.3	25	22.8	22	30.	15	44.	30	42.3
4.Grand Meadow			11	20.8	16	30.	27	37.1	15	46.8	24	50.4
5.Atwater	10	11.9	11	27.8	13	33.7	14	34.1	15	35.3	11	38.2
6.Cokate	21	15.7	22	20.5	22	27.7	26	36.3	17	38.8	20	48.4
7.Henderson	16	8.5	20	15.2	15	25.	17	35.3	19	43.8	13	43.
8.Stewartville			26	23.7	18	35.	20	34.	18	42.6	19	46.5
9.Blackduck	22	24.5	20	22.	26	25.8	20	35.7	17	44.5	15	47.
10.Dodge Center	18	10.8	16	28.	16	32.9	19	36.	17	42.7	20	47.5
11.Akeley			23	26.6	36	32.2	42	40.2	25	45.3	34	41.6
12.Kenyen	29	13.8	26	23.7	33	30.7	26	35.3	26	43.9	31	46.
13.Dawson	37	11.6	41	25.4	38	28.4	37	35.7	41	46.8	33	44.8
14.Glences	26	21.6	24	24.9	31	29.7	34	38.5	26	40.4	25	46.9
16.Glenwood	35	15.4	58	20.2	45	26.7	52	36.	57	44.6	34	48.3
18.Shakopee	17	16.7	12	25.3	18	24.3	17	40.7	12	39.1	20	44.
19.Luverne	35	22.8	76	25.9	47	33.3	48	38.2	51	44.7	54	55.8
20.Alexandria							69	34.				
21.Waseca	49	8.1	54	24.	48	30.5	61	35.1	60	40.3	36	42.6
22.Eveleoth	197	12.	246	25.6	215	29.4	152	40.5	113	45.3	89	47.7
23.Pillsbury	41	15.5	69	30.7	41	34.8	62	40.7	57	44.3	31	45.8
24.Prescott	74	17.4	53	28.9	90	29.7	76	34.2	114	43.7	83	45.8
26.Chisholm	117	22.	119	24.1	122	32.3	112	37.6	90	48.9	95	45.9
No. Pupils	799		962		945		979		840		736	
Medians		15.		24.		29.4		37.1		42.5		46.7

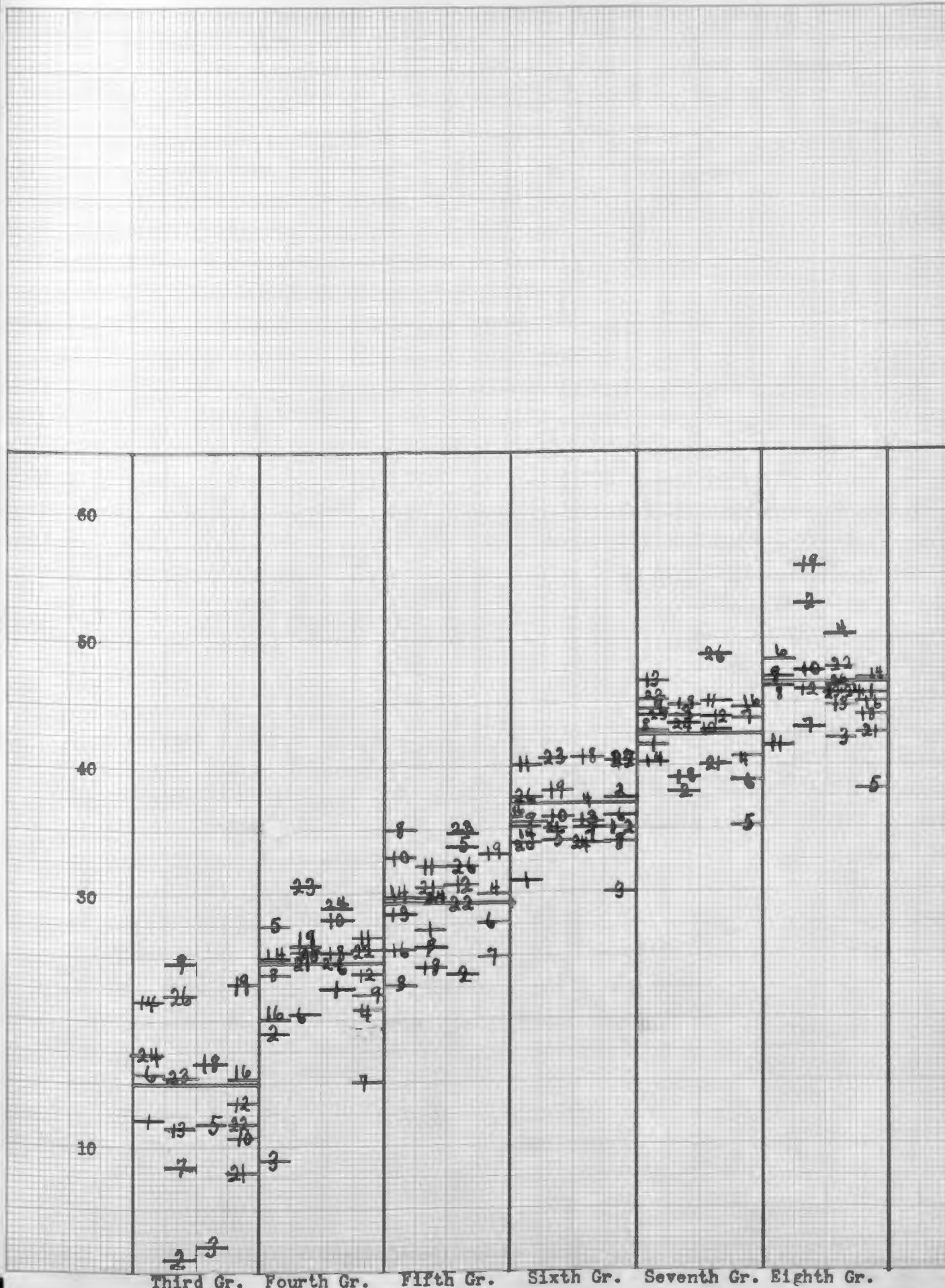


Fig. 1. Reading-Understanding of Sentences. Sept. 1916.

Table 2.
READING--UNDERSTANDING OF SENTENCES

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Sept. 1916.

City	Third Gr.		Fourth Gr.		Fifth Gr.		Sixth Gr.		Seventh Gr.		Eighth Gr.	
	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.
2.Mantor-ville	14	1.3	9	19.	10	23.6	16	37.5	15	36.	8	52.9
3.Norwood	20	2.5	14	9.3	25	22.8	22	30.	15	44.	30	42.3
4.Grand Meadow			11	20.8	16	30.	27	37.1	15	40.8	24	50.4
5.Atwater	10	11.9	11	27.5	13	33.7	14	34.1	15	35.3	11	38.2
7.Henderson	16	8.5	20	15.2	15	25.	17	35.3	19	43.8	13	43.
8.Stewart-ville			26	23.7	18	35.	20	34.	18	42.6	19	46.8
12.Kenyen	29	13.5	26	23.7	33	30.7.	26	35.3	26	43.9	31	46.
13.Dawson	37	11.6	41	25.4	38	28.4	37	35.7	41	46.8	33	44.8
14.Glencooe			24	24.9	31	29.7	34	35.5	26	40.4	25	46.9
16.Glenwood	35	15.4	58	20.2	45	25.7	52	36.	57	44.6	34	45.3
22.Eveleth	166	16.	153	24.2	178	26.5	152	40.5	113	45.3	89	47.7
26.Chisholm	117	22.	119	24.1	122	32.3	112	37.6	90	48.9	95	45.9
No. Pupils	444		512		544		529		452		411	
Medians		13.		22.		29.		37.		43.		46.6

READING—UNDERSTANDING OF SENTENCES

Feb. 1917.

2.Mantorville	14	6.	9	6.9	10	21.4	16	44.	15	47.8	8	49.8
3.Norwood	20	0.	14	8.9	25	26.1	22	41.	15	42.7	30	47.3
4.Grand Meadow			11	30.	16	41.	27	47.4	15	47.1	24	55.2
5.Atwater	10	7.5	11	22.	13	36.5	14	52.7	15	47.8	11	51.2
7.Henderson	16	6.5	20	12.9	18	33.9	17	40.	19	45.1	13	52.7
8.Stewartville			26	9.1	18	28.5	20	42.3	18	50.	19	53.1
12.Kenyen	29	1.5	26	11.2	33	20.8	26	43.	26	52.3	31	53.2
13.Dawson	37	7.5	41	15.2	38	39.1	38	47.3	41	54.7	33	52.4
14.Glencoe			24	36.8	31	33.4	34	40.	26	46.	25	43.5
16.Glenwood	35	10.2	58	25.1	45	40.4	52	46.2	57	49.	34	49.5
22.Eveleth	166	14.6	153	25.2	178	40.	152	44.5	115	48.6	88	52.9
26.Chisholm	117	15.7	119	34.9	122	42.3	112	46.1	90	49.7	95	55.5
No. Pupils	444		512		544		529		452		411	
Medians		9.		20.		35.		44.		48.		51.

FORM 7. 11-16-5m

READING TEST: UNDERSTANDING OF SENTENCES

ARRANGED BY
BUREAU OF COOPERATIVE RESEARCH
COLLEGE OF EDUCATION
THE UNIVERSITY OF MINNESOTA

FOR GRADES THREE TO FIVE

INDIVIDUAL SCORE SHEET

NAME _____

SEX _____ AGE _____ YEARS _____ MONTHS _____

CITY _____ SCHOOL _____ GRADE _____

TEACHER _____ DATE _____

Set I or 10	Set III or 30	Set IV or 40	Set V or 50	Set VI or 60

Time of beginning work _____

Time of completing work _____

Time spent _____

To be returned to the University of Minnesota Bureau of
Cooperative Research, Minneapolis, Minnesota.

SCALE BETA I.

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Read this and then write the answers. Read it again as often as you need to.

John had two brothers who were both tall. Their names were Will and Fred. John's sister, who was short, was named Mary. John liked Fred better than either of the others. All of these children except Will had red hair. He had brown hair.

1. Was John's sister tall or short? _____
2. How many brothers had John? _____
3. What was his sister's name? _____

30

Read this and then write answers to questions 1 and 2. All questions must be answered from the paragraph. Read the paragraph as often as you need to.

First, let us ask, where does book-making begin? With the printer? No, for before the printer can even think about printing, he must have his "copy." This "copy," as the printer calls it, is furnished by the publisher; and the publisher gets it from the author, who calls it his "manuscript." The author has spent many days, perhaps months, or even years, upon it, writing it out with his own hand. With pen and ink he has put his thoughts upon the paper.

1. Who is mentioned as the maker of a "manuscript"? _____
2. Who is it that must have the "copy"? _____

Read this and then write the answers. Read it again as often as you need to.

Long after the sun had set, Tom was still waiting for Jim and Dick to come. "If they do not come before nine o'clock," he said to himself, "I will go on to Boston alone." At half-past eight they came, bringing two other boys with them. Tom was very glad to see them and gave each of them one of the apples he had kept. They ate these and he ate one, too. Then all went down the road.

3. What did they do after eating the apples? _____
4. Who else came besides Jim and Dick? _____
5. How long did Tom say he would wait for them? _____

40

Read this and then write the answers to questions 1, 2, and 3. All questions must be answered from the paragraph. Read the paragraph as often as you need to.

Hay-fever is a very painful, though not a dangerous, disease. It is like a very severe cold in the head, except that it lasts much longer. The nose runs; the eyes are sore; the person sneezes; he feels unable to think or work. Sometimes he has great difficulty in breathing. Hay-fever is not caused by hay, but by the pollen from certain weeds and flowers. Only a small number of people get this disease, perhaps one person in fifty. Most of those who do get it, can avoid it by going to live in certain places during the summer and fall. Almost everyone can find some place where he does not suffer from hay-fever.

1. What is the cause of hay-fever? _____
2. How large a percentage of people get hay-fever? _____
3. What means could they take to keep from getting it? _____

Read this and then write the answers to 4 and 5. All questions must be answered from the paragraph. Read the paragraph as often as you need to.

You need a coal range in winter for kitchen warmth and for continuous hot-water supply, but in summer, when you want a cool kitchen and less hot water, a gas range is better. The xyz ovens are safe. In the end-ovens there is an extra set of burners for broiling.

4. What two varieties of stoves does the paragraph mention? _____
5. For what purpose is the extra set of burners? _____

Read this and then write the answers to 1, 2, and 3. All questions must be answered from the paragraph. Read the paragraph as often as you need to.

We often think of a rich man as one who has much money, as if money and wealth meant the same thing. However, money is only one sort of wealth and some money is not exactly wealth. A twenty dollar bill, for example, is only someone's promise to pay so much gold. Wealth means land, houses, food, clothes, jewels, tools, gold, silver, coal, iron,—anything that a man can have that satisfies some want. Money means something which a person can exchange for any one of many sorts of wealth. The main value of any piece of wealth, such as a barrel of flour, a house, or a cow, is the direct use you can make of it. The value it has by reason of what you can change it for is of less importance. The main value of any piece of money, such as a silver dollar, a ten dollar bill, or a nickel, is NOT any direct use you can make of it. Its main value is that you can exchange it for something that is of direct use. For this reason, it is called a "medium of exchange."

1. What two things are contrasted in this paragraph? _____
2. How could a man be rich and still not own a single penny of money? _____
3. Name something that is money, but is not exactly wealth. _____

Read this and then write the answers. Read it again as often as you need to.

It may seem at first thought that every boy and girl who goes to school ought to do all the work that the teacher wishes done. But sometimes other duties prevent even the best boy or girl from doing so. If a boy's or girl's father died and he had to work afternoons and evenings to earn money to help his mother, such might be the case. A good girl might let her lessons go undone in order to help her mother by taking care of the baby.

4. What are some conditions that might make even the best boy leave school work unfinished? _____
5. What might be the effect of his father's death upon the way a boy spent his time? _____

Read this and then write answers to questions 1, 2, 3, 4, and 5. All questions must be answered from the paragraph. Read the paragraph as often as you need to.

Every one of the million readers of anecdotes, or memoirs, or lives of Napoleon, delights in the page, because he studies in it his own history. Napoleon is thoroughly modern, and, at the highest point of his fortunes, has the very spirit of the newspapers. He is no saint—to use his own words, "no capuchin," and he is no hero, in the high sense. The man in the street finds in him the qualities and powers of other men in the street. He finds him, like himself, by birth a citizen who, by very intelligible merits, arrived at such a commanding position that he could indulge all those tastes which the common man possesses, but is obliged to conceal and deny; good society, good books, fast traveling, dress, dinners, servants without number, personal weight, the execution of his ideas, the standing in the attitude of a benefactor to all persons about him, the refined enjoyments of pictures, statues, music, palaces and conventional honors,—precisely what is agreeable to the heart of every man in the nineteenth century.

1. What other person possesses the same tastes as Napoleon? _____
2. Who is said to have arrived at a commanding position? _____
3. What must the common man do with tastes such as Napoleon indulged? _____
4. Who is said to have "intelligible merits"? _____
5. What does the "man in the street" find in Napoleon? _____

PRELIMINARY TEST.

Read this and then write the answers to the questions.

Tom gave a gray cat to Mary. She gave him a black dog.

1. What was the girl's name?.....
2. What color was the dog?.....
3. What color was the cat?.....

Read this and then write the answers to the questions.

Your nose is on your face. Your fingers are on your hands. Your teeth are in your mouth.

1. Where are your fingers?.....
2. Where is your nose?.....
3. Where are your teeth?.....

Read this and then write the answers to the questions.

Dick took a bat. Fred took a ball. Will took six cents.

1. What did Will take?.....
2. What did Fred take?.....
3. What did Dick take?.....

READING TEST: UNDERSTANDING OF SENTENCES

ARRANGED BY
BUREAU OF COOPERATIVE RESEARCH
COLLEGE OF EDUCATION
THE UNIVERSITY OF MINNESOTA

FOR GRADES SIX TO NINE

INDIVIDUAL SCORE SHEET

NAME _____
SEX _____ AGE _____ YEARS _____ MONTHS
CITY _____ SCHOOL _____ GRADE _____
TEACHER _____ DATE _____

Set IV or 40	Set V or 50	Set VI or 60	Set VII or 70

Time of beginning work _____

Time of completing work _____

Time spent _____

To be returned to the University of Minnesota Bureau of
Coöperative Research, Minneapolis, Minnesota.

SCALE BETA I.

40

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Hay-fever is a very painful, though not a dangerous, disease. It is like a very severe cold in the head, except that it lasts much longer. The nose runs; the eyes are sore; the person sneezes; he feels unable to think of work. Sometimes he has great difficulty in breathing. Hay-fever is not caused by hay, but by the pollen from certain weeds and flowers. Only a small number of people get this disease, perhaps one person in fifty. Most of those who do get it can avoid it by going to live in certain places during the summer and fall. Almost everyone can find some place where he does not suffer from hay-fever.

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4. What two varieties of stoves does the paragraph mention? _____
5. For what purpose is the extra set of burners? _____

50

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We often think of a rich man as one who has much money, as if money and wealth meant the same thing. However, money is only one sort of wealth and some money is not exactly wealth. A twenty dollar bill, for example, is only someone's promise to pay so much gold. Wealth means land, houses, food, clothes, jewels, tools, gold, silver, coal, iron,—anything that a man can have that satisfies some want. Money means something which a person can exchange for any one of many sorts of wealth. The main value of any piece of wealth, such as a barrel of flour, a house, or a cow, is the direct use you can make of it. The value it has by reason of what you can change it for is of less importance. The main value of any piece of money, such as a silver dollar, a ten dollar bill, or a nickel, is NOT any direct use you can make of it. Its main value is that you can exchange it for something that is of direct use. For this reason, it is called a "medium of exchange."

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5. What does the "man in the street" find in Napoleon? _____

Read this and then write answers to questions 1, 2, and 3. All questions must be answered from the paragraph. Read the paragraph as often as you need to.

Studies serve for delight, for ornament, and for ability. Their chief use for delight is in privateness, and retiring; for ornament, is in discourse; and for ability, is in the judgment and disposition of business; for, expert men can execute, and perhaps judge of particulars, one by one; but the general counsels, and the plots and marshaling of affairs, come best from those that are learned.

To spend too much time in studies, is sloth; to use them too much for ornament, is affectation; to make judgment wholly by their rules, is the humor of a scholar; they perfect nature, and are perfected by experience—for natural abilities are like natural plants, that need pruning by study; and studies themselves do give forth directions too much at large, except they be bounded in by experience.

1. In how many ways may "studies" be misused? _____
2. In what things are learned men said to be the best? _____
3. In what way do studies serve for ornament? _____

Read this and then write the answers to 4 and 5. All questions must be answered from the paragraph. Read the paragraph as often as you need to.

However certain it may seem to be that men work only because they must, and would avoid labor except for the food, clothing, and luxuries that are its rewards, the facts may well be the contrary. It can hardly be the case that men dislike work because they wish to be utterly idle. For mere rest, mere inactivity, is not commonly enjoyed. To have nothing to do is not what men seek. Were that so, we should envy the prisoner shut up in his cell. If men had to choose between a life spent at eight hours of work daily in a factory and a life of eight hours of sitting on a throne without moving hand or foot, many of them would, after trying both, choose the former. Activity of body or mind, at which a man can succeed, is, in and of itself, rather enjoyed than disliked.

4. In what respect is a prisoner in his cell like a man with a million dollars? _____
5. What is stated in the paragraph to be really liked and not objected to? _____

PRELIMINARY TEST.

Read this and then write the answers to questions 1, 2, 3, 4 and 5. All questions must be answered from the paragraph. Read it as often as you need to.

The good woman had risen thus early in order to set about making a scarecrow, which she intended to put in the middle of her corn patch. It was now the last week of May, and the crows and the blackbirds had already discovered the little, green, rolled-up leaf of the Indian corn just peeping out of the soil. She was determined, therefore, to contrive as lifelike a scarecrow as ever was seen.

1. What was the good woman about to do? _____
2. What time of year was it? _____
3. What time of day was it? _____
4. Why did she plan to make a scarecrow? _____
5. What was she going to do with it? _____

Chart No.

Reading

Understanding of Sentences

Reading

Visual Vocabulary

September

February

September

February

60

55

50

45

40

35

30

25

20

15

10

5

0

60

55

50

45

40

35

30

25

20

15

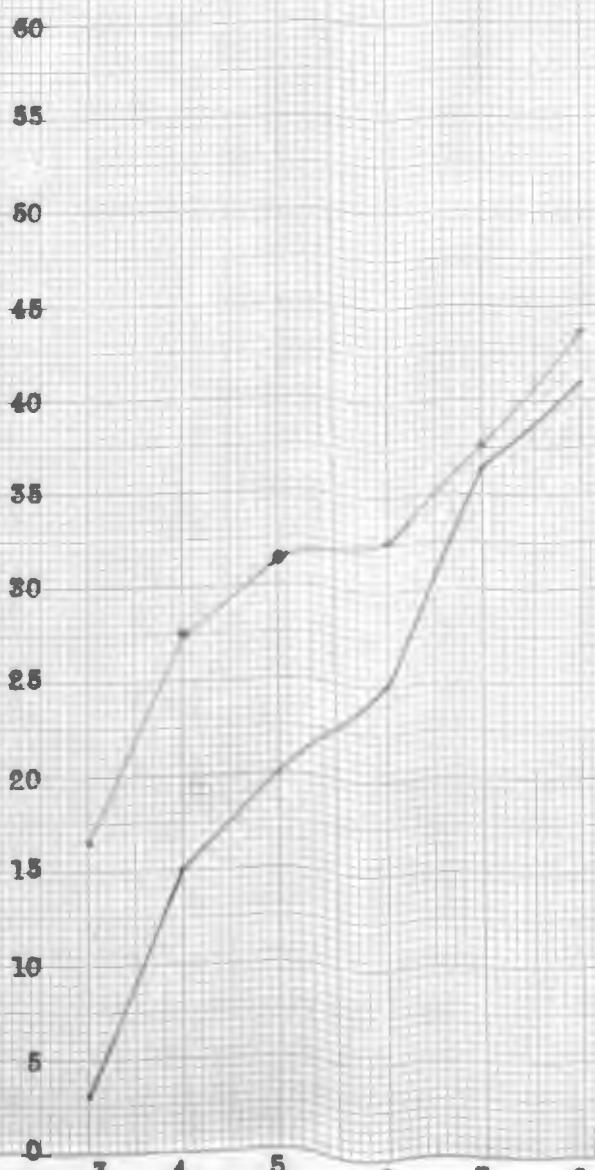
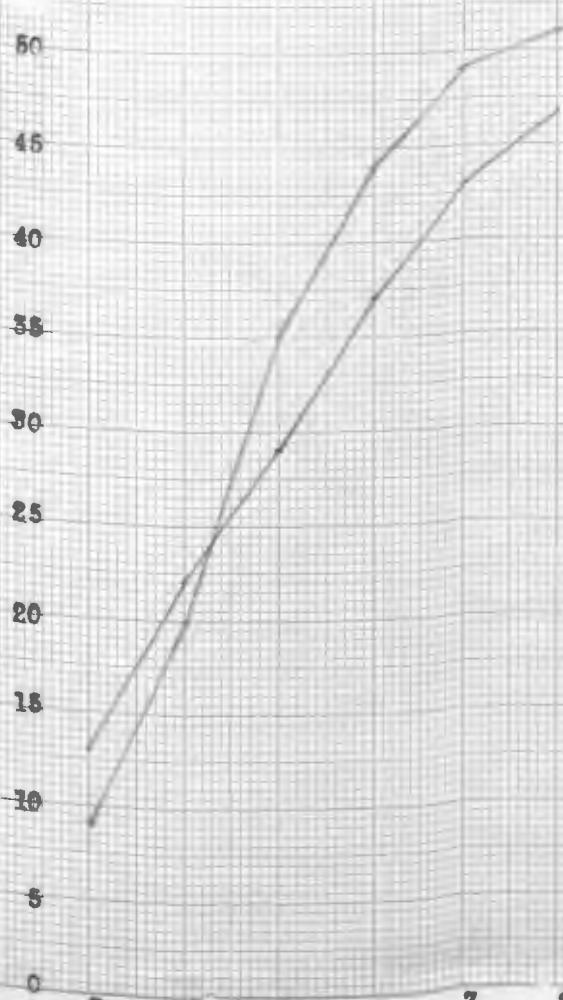
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5

0

Fig. 2

Fig. 3



b. M. E. Haggerty's Visual Vocabulary

This test consists of several lines of words having five words to the line. The children are directed to look at each word and put a certain letter in it if it means a certain thing. The pupil's response to these directions show how well he understands the meaning of the words given. A preliminary test is given to each child to prepare him for the real test and help is given him in this preliminary test if it is found necessary.

Directions for Giving the Test.

The same directions are used for this test as for the Understanding of Sentences until we come to section 4 when the following is used:

4. Say to the children: "On this page are some words. The reading tells you to do something to these words. Read the lines and do what it says to do. Read the instructions two or three times if necessary. When you have finished, bring your paper to me at the desk. At the signal, 'get ready' take up your pencil and look at me. At the signal, 'start,' begin work."

Directions for Scoring the Test.

1. Arrange the papers from a single class alphabetically in a pile.
2. Take from the pile the first paper and read through the child's markings until you come to a line in which an error or omission occurs. Place to the left of this line a figure indicating the number of errors and omissions in that line. Read through the remaining lines and indicate in a similar manner the number of errors and omissions. The highest numbered line which the child does with one (or no) omission or error is taken as his score. Check this score on the first page in the blank indicated. Proceed in a similar manner with each of the other papers of the class.

Class Scores.

1. Use class record sheet No. 1.
2. Enter in the wide space at the left the name of the pupil and at the appropriate places the figures indicating the number of errors and omissions in each line.
3. Add the numbers in each column and place the sum at the bottom of the score sheet. Find the percentage of error by dividing the sum thus obtained by five times the number of pupils in the class. The score of the

class may be taken as the line in which the percentage of error is 20.

4. If no single line gives exactly 20% of error, the actual class score will be intermediate between the two line which give nearest 20% of error.

¹
By means of a table this intermediate value may be calculated.

Checking and Computing of Scores.

The schools included the childrens papers and class record sheets in making returns to the Bureau and these were checked by the writer. This test seemed to be easier to correct than the Understanding of Sentences for very few mistakes were found. As a result, only a few class score had to be computed a second time.

The Initial or September Abilities.

Table 3 shows the initial abilities of the 5,032 pupils who took the Visual Vocabulary test in September. This table gives the number of pupils and the class scores for each grade in each school. A study of this table shows that the pupils in nearly 50% of the schools failed to make a score in the third grade and only three of the schools made a fairly high score. The fact that these three schools made scores above ten would tend to show that the test is not too difficult for third grade pupils. The only explanation I can give for so many zero scores is that the pupils in these schools did not understand the nature of the test and did not know what was wanted of them. In grades four and five, we have an instance of the lower grade making a slightly higher median score than the higher one. This is due to the fact that nine schools,—4, 5, 9, 11, 19, 21, 23, 24, and 26--made lower class scores in the fifth grade than in the fourth. However, Fig. 4 shows that there is a closer grouping of schools around the median in grade five than in grade four; also that four schools which were below the median in grade four—2, 6, 8, and 22--are above the median in grade five but this is offset by schools # 4, 9, and 21 which were above the median in the fourth and fall below in the fifth. This would seem to indicate that, in Minnesota, fifth grade teachers cease to put any stress on growth in vocabulary and that what improvement is made is incidental. It may be due to the crowding of the curriculum in the fourth and fifth grades so that more emphasis is put upon the quantity of work done than on quality.

1. Haggerty, M.E., "Ability to Read." Indiana Univ. Studies, No. 34, pp. 62-63.

A glance at Figure 4 shows that the schools tend to group themselves more closely about the median as they advance through the grades. This indicated some uniformity in the amount of teaching done but the small amount of increase, especially in grades six, seven and eight, shows that proper grade progression is not being looked after in respect to the meaning of the words acquired. This Figure shows that there was considerable variation in the progress of grades of the same school and also in the same grades of different schools. It is interesting to note that school No. 19 still maintains its place above the median in every grade as in the U. S. test but that it makes a higher median score in grade four than in grade five. School No. 1 which was constantly below the median in the U. S. test is still below in every grade but the sixth where it makes nearly the same score as its own seventh grade.

Table 3
READING--VISUAL VOCABULARY
Sept. 1916.

31

City	Third Gr.	Fourth Gr.	Fifth Gr.	Sixth Gr.	Seventh Gr.	Eighth Gr.						
	Pupils	So.	Pupils	So.	Pupils	So.	Pupils	So.	Pupils	So.	Pupils	So.
1.Medford	20	0.	22	16.5	20	17.	19	31.6	17	32.1	10	39.
2.Manter-ville	14	0.	9	.8	11	20.7	16	24.4	16	37.9	8	43.7
3.Merwood	23	0.	16	2.5	26	10.6	21	24.	15	37.3	27	36.2
4.Grand Meadow	15	0.	11	26.	16	19.8	26	21.4	16	35.7	23	40.8
5.Atwater	11	0.	10	24.	12	22.5	14	37.	14	22.2	11	37.1
6.Cokato	20	0.	24	12.5	21	31.8	26	35.	17	37.9	20	39.2
7.Henderson	16	0.	20	5.	14	19.4	17	36.3	11	35.	17	40.5
8.Stewart-ville	20	.3	26	15.9	16	32.8	21	20.4	17	28.4	17	43.9
9.Blackduck	22	2.	20	26.7	25	12.2	20	25.	17	40.7	16	41.1
10.Dodge Center					16	17.9	19	22.4	17	27.	20	36.7
11.Akeley			22	32.7	24	29.9	39	33.	23	38.1	34	45.7
12.Kenyon	28	0.	26	20.4	32	20.4	28	20.9	23	36.	30	41.8
13.Dawson	37	4.5	40	22.3								
14.Glencoe	26	0.	24	12.9	30	16.9	34	21.3	25	37.3	25	39.9
16.Glenwood	35	0.	58	13.6	46	14.6	53	32.6	59	34.7	33	40.7
18.Shakopee	17	2.6	10	5.	21	17.4	18	31.1	15	28.7	20	35.5
19.Luverne	53	3.2	54	25.4	48	21.2	48	34.8	50	42.6	55	45.2
20.Alexandria					69	31.8						
21.Waseca	51	0.	55	24.6	48	17.7	50	30.6	60	36.2	34	38.6
22.Eveleth	234	10.2	243	19.8	180	21.	149	20.1	75	35.4	80	39.2
23.Pillsbury	43	14.1	66	30.3	42	22.4	64	25.5	62	24.2	31	42.4
24.Prescott	74	0.	50	25.2	92	24.7	75	35.3	113	38.9	84	41.5
26.Chisholm	117	12.9	119	26.1	122	21.9	113	34.9	87	37.1	93	41.9
No. Pupils	876		915		862		936		755		688	
Medians		2.9		21.3		20.6		30.6		36.7		41.

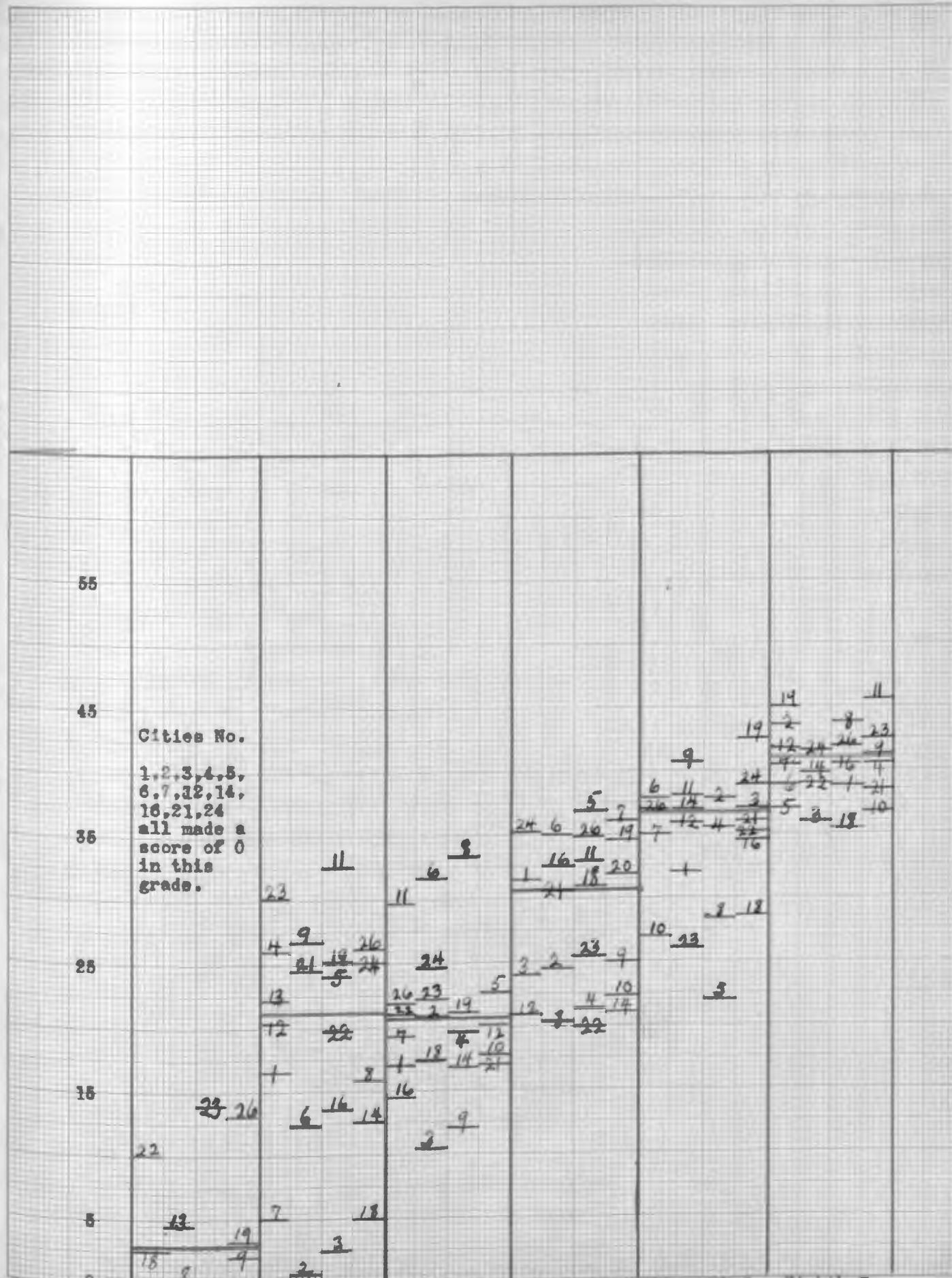


Fig. 4. Reading-Visual Vocabulary. Sept. 1916.

Improvement in Reading.

About one-half as many pupils took the February test in Visual Vocabulary as took the September test. After checking the February score sheets with the September and eliminating those not common to both, it was found that the median scores for September were somewhat different than when all the schools were used. Evidently some of the more erratic schools were eliminated for the median scores show progress from grade to grade which is more satisfactory. Grade three is, however, still unsatisfactory. It seems to me that a median score of at least ten ought to be expected on this test in September—judging by what these same pupils did with the February test.

The median scores in February also show progress from grade to grade. Comparing the medians for February with those for September, we find that improvement has been made in every grade. The amount of improvement in grade three is evidently too great. Figure 3 shows that while improvement is made in all grades, more improvement is made in the lower grades than in the upper ones. The figure shows that the seventh made the least improvement and the eighth next. This indicates that, beginning in the sixth grade, there is a general letting up in teaching proficiency of reading. Teachers, somehow, come to assume that children read well enough, that after a fair proficiency has been attained in vocabulary and sentence interpretation there is no longer any need for improvement in this field and that the attention can be turned to other things. In doing this, teachers forget that growth and development in these other subjects depends almost entirely upon improvement in reading ability.

Table 4.

READING—VISUAL VOCABULARY

Sept. 1916.

City	Third Gr.		Fourth Gr.		Fifth Gr.		Sixth Gr.		Seventh Gr.		Eighth Gr.	
	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.
2.Mantor-Ville	14	0.	9	.8	11	20.7	16	24.4	16	37.9	8	43.7
3.Norwood	23	0.	16	2.5	26	10.6	21	24.	15	37.3	27	36.2
5.Atwater	11	0.	10	24.	12	22.5	14	37.	14	22.2	11	37.1
7.Henderson	16	0.	20	5.	14	19.4	17	36.3	18	35.	17	40.5
8.Stewartville			26	15.9	16	32.8	21	20.4	17	28.4	17	43.9
12.Kenyen	28	0.	26	20.4	32	20.4	28.	20.9	23	36.	30	41.8
14.Glencoe			24	12.9	30	16.9	34	21.3	25	27.3	25	39.9
16.Glenwood	35	0.	58	13.6	46	14.6	53	32.6	58	34.7	33	40.7
22.Eveleth	234	10.2	160	30.6	129	19.9	101	31.8	66	35.4	89	39.2
26.Chisholm	117	12.9	119	26.1	122	21.9	113	34.9	87	37.1	93	41.9
No. Pupils	478		468		438		418		339		380	
Medians		3.		15.		20.		25.		36.4		41.

READING—VISUAL VOCABULARY

Feb. 1917.

2.Mantorville	15	1.7	7	32.2	9	25.	15	47.3	14	41.5	8	52.5
3.Norwood	23	4.6	15	14.3	28	13.2	20	28.8	16	33.9	27	33.9
5.Atwater	12	26.9	11	33.4	14	35.	13	33.4	14	39.	9	43.9
7.Hendersen	14	19.7	20	25.	15.	34.3	17	25.7	21	27.7	14	43.6
8.Stewartville			24	23.3	18	34.	21	35.	21	30.5	19	34.7
12.Kenyen	28	14.3	26	25.	32	32.	28	36.6	25	35.1	30	42.7
14.Glencoe			25	23.8	30	26.7	34	37.3	26	40.3	24	49.6
16.Glenwood	33	5.	57	25.7	45	35.2	62	23.5	49	44.4	29	44.
22.Evellehn	234	16.	160	34.2	129	22.8	101	32.2	66	38.4	89	56.5
26.Chisholm	117	19.7	119	29.1	122	23.7	113	24.6	87	45.3	93	51.
No. Pupils	476		464		442		426		339		342	
Medians.		16.6		27.5		31.6		32.5		37.5		43.7

c. Spelling-Ayres 1000 Word List-Line J.

An average of nearly 1,000 pupils per grade took this test in September. The test consisted of the following twenty words selected from line J:

blue	rest	read	large
town	help	cannot	down
grand	hard	line	bill
dark	cover	hip	want
game	age	saw	part

Directions for Giving the Test.

The words should be pronounced by the teacher to the children as an exercise in written spelling. The children should not know about the words previous to the spelling exercise. There should be no previous practice in the spelling of these particular words and the spelling list should be kept out of sight of the children.

Directions for Scoring the Test.

The papers of each child should be scored for the number of words correctly spelled. The score should be recorded at the top of the test paper. Class score: Arrange the names of the class alphabetically on the class score sheet. Copy from the individual test sheets the number of words correctly spelled by each child. In the column marked "Total" record the total number of words spelled correctly during the entire test (three lists of words). In the column marked "Per Cent" record the per cent of all words correctly spelled. Grade and city scores can be made in a similar manner.

Checking and Computing of Scores.

The pupils test papers were returned to the Bureau along with the score sheets and were checked for accuracy by the writer and two assistants. Very few corrections had to be made, the only one being in the figuring of class scores.

The Initial or September Abilities in Spelling.

The September scores for the different grades of each school are shown in Table 5. A study of this table shows that improvement was made from grade to grade up to the seventh grade according to the median scores. Comparison with the Ayres standard indicate that Minnesota schools are about one grade below standard. Only one school, the Pillsbury of Minneapolis, equals or exceeds Mr. Ayres' third grade standard, two schools, Medford and Chisholm, equal or exceed the standard for the fourth grade, 12 schools equal or exceed the median standard for fifth grade and no school does this in the sixth. Only one seventh and one eighth grade equals the sixth grade standard of 100%. Based on this test, it would seem that Minnesota pupils are very poor spellers. This comparison is not quite fair, however, for Ayres' standard scores were determined in the middle of the year instead of the beginning. A fairer basis for comparison will be the results of the February test.

Improvement in Spelling Ability.

About one-half of the pupils who took the September test also took the February test. This test consisted of twenty words as follows:

every	when	along	here
most	from	name	kind
said	wind	hope	found
work	print	glad	never
more	air	mine	report

Table 6 shows the results of the February test in comparison with the September test after the proper eliminations were made from the original September list. In Table 6, the medians show that progress was still made only up to the seventh grade in September but that continuous progress was made in February. This table shows that slight improvement was made in every grade but the sixth from September to February and this shows a very slight loss. If the average of the class scores were taken, this grade would show an improvement also. These facts are shown in Fig. 4X which enables one to compare the September scores for the entire 23 schools with the September and February results of the 12 schools. Ayres standard is also indicated. A study of this figure shows that the median for the fifth grade approaches this standard near-

est in February while the sixth comes the nearest in September. The words in line J are not supposed to be a test for seventh and eighth grad pupils at all but it seems to serve that purpose for Minnesota children except in a few cases. From these tests it seems safe to conclude that Minnesota pupils are poor spellers although they have made some improvement in the semester.

Table 5.
SPELLING, AYRES-LINE J., 20 WORDS.

38

Sept. 1916.

City	Third Gr. Pupils	Fourth Gr. Pupils	Fifth Gr. Pupils	Sixth Gr. Pupils	Seventh Gr. Pupils	Eighth Gr. Pupils
1.Medford	17	79	23	95	25	94
2.Manter-ville	15	35	10	79	9	92
3.Norwood	23	40	16	76	29	73
4.Grand Meadow	15	39	11	92	15	97
5.Atwater	12	55	10	74	14	84
6.Cekate	20	66	26	80	19	93
7.Henderson	14	46	19	84	15	88
9.Blackduck	21	66	20	86	25	95
10.Dodge Center	17	60	15	95	16	97
11.Akeley	29	59	43	82	31	93
12.Kenyon	29	33	26	75	30	93
14.Glencoe	24	66	23	87	31	96
15.Madisen			36	69	40	93
16.Glenwood	35	50	57	81	47	85
17.Grand Rapids	53	70	53	84	54	94
19.Luverne	51	72	54	90	49	95
20.Alexandria	58	56	57	81	72	90
21.Waseca	54	56	53	72	47	92
22.Eveleth	298	72	238	91	220	95
23.Pillsbury	45	86	69	93	42	96
24.Prescott	83	58	62	90	91	94
25.Van Cleve	54	68	52	89	33	98
26.Chisholm	211	62	224	97	211	96
No. Pupils	1088		1197		1165	
Medians % Minn.	60		85		94	
Medians Ayres	84		94		98	
					100	
						918
						835
						97.2
						97.8

Table 6.
SPELLING, AYRES-LINE J, 20 WORDS.

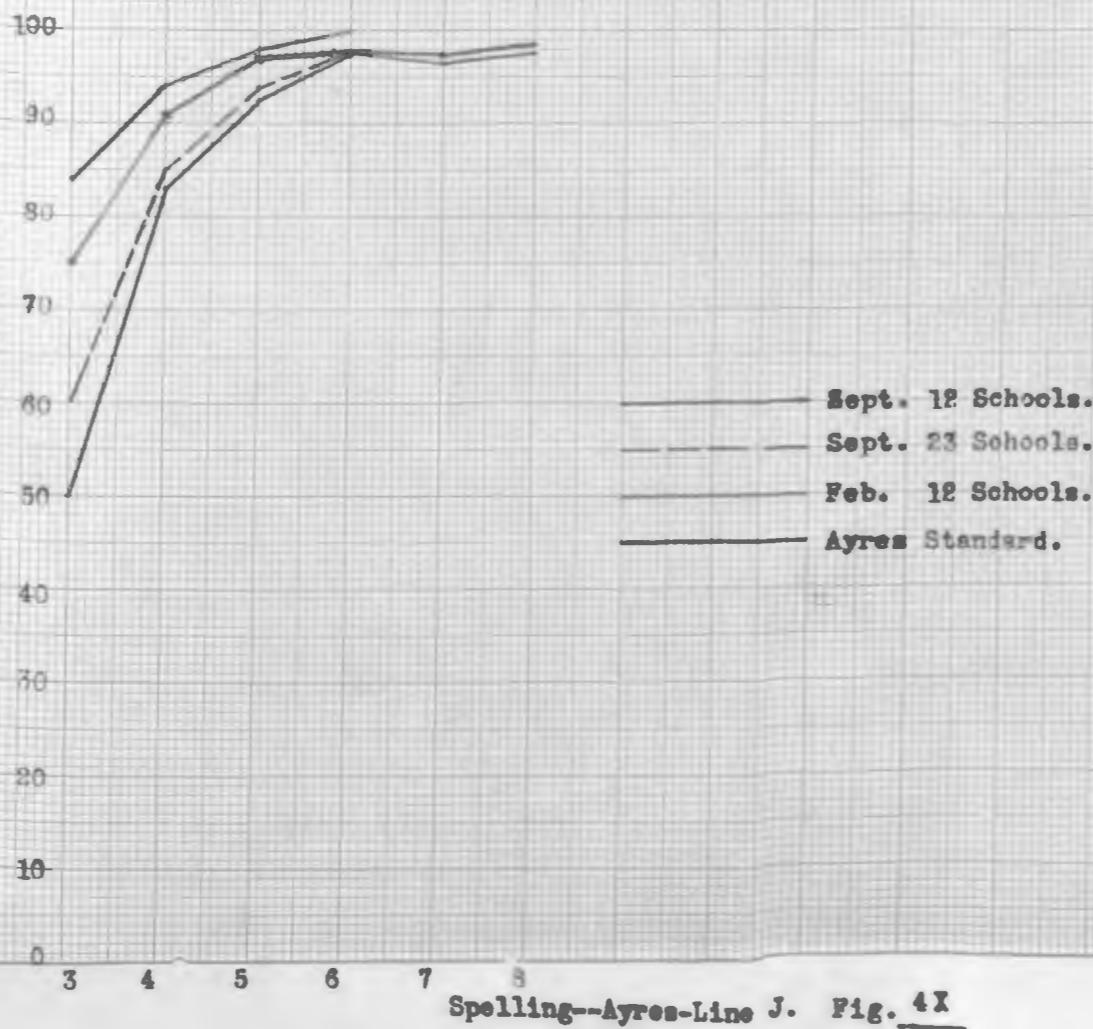
59

Sept. 1916.

City	Third Gr. Pupils	Fourth Gr. Pupils	Fifth Gr. Pupils	Sixth Gr. Pupils	Seventh Gr. Pupils	Eighth Gr. Pupils						
	%	%	%	%	%	%						
1.Medford	17	79	23	95	25	94	21	97	21	98	11	97
2.Mantor-ville	15	35	10	79	9	92	15	96	16	95	9	100
3.Norwood	23	40	16	76	29	75	24	95	15	96	26	99
4.Grand Meadow	15	39	11	92	15	97	28	97	16	93	24	96
5.Atwater	12	55	10	74	14	84	15	95	11	92	9	93
6.Cokato	20	66	26	80	19	93	25	97	19	98	18	96
7.Henderson	14	46	19	84	15	88	17	95	18	99	15	99
12.Kenyon	29	33	26	75	30	93	28	96	22	93	30	98
14.Glencooe			23	87	31	96	33	98	24	100	25	96
16.Glenwood	35	50	57	81	47	85	55	95	55	98	34	96
22.Eveleth	196	77	200	90	192	96	140	97	74	96	80	97
26.Chisholm	211	62	224	97	211	96	167	97	106	99	96	98
No. Pupils	587		645		637		568		397		377	
Medians % Minn.		50		83		92.5		97.5		96.6		97.5

Feb. 1917.

City	Third Gr. Pupils	Fourth Gr. Pupils	Fifth Gr. Pupils	Sixth Gr. Pupils	Seventh Gr. Pupils	Eighth Gr. Pupils						
	%	%	%	%	%	%						
1.Medford	17	74	23	96	25	96	21	99	21	98	11	99
2.Mantor-ville	15	74	10	98	9	98	15	96	16	99	9	100
3.Norwood	23	65	16	84	29	88	24	98	15	98	26	99
4.Grand Meadow	15	69	11	90	15	99	28	98	16	97	24	99
5.Atwater	12	81	10	94	14	96	15	98	11	97	9	99
6.Cokato	20	83	26	90	19	99	25	99	19	99	18	100
7.Henderson	14	82	19	92	15	95	17	97	18	99	15	99
12.Kenyon	29	64	26	86	30	96	28	98	22	98	30	96
14.Glencooe			23	89	31	96	33	94	24	99	25	100
16.Glenwood	35	70	57	89	47	93	55	96	55	99	34	99
22.Eveleth	196	84	200	95	192	97	140	98	74	99	80	99
26.Chisholm	211	86	224	89	211	98	167	99	106	99	96	96
No. Pupils	587		645		637		568		397		377	
Medians % Minn.		75		91		97		97.2		97.5		98.3
Median % Ayres		84		94		98		100				



d. Spelling-Ayres' 1,000 Word List, Line Q.

Practically the same number of pupils took this test of 15 words that took the one from line J. In most schools, they were given on the succeeding day and this accounts for the slight difference in number of pupils.

The test consisted of the following words:

position	arrest	suppose
ledge	special	direction
primary	present	although
result	justice	attempt
information	enclose	statement

The directions for Giving and Scoring the test and for Computing the scores are the same as stated under section c.

The Initial or September Abilities--Line Q.

The September scores for each grade in each school are shown in Table 7. Third grade pupils were not expected to make a score on this test. The table shows that progress was made from grade to grade but in no grade does the Minnesota median approach the standard median close. No fourth or fifth grade score equals or exceeds the standard for those grades. One sixth, two seventh's and two eighth's only equal or exceed the standard for those grades. Comparison of the medians with the standard shows that Minnesota pupils are about one grade behind in spelling ability.

Improvement in Spelling Ability--Line Q.

The February test of 15 words were as follows:

connection	command	term
firm	debate	section
religion	crowd	measure
convict	factory	serve
private	represent	either

Table 8 gives the number of pupils and the scores for each grade of each school for both September and February. A study of this table shows that progress was made from grade to grade in both tests and that considerable improvement was made from September to February in every grade. Comparison of the medians with Ayres' standard show that they do not meet the standard for any grade in either test. Fig. 8 indicates these same facts in graphical form and shows that the sixth and eighth grades nearly reach the standard in February.

Table 7.
SPELLING, AYRES-LINE Q, 15 WORDS

Sept. 1916.

City	Third Gr. Pupils	Fourth Gr. Pupils	Fifth Gr. Pupils	Sixth Gr. Pupils	Seventh Gr. Pupils	Eighth Gr. Pupils
1.Medford	17	6	23	19	25	50
2.Manter-ville	15	4	10	16	9	53
3.Norwood	23	3	16	9	29	34
4.Grand Meadow	15	0	11	22	15	49
5.Atwater	12	4	10	10	14	25
6.Cokato	20	13	26	11	19	52
7.Henderson	16	2	19	25	15	35
9.Blackduck	21	5	20	16	25	44
10.Dodge Center	17	15	15	43	16	51
11.Akely	30	6	44	29	35	41
12.Kenyen	28	1	25	11	33	34
14.Glencoe	24	9	23	17	31	45
15.Madison			35	23	37	54
16.Glenwood	35	3	58	18	47	81
17.Grand Rapids	51	5	54	21	53	67
19.Luverne	51	17	52	35	49	80
20.Alexandria	58	4	59	13	72	51
21.Waseca	54	5	53	16	47	54
22.Eveleth	218	9	238	33	217	54
23.Pillsbury	45	20	69	41	42	44
24.Prescott	83	5	62	30	91	41
25.Van Cleve	54	8	52	20	33	51
26.Chisholm	211	8	224	36	211	57
No. Pupils	1098		1198		1165	
Median % Minn.		6.5		21		50.5
Median % Ayres				58	78	84
						70
						84.4
						92
						96
						91
						852

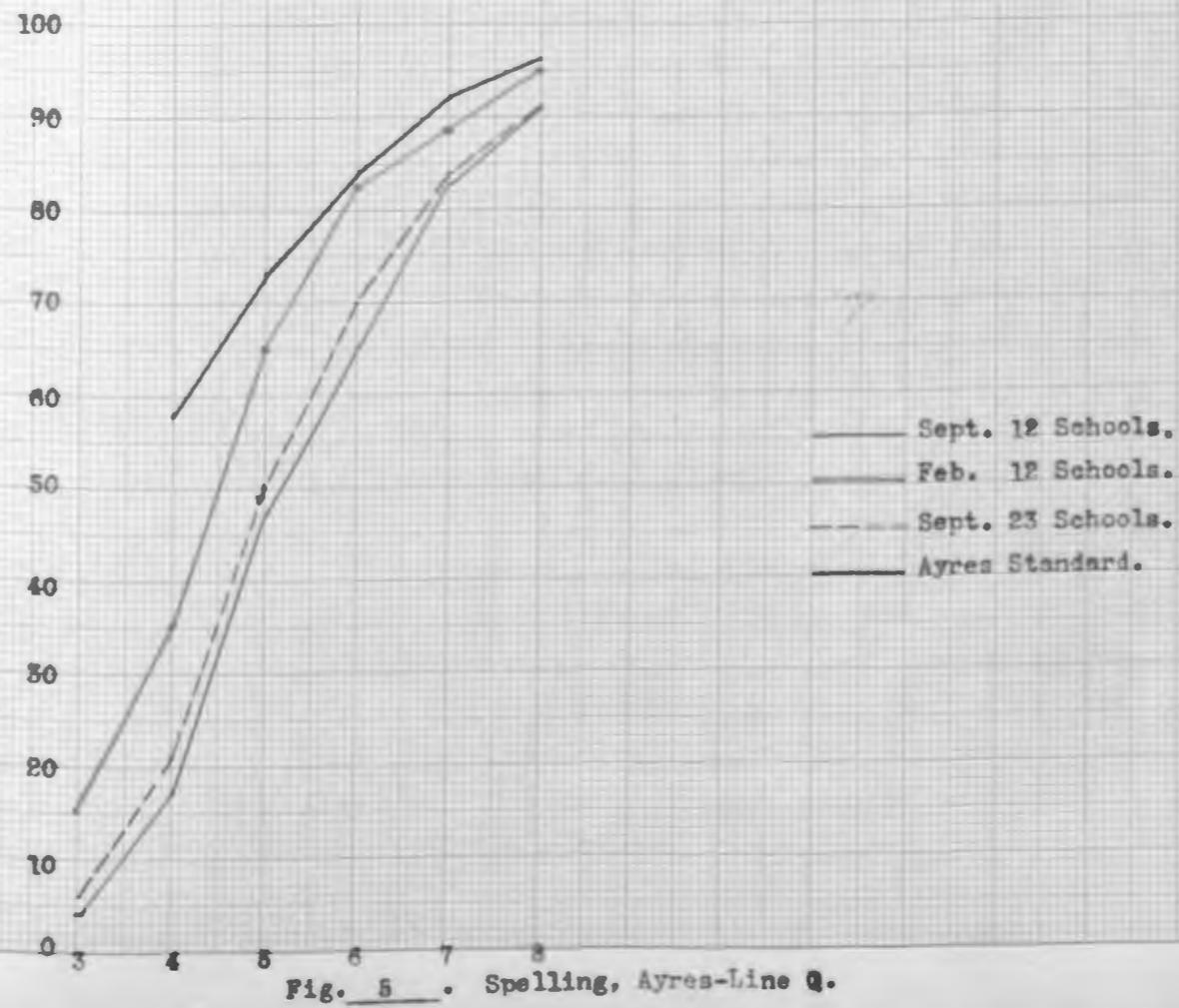
Table 8
SPELLING, AYRES-LINE Q., 15 WORDS

Sept. 1916.

City	Third Gr. Pupils	Fourth Gr. %	Fifth Gr. Pupils	Sixth Gr. %	Seventh Gr. Pupils	Eighth Gr. %
1.Medford	17	6	23	19	25	50
2.Mantorville	15	4	10	16	9	53
3.Norwood	23	8	16	9	29	34
4.Grand Meadow	15	0	11	22	15	49
5.Atwater	12	4	10	10	14	25
6.Cokato	20	13	26	11	19	52
7.Henderson	16	2	19	25	15	35
12.Kenyon	28	1	25	11	33	34
14.Glencoce			23	17	31	45
16.Glenwood	35	3	58	18	47	31
22.Eveleth	196	10	200	33	192	59
26.Chisholm	211	8	224	36	211	87
No. Pupils	588		645		640	
Median % Minn.		4.3		17.5	47.5	65
						83
						91

Feb. 1917.

City	Third Gr. Pupils	Fourth Gr. %	Fifth Gr. Pupils	Sixth Gr. %	Seventh Gr. Pupils	Eighth Gr. %
1.Medford	17	12	23	38	25	66
2.Mantorville	15	12	10	32	9	80
3.Norwood	23	9	16	27	29	60
4.Grand Meadow	15	6	11	29	15	74
5.Atwater	12	28	10	54	14	52
6.Cokato	20	34	26	46	19	85
7.Henderson	16	16	19	44	15	41
12.Kenyon	28	8	25	22	33	87
14.Glencoce			23	32	31	54
16.Glenwood	35	10	58	33	47	47
22.Eveleth	196	27	200	59	192	83
26.Chisholm	211	21	224	44	211	77
No. Pupils	586		645		640	
Median % Minn.		15		35	65	82.5
Median % Ayres			58	73	84.	92.
						95
						96



e. Spelling-Buckingham, Groups A, C, and E.

This test of fifteen words along with the words from Ayres lists made up the entire test of fifty words. The September test consisted of the following words:

Tuesday	raise	nails
forty	touch	butcher
towel	tying	cousin
against	minute	choose
guess	saucer	pigeons

The directions for giving and scoring the test and for computing the scores are the same as stated under section c.

The Initial or September Abilities.

Table 9 gives the number of pupils and scores for each grade of each school. There are no standard scores for these words. Since the children were not up to the standard set by Ayres, it is probable that the median scores found here are a little low. A study of Table 9 shows that good improvement was made from grade to grade although the amount of improvement is greater the lower the grade. It is interesting to note the variation in the scores of the three Minneapolis schools, 23, 24 and 25. These three schools are under the supervision of the same Principal. In grades three and four, the Pillsbury makes the best score but in grades five and six the Van Cleve gets the highest while in the seventh and eighth, the Prescott comes to the top.

Improvement in Spelling Ability.

For the purpose of measuring improvement, Groups B, D, and F were given in February. These words are of practically the same difficulty as the Groups A, C, and E. Following are the words:

answer	freeze	bought
instead	wear	pretty
whole	pear	stopping
janitor	button	telephone
carriage	sword	saucy

The results of this test are found in Table 10. An inspection of this shows that about the same progress is made from grade to grade as before; that considerable improvement was made over the Sept. scores; that the greatest improvement was made in grade three and that the amount decreased from the third to the eighth. Fig. 6 shows the last point best.

SPELLING, BUCKINGHAM-GROUPS A, C, and E, 15 WORDS

Sept. 1916.

City	Third Gr. Pupils	Fourth Gr. Pupils	Fifth Gr. Pupils	Sixth Gr. Pupils	Seventh Gr. Pupils	Eighth Gr. Pupils
1.Medford	17 14	23 44	25 59	21 63	21 75	11 85
2.Manter-ville	18 4	10 27	9 56	15 73	16 85	9 92
3.Herwood	23 3	16 14	29 42	24 54	15 77	26 89
4.Grand Mendota	18 4	11 31	18 61	27 65	17 75	26 87
5.Altwater	12 24	10 37	14 42	15 66	11 71	9 83
6.Oekate	20 6	26 24	29 64	25 75	19 87	18 89
7.Henderson	13 8	19 33	18 50	17 78	18 74	15 75
9.Blackduck	22 37	20 41	25 54	20 81	17 81	14 89
10.Dodge Center	17 20	16 49	18 70	17 75	17 81	21 86
11.Akeley	29 7	42 30	34 59	42 69	24 83	20 80
12.Kenyon	28 3	25 20	32 63	28 64	23 68	31 86
14.Glencoe	24 9	23 28	31 60	33 74	24 88	25 84
15.Madisen		36 30	39 53	34 76	45 81	48 81
16.Glenwood	35 6	53 27	47 40	56 60	53 80	34 87
17.Grand Rapids	82 14	54 40	54 51	87 74	48 89	80 86
19.Luverne	81 25	55 40	49 65	49 87	50 88	85 87
20.Alexandria	61 8	87 26	71 54	58 67	53 90	82 89
21.Waseca	54 9	53 35	47 61	48 78	59 87	75 80
22.Eveloth	217 21	258 53	222 69	182 82	110 88	108 92
23.Pillsbury	45 32	69 60	42 60	60 78	60 89	89 88
24.Presecott	83 7	62 38	91 48	73 72	109 89	85 88
25.Van Cleve	54 16	52 28	33 63	35 60		
26.Ohishholm	211 15	224 42	211 65	167 84	104 94	98 90
No. Pupils	1098	1201	1170	1093	916	856
Median % Minn.	9.3	35	60	74	85	86.7

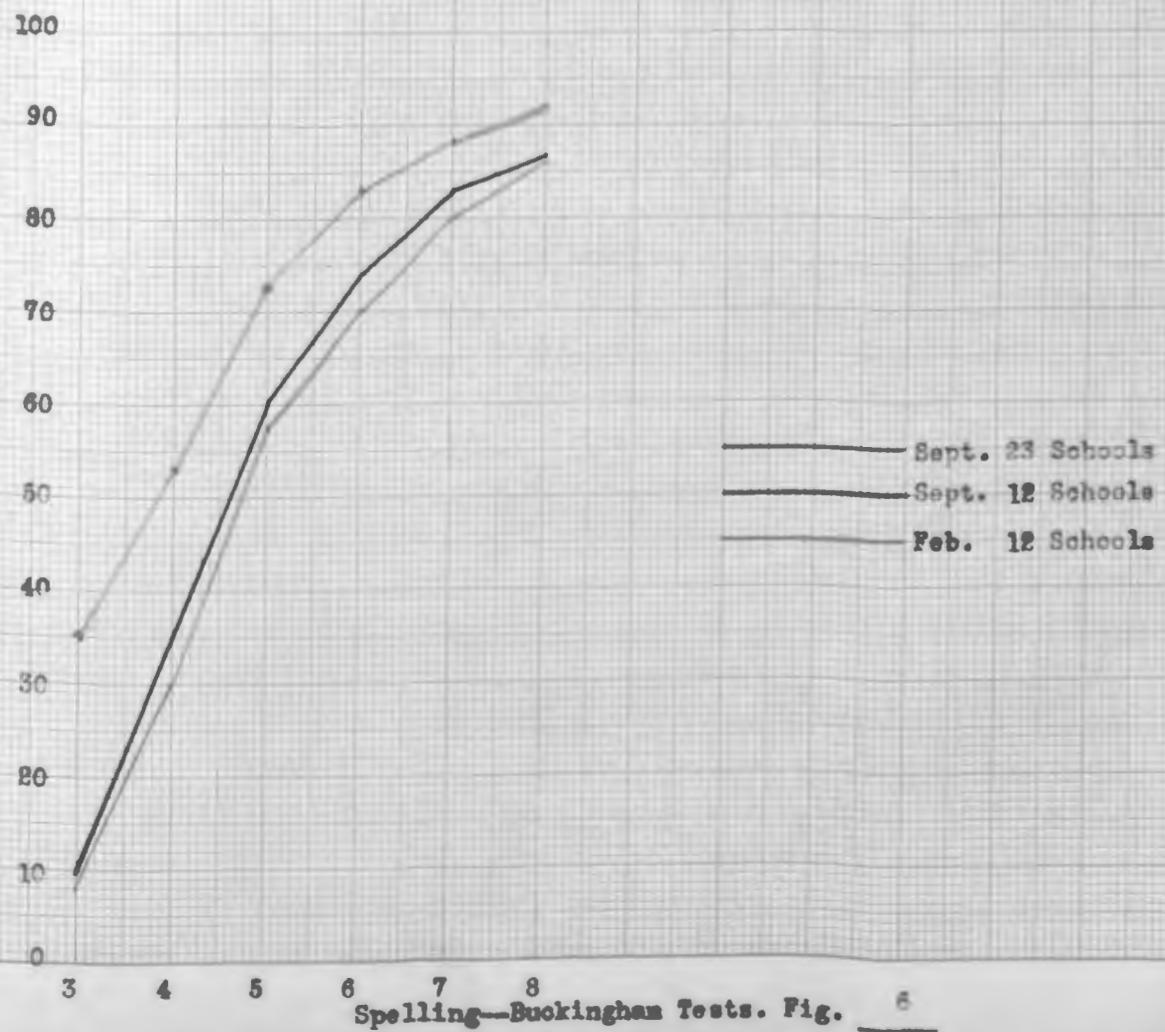
Table 10.
SPELLING, BUCKINGHAM-GROUPS A, C, and E, 15 WORDS

Sept. 1916.

City	Third Gr. Pupils		Fourth Gr. Pupils		Fifth Gr. Pupils		Sixth Gr. Pupils		Seventh Gr. Pupils		Eighth Gr. Pupils	
	%		%		%		%		%		%	
1.Medford	17	14	23	44	25	59	21	68	21	75	11	85
2.Mantorville	15	4	10	27	9	56	15	73	16	85	9	92
3.Norwood	23	3	16	14	29	42	24	54	15	77	26	89
4.Grand Meadow	15	4	11	31	15	61	27	65	17	75	26	83
5.Atwater	12	24	10	37	14	42	15	66	11	71	9	83
6.Cokato	20	6	26	24	19	64	25	75	19	87	18	89
7.Henderson	13	8	19	33	15	50	17	78	18	74	16	75
12.Kenyon	28	3	25	20	32	53	28	64	23	68	31	86
14.Glencoe			23	28	31	60	33	74	24	88	25	84
16.Glenwood	35	6	53	27	47	40	56	60	53	80	34	82
22.Eveleth	196	22	200	54	192	70	140	82	74	86	80	93
26.Chisholm	211	15	224	42	211	66	167	84	106	94	96	90
No. Pupils	589		650		635		568		397		374	
Median % Minn.		8		30		57.5		70		80		86

Buckingham -- Feb. 1917. Groups B, D, and F.

City	Third Gr. Pupils		Fourth Gr. Pupils		Fifth Gr. Pupils		Sixth Gr. Pupils		Seventh Gr. Pupils		Eighth Gr. Pupils	
	%		%		%		%		%		%	
1.Medford	17	24	23	42	25	60	21	85	21	76	11	85
2.Mantorville	15	19	10	46	9	83	15	88	16	88	9	92
3.Norwood	23	34	16	53	29	51	24	79	15	90	26	95
4.Grand Meadow	15	35	11	61	15	76	27	71	17	82	26	94
5.Atwater	12	42	10	55	14	61	15	91	11	73	9	85
6.Cokato	20	41	26	53	19	78	25	84	19	90	18	92
7.Henderson	13	30	19	57	18	70	17	84	18	87	16	86
12.Kenyon	28	20	25	37	32	73	28	75	23	78	31	90
14.Glencoe			23	35	31	67	33	84	24	93	25	92
16.Glenwood	35	23	53	56	47	51	56	74	53	85	34	92
22.Eveleth	196	43	200	73	192	78	140	87	74	91	80	95
26.Chisholm	211	49	224	52	211	84	167	88	106	91	96	91
No. Pupils	589		650		635		568		397		374	
Median % Minn.		35		53		72.5		83		88		92



f, Language-Trabue, Scales B and C.

Each of these tests consists of a number of incomplete sentences which form a scale. They are designed to measure how carefully and rapidly a child can think and how good he is in language work. Incidentally, these tests also measure general intelligence.

Directions for Giving the Test.

After the preliminary test has been given, the teacher is instructed to say to the pupils:

4. "You are to write one word on each blank, in each case selecting the word which makes the most sensible statement." You may have just seven minutes in which to sign your name at the top of the page and write the words that are missing. The papers will be passed to you face downward. Do not turn them over until we are all ready. After the signal is given to start, remember that you are to write just one word on each blank and that your score depends upon the number of perfect sentences you have at the end of seven minutes."

Directions for Scoring the Test.

Answers should be scored 2, 1, or 0 depending on where in the key the answer is found. All answers not found in the key should be listed as zero. The individual scores the sum of all the points made on the entire test.

Class scores:

1. Arrange the papers in alphabetical order.
2. Record on class record sheet the name of each pupil and the number of points with which he should be credited for each sentence.
3. Total these points at the right in the space marked "Total." These figures will represent the ability of the individual pupil.
4. Total each column at the bottom of the page. Find the class percentage by dividing the total for each sentence by twice the number of pupils in the class. The sentence in which the class percentage is nearest 80 may be taken as the class score.

1. Trabue, R. M., Completion-Test Language Scales. Contributions to Education No. 77, Columbia University, New York. p 81.

Checking and Computing of Scores.

In checking over the pupils papers, it was found that but few corrections had to be made. However, when the February papers came in it was necessary to do considerable checking on account of the change of number of pupils taking the test.

The Initial or September Scores in Language.

About seven hundred pupils took the Scale C test in each grade in each school. Table 11 gives the number of pupils and scores made. The scores are expressed as the scale value of the sentence which represented the class score for each grade. An inspection of Table 11 shows that progress was made from grade to grade although the medians are the same for grades five and six and also seven and eight. This is due to the fact that there is not a close system of scoring. We are to consider as the standard for any grade that sentence which was completed by 80% of the class and practically no case will this be exactly 80. Comparing the medians for September with the standards suggested by Trabue we find that Minnesota is above for every grade. The above standards, however, were intended for Scale B but as the value of these scales are approximately the same, it is fair to use this standard for scale C also.

Improvement in Language Ability.

A little over fifty per cent of the pupils who took the September test also took the February test when Scale B was used. Table 12 and Fig. 7 show the results of the February test in comparison with the September scores of the same pupils. In order to get a more accurate score for each grade than the median, I found the average median score by multiplying the score for each grade in each school by the number of pupils. Adding the products and dividing by the total number of pupils for each grade gave me a score for each grade that was influenced by the actual number of pupils taking the test. An inspection of Fig. 7 and Table 12 shows that actual progress was made from grade to grade; also that grades six and eight made the greatest amount of improvement. Fig 7 shows that the third grade scores were above the standard in both tests but the Sept. scores are below it in all other grades. The Feb. scores remain above the standard in all grades. Probably our Minnesota scores for Feb. would be a better standard although the seventh grade score seems a little low.

Table 11.

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LANGUAGE--Trabue, Scale C.

Sept. 1918.

	Third Gr.	Fourth Gr.	Fifth Gr.	Sixth Gr.	Seventh Gr.	Eighth Gr.						
	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.				
1.Medford	17	1.38	22	3.58	19	4.47	15	4.47	21	4.47	11	5.69
2.Mantor-ville	14	1.38	9	2.52	10	5.69	15	3.58	15	5.69	8	5.69
3.Norwood	21	1.38	17	4.47	30	4.47	24	4.47	15	4.47	28	3.58
5.Atwater	12	1.38	9	2.52	13	4.47	15	3.58	13	3.58	12	5.69
7.Henderson	17	1.38	22	2.52	13	3.58	16	3.58	21	5.69	16	4.47
9.Blackduck	22	2.52	20	2.52	25	4.47	21	5.69	17	5.69	17	4.47
10.Dodge Center	17	2.52	15	3.58	16	4.47	19	5.69	17	4.47	20	6.95
11.Akeley	52	1.38	48	4.47	37	5.69	42	4.47	28	7.85	38	5.69
12.Kenyen	29	1.38	25	3.58	32	2.52	28	5.69	26	5.69	29	4.47
13.Dawson	38	2.52	41	3.58	38	3.58	37	4.47	42	5.69	33	5.69
14.Glencooe	25	2.52	24	3.58	31	4.47	33	5.69	25	5.69	26	4.47
16.Glenwood	35	1.38	58	2.52	48	4.47	57	3.58	55	5.69	35	5.69
18.Shakepee	16	2.52	14	2.52	19	4.47	13	4.47	12	5.69	24	5.69
19.Luverne	49	2.52	57	4.47	47	4.47	48	5.69	51	4.47	59	4.47
20.Alexandria					76	3.58	70	5.69	51	5.69	82	6.95
22.Eveleth	227	2.52	244	2.52	209	3.58	161	5.69	111	4.47	109	5.69
23.Pillsbury	39	4.47	69	3.58	43	4.47	59	4.47	61	4.47	33	6.95
24.Prescott	68	2.52	54	4.47	92	4.47	76	4.47	114	5.69	80	5.69
No. Pupils	698		748		798		749		695		630	
Medians		2.52		3.58		4.47		4.47		5.69		5.69
Trabue standard	1.98		2.94		4.26		4.26		5.40		5.40	

Table 12
LANGUAGE--TRABUE, SCALE C.

52

Sept. 1916.

	Third Gr.	Fourth Gr.	Fifth Gr.	Sixth Gr.	Seventh Gr.	Eighth Gr.	
Pupils	Sc.	Pupils	Sc.	Pupils	Sc.	Pupils	Sc.

2.Mantor-ville	14	1.38	9	2.52	10	5.69	15	3.58	15	5.69	8	5.69
3.Norwood	21	1.38	17	4.47	30	4.47	24	4.47	18	4.47	28	3.58
5.Atwater	12	1.38	9	2.52	13	4.47	15	3.58	13	3.58	12	5.69
7.Henderson	17	1.38	22	2.52	13	3.58	16	3.58	21	5.69	16	4.47
12.Kenyon	29	1.38	25	3.58	32	2.52	28	5.69	26	5.69	29	4.47
13.Dawson	38	2.52	41	3.58	38	3.58	37	4.47	42	5.69	33	5.69
16.Glenwood	35	1.38	58	2.52	48	4.47	67	3.58	55	5.69	38	5.69
22.Eveleth	227	2.52	244	2.52	165	3.58	111	4.47	86	4.47	71	5.69
No. Pupils	393		425		349		313		273		232	
Medians		1.38		2.52		3.58		3.58		5.69		5.69
Av. Medians		2.14		2.76		3.77		3.93		4.80		5.20

LANGUAGE--Trabue, Scale B.

Feb. 1917.

2.Mantor-ville	15	2.94	7	4.26	11	5.40	15	6.50	14	5.40	9	5.40
3.Norwood	21	2.94	14	4.26	28	4.26	20	5.40	17	5.40	33	5.40
5.Atwater	12	4.26	11	4.26	14	5.40	13	6.50	14	2.94	9	6.50
7.Henderson	15	1.98	20	2.94	15	5.40	17	5.40	20	6.50	14	5.40
12.Kenyon	29	4.26	26	4.26	32	6.50	28	5.40	24	5.40	32	6.50
13.Dawson	37	2.94	40	5.40	41	5.40	32	5.40	37	6.50	33	6.50
16.Glenwood	35	2.94	59	2.94	42	5.40	64	5.40	50	5.40	32	6.50
22.Eveleth	227	2.94	244	2.94	165	4.26	111	5.40	86	5.40	71	7.42
No. Pupils	393		425		349		313		273		232	
Medians		2.94		4.26		5.40		5.40		5.40		6.50
Av. Medians		3.03		3.34		4.87		5.50		5.54		6.96

Write only one word on each blank

Time Limit: Seven Minutes

NAME.....

TRABUE
LANGUAGE SCALE B

1. We like good boys girls.
6. The is barking at the cat.
8. The stars and the will shine tonight.
22. Time often more valuable money.
23. The poor baby as if it were sick.
31. She if she will.
35. Brothers and sisters always to help other and should quarrel.
38. weather usually a good effect one's spirits.
48. It is very annoying to tooth-ache, often comes at the most time imaginable.
54. To friends is always the it takes.

Write only one word on each blank
Time Limit: Seven Minutes

NAME

**TRABUE
LANGUAGE SCALE C**

2. The sky blue.
5. Men older than boys.
12. Good boys kind their sisters.
19. The girl fell and her head.
24. The rises the morning and at night.
30. The boy who hard do well.
37. Men more to do heavy work women.
44. The sun is so that one can not directly causing great discomfort to the eyes.
53. The knowledge of use fire is of important things known by but unknown animals.
56. One ought to great care to the right of , for one who bad habits it to get away from them.

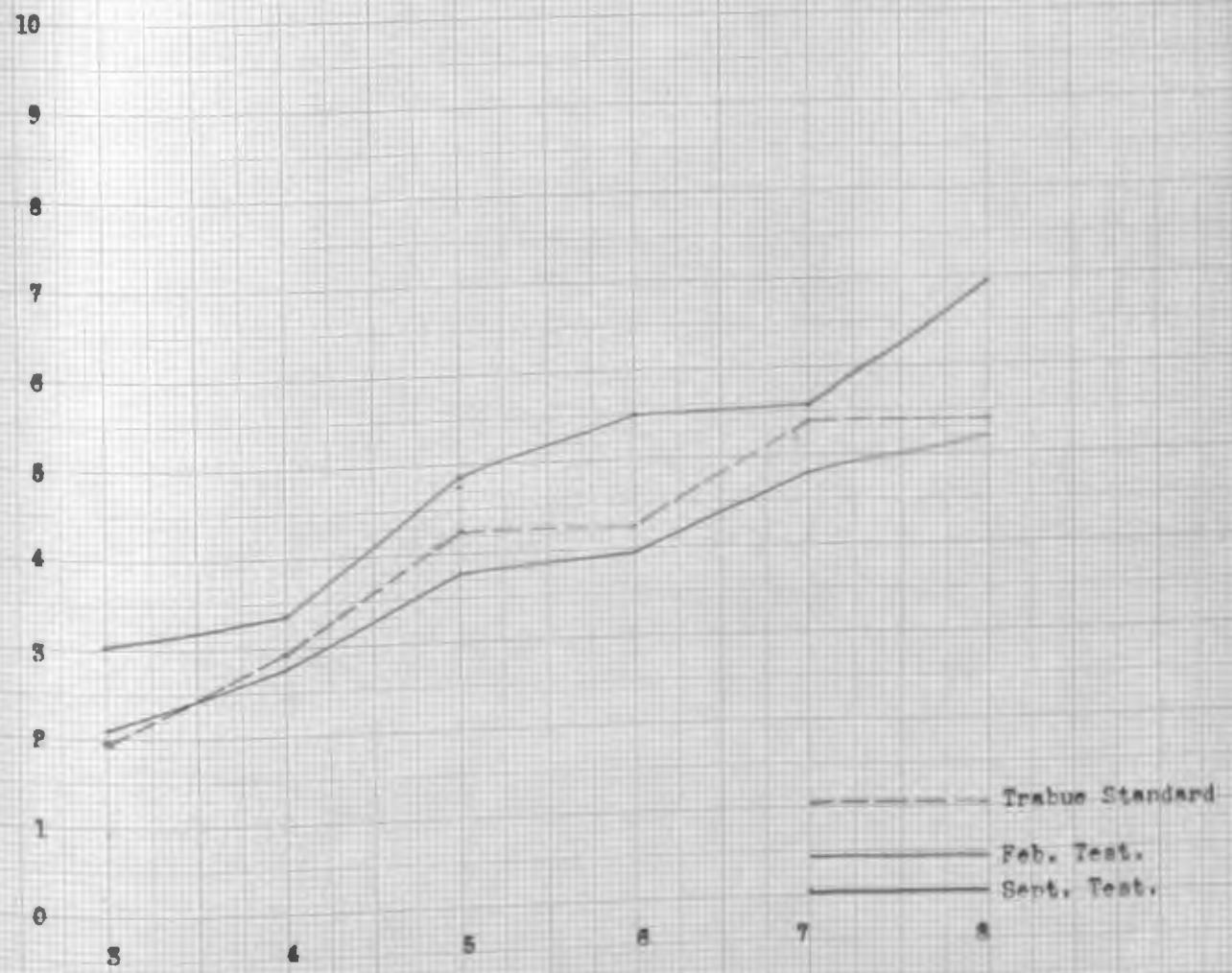


Fig. 7.

Language- Trabue: B and C.

g. Handwriting—Ayres' Scale, September.

This test consisted in writing the following stanza as many times as possible in three minutes:

Sing a song of sixpence, pocket full of rye,
 Four and twenty blackbirds baked in a pie;
 When the pie was opened the birds began to sing,
 Wasn't that a dainty dish to set before the king.

Directions for Giving the Test.

1. Distribute sufficient paper to each pupil.
2. Have pupils write information in the blanks.
3. Have the children read the stanza until familiar with it. Then say to the class: "I am going to test your handwriting. You are to write the stanza which you have just read. You will be given three minutes in which to write. You will be graded both upon how much you write and upon how well you write. You must, therefore, write as well as you can and also as fast as you can. Remember: fast work and good work. Ready! Start!" Before taking up the paper have the pupils count the number of letters written. He should write this number at the top of his test sheet.

Directions for Scoring Tests.

The method of using the scale is the method of comparison. Arrange the papers alphabetically. Take the first child's paper and place it beside the lower part of the scale. If you judge it to be better than the specimens under 20, compare it with those under 30 etc. until you find the section it is most nearly like. Have this done by three judges and for the final score choose the value intermediate between the other two scores.

To find the class score:

1. Arrange the final scores in a column in order of magnitude, placing the highest score at the top.
2. Divide the column by drawing a line between two scores so that as many scores appear above the line as below.
3. In a similar fashion divide the scores falling below this line into two halves so that three-fourths of the scores are above the last line.

4. The score immediately above this line will then be considered the score for the class, because 75% of the class will equal or exceed that score.

Checking and Computing of Scores.

The papers and the score sheets were taken by the writer and carefully checked for mistakes. It was found that many teachers were unable to find the "final score" properly. The directions stated that they were to take the value intermediate between the other two scores. Some took this to mean the score in the middle column and others insisted on averaging the three scores. Pupils made so many errors in counting their letters that it was necessary to re-count every paper. A great many pupils stopped writing when the stanza was completed once. This was especially true in the lower grades.

The Initial or September Abilities.

Specimens of handwriting were obtained from 2,404 pupils distributed as shown in Table 15. This table gives the scores in quality and speed for each school in each grade. A study of this shows that Minnesota school children make fair progress from grade to grade in both speed and quality but comparisons with the Ayres standards show that the initial ability in speed is much too low in grades three to six, that it is just at the standard in grade seven and far above it in grade eight. In quality, however, the score is low in every grade. The facts are brought out very clearly in Fig. 8 which is arranged according to Ayres recent method. This shows that the four lower grades are back one whole grade in speed and that grade approaches the standard in quality. Fig. 9 shows the same thing in another way and also enables one to compare Minnesota with 56 other cities in the United States. It shows that the 56 cities exceed Minnesota in grades three, four, and five in speed but that they fall behind grades six, seven and eight. Minnesota is far below the 56 cities in quality.

The Improvement in Handwriting.

Nearly 1,400 pupils took the test in February. Table 14 shows that good progress was made from grade to grade in both speed and quality in Feb. Comparison with the September scores show that improvement was made in speed but practically no improvement was made in quality. This means that Minnesota

teachers should put more emphasis on the quality of writing and less on speed.

In connection with this, it would be interesting to know how much time was spent on writing in the different schools and grades. An experiment made at Norman, Oklahoma on 182 pupils showed that the pupils who spent fifty minutes per week made as much improvement in 18 weeks as those who spent twice that time.

Table 13.
HANDWRITING

37

Scores in Quality and Speed in Each School

Sept. 1916

City	Third Gr.		Fourth Gr.		Fifth Gr.		Sixth Gr.		Seventh Gr.		Eighth Gr.	
	Q	S	Q	S	Q	S	Q	S	Q	S	Q	S
3.Norwood	25	42	30	52	30	47	30	58	40	72	40	72
6.Cokato	30	33	25	46	30	57	40	61	40	74	50	80
7.Henderson	30	28	30	37	30	65	30	77	45	69	40	75
9.Blackduck	20	31	30	28	30	62	40	85	40	100	50	99
12.Kenyon	20	29	30	55	30	64	40	64	45	83	50	85
14.Glencooe	30	28	30	40	30	46	40	61	30	82	40	76
16.Glenwood	20	31	20	47	30	53	40	60	30	79	50	87
19.Luverne	20	41	30	61	30	76	25	68	25	80	30	93
20.Alexandria			25	40	20	52	30	60	35	85	40	120
22.Eveleth			30	45	35	47	30	47	50	62	50	71
Median Quality	28		31		35		35		42		44	
Av. Med. Speed	33		45		57		64		76		88	
Ayres Quality	42		46		50		54		58		62	
Ayres Speed	64		55		64		71		76		79	
No. Pupils	324		834		496		478		374		379	-2608

Table 14.

58

HANDWRITING

Scores in Quality and Speed in Each School

Sept. 1916

City	Third Gr.		Fourth Gr.		Fifth Gr.		Sixth Gr.		Seventh Gr.		Eighth Gr.	
	Q	S	Q	S	Q	S	Q	S	Q	S	Q	S
7.Henderson	30	28	30	37	30	65	30	77	45	69	40	75
12.Kenyon	20	29	30	55	30	64	40	64	45	83	50	85
14.Glencoe			30	40	30	46	40	61	30	62	40	76
16.Glenwood	20	31	20	47	30	53	40	60	30	79	30	87
22.Eveleth			30	45	35	47	30	47	50	62	50	71
Median Quality	22.5		32.5		34		42		43		43	
Av. Med. Speed	29		45		55		62		71		78	
Ayres Quality	42		46.		50		54		58		62	
Ayres Speed	44		55		64		71		76		79	
No. Pupils	81		326		307		283		198		193	

Feb. 1917.

City	Third Gr.		Fourth Gr.		Fifth Gr.		Sixth Gr.		Seventh Gr.		Eighth Gr.	
	Q	S	Q	S	Q	S	Q	S	Q	S	Q	S
7.Henderson	30	12	30	51	30	65	35	78	45	68	40	76
12.Kenyon	25	48	40	62	30	72	40	80	60	99	70	78
14.Glencoe			30	53	30	53	35	63	40	70	45	90
16.Glenwood	30	47	35	66	35	63	40	78	40	71	35	80
22.Eveleth			35	47	35	62	40	60	50	76	60	81
Median Quality	22.5		32.5		35		42		45		45	
Av. Med. Speed	36		56		63		72		77		81	
Ayres Quality	42		46		50		54		58		62	
Ayres Speed	44		55		64		71		76		79	
No. Pupils	81		326		307		283		198		193	-1388

Rate

88
84
80
76
72
68
64
60
56
52
48
44
40
36
32

Ayres Standard
Minn. Scores.

22 26 30 34 38 42 46 50 54 58 62 66 Quality.

Fig. 8 Handwriting-Sept. 1916.

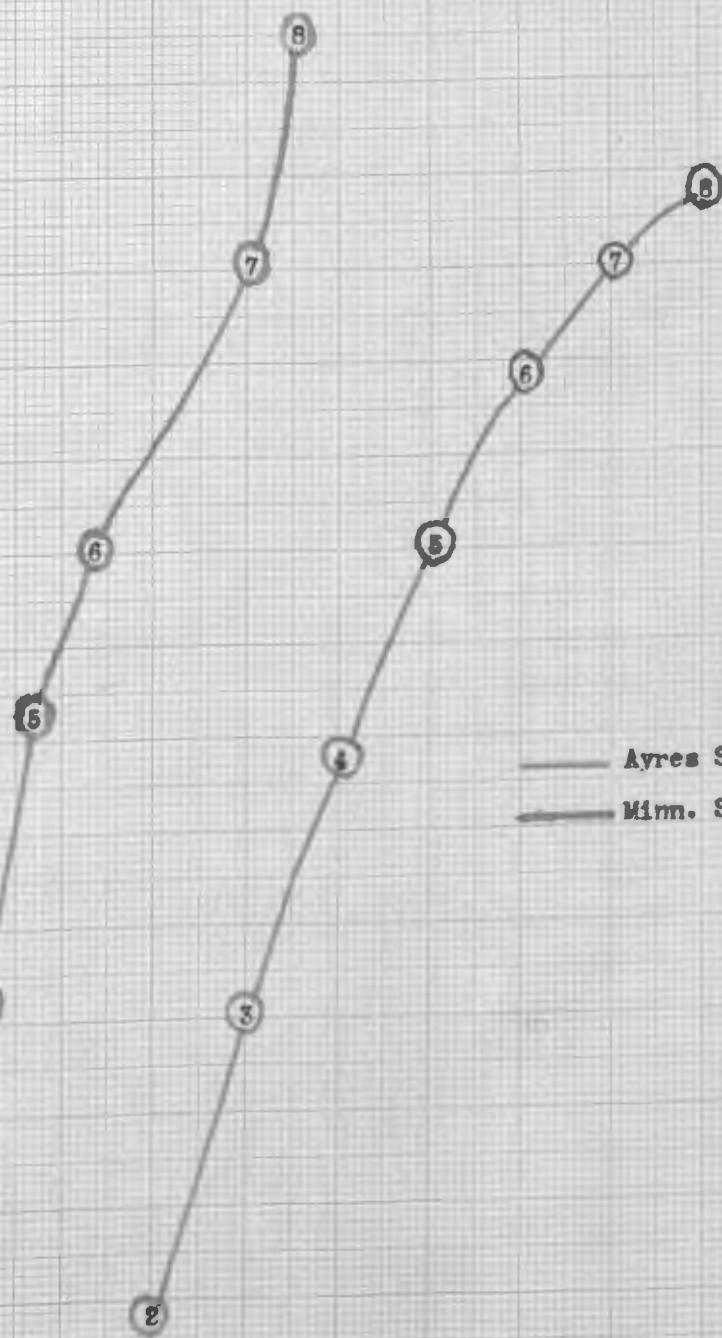


Chart No.

Sept. Handwriting-Median Rank of Minnesota Schools

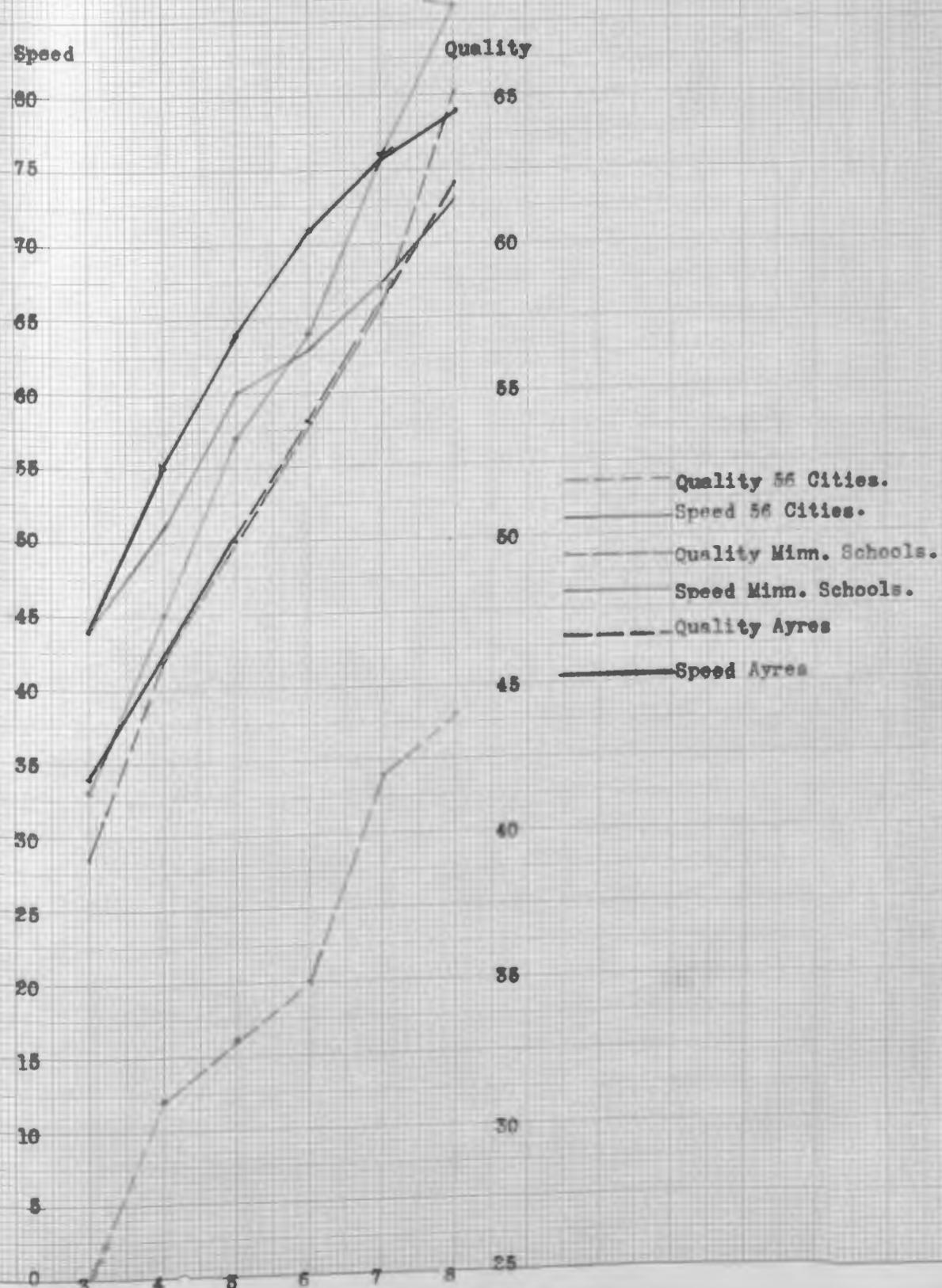


Fig. 9

Chart No.

Handwriting-Minnesota Schools
Sept. and Feb.



Fig. 10.

h. Composition -- Two Scales.

This was the most unsatisfactory of the tests for language abilities. Only seven schools sent in compositions in September and but three in February.

Directions for Giving the Test.

1. Instruct the children to write in the proper place the information called for. Then say to the class: "I am going to ask you to write a composition. I shall give you a subject and you will have 25 minutes in which to complete it. The subject is, Three Things I Would Do To Improve my School Building and How I Would Do Them."

Directions for Scoring the Papers.

1. Grades three to six are to be scored on the Hillegas Scale. For grades 7 and 8, use the Harvard Newton Scale. Each of these scales contains compositions of different degrees of merit. At one end of the scale are good specimens of English writing; at the other end are very poor specimens; between these are compositions of intermediate value arranged in order of merit. The method of using these scales is the method of comparison. The class scores are determined in the same way that scores for quality were determined for handwriting.

Checking and Computing Scores.

In checking up the scores in Composition, the writer found many errors. Much confusion resulted in having the compositions of the seventh and eighth judged on the Harvard-Newton scale. Some teachers use the same scale for all grades while others followed directions.

Initial Abilities in Composition.

Table 15 gives the September scores at the bottom of the page. An inspection of this shows that it is practically impossible to determine a median score for the different grades. One can conclude that the schools made some progress from grade to grade but the table shows great variation.

Improvement in Composition.

The three schools that sent in compositions in Feb. all show improvement over their Sept. scores. The failure of the pupils to hold to the subject and the inability of teachers to use the scales are cause for the unsatisfactory results.

Table 15

63

ENGLISH COMPOSITION

The Compositions of pupils from grades three to six were judged on the Hillegas Scale and those of grades seven and eight on the Harvard-Newton scale. The scores are scale values. Sept. 1916.

	Third Gr. Pupils	Fourth Gr. Pupils	Fifth Gr. Pupils	Sixth Gr. Pupils	Seventh Gr. Pupils	Eighth Gr. Pupils
	Sc.	Sc.	Sc.	Sc.	Sc.	Sc.

7.Henderson	18	8	19	10	13	37		19	40	12	61	
12.Kenyon	26	10	24	14	32	183	27	369	24	75	25	80
16.Glenwood	32	0	56	25	42	50						

February Scores.

7.Henderson	13	200	19	260	13	360		19	70	12	68	
12.Kenyon	26	75	24	150	32	369	27	474	24	85	25	80
16.Glenwood	32	183	56	391	42	474						

September 1916.

5.Atwater	12	0	11	40	16	180	14	180	18	30	9	30
9.Blackduck	23	0	21	0			62	183				
11.Akely	28	10	45	0	33	10	40	15	19	38	35	46
12.Kenyon	27	10	25	15	32	183	28	260	23	30	26	75
10.Dodge Center	15	10	14	30	15	30	19	30	17	52.6	19	52.6
16.Glenwood	32	0	56	25	42	50						
19.Luverne	51	0	56	7	51	20	46	18	61	30	61	45.

1. English Grammar-Buckingham Test.

Eight schools gave the Grammar test to their seventh and eighth grade pupils in September and of these two did not send in the papers for their seventh grade.

Directions for Giving the Test.

1. Distribute copy of test to each pupil.
2. Have the blanks filled out.
3. Say to pupils: "On the following pages of this sheet you will find some questions in English Grammar. I want you to read these questions and answer as many of them as you can. You will be allowed thirty minutes to complete the work. Work carefully but do not waste time. Bring your paper forward when through."

Directions for scoring of test.

1. Arrange papers alphabetically in a pile, one for the boys and one for the girls.
2. Take the papers in order and grade them according to the key:
10 for a correct answer, 5 for nearly correct, 0 for incorrect.
3. Copy names of pupils on the class record sheet.
4. Enter in proper places the score of each pupil in each question.
5. Total these individual score at the right of the page. This will give the total value for each pupil. Add these totals at the bottom of page.
6. Total the values for each question at the bottom of each group and add these totals across to the right. The sum thus obtained must equal the sum obtained in adding the columns of totals.
7. Divide the sum of the totals for the boys by the number of boys to obtain their average. Divide the sum of the totals for the girls by the number of girls for their average. Finally, divide the sum of the totals for the boys and girls by the total number of boys and girls for the average of all which may be taken as the class score.

Checking and Computing Scores.

A few corrections were necessary and one school sent in papers uncorrected at all which had to be scored and tabulated.

Initial Abilities in Grammar.

Table 16 gives the results of the September test in Grammar. It shows that seventh grade pupils have practically no grammatical ability, the medians being a scor of 2 for the boys and 3 for girls. Grade eight did much better, the scores being 25 and 37.6 respectively for boys and girls. In both grades the girls have a higher median score than the boys. A study of the table shows that in every school except one for each grade the girls have a higher score than the boys. This Sept. test is the same one that Buckingham gave in March to the Gary and Prevocational schools of New York City. Based on the average number of correct answers per pupil, he found the March score for all classes to be 3.04. To make this comparable with our class score of 33.7, the median for all eighth grade pupils, we must multiply 3.04 by 14, the number of quætions in the set. This would give a score of 42.5 which is nearly nine points higher than our Minnesota score. Considering this as Buckingham's standard, our Minnesota results are far from satisfactory.

Improvement in Grammar.

Only three schools of the original eight gave the second test in Feb., Atwater, Kenyon and Glenwood. Atwater did not give the second test to the seventh grads so we have but two schools with 68 pupils in the Feb. test. These seventh grade pupils show much improvement, however, as an inspection of Table 17 and Figure 11 will show. In the eighth grade, the pupils from both Atwater and Kenyon show dicided improvement but the Glenwood pupils lose very much. The papers of the latter pupils seemed to show a "don't care" sp̄it.

The average of the eighth grade scores for Feb. equals 34.6 while the average of the same grade for Sept. is 38.5 or 1.1 points less so that taking all three schools together very little improvement is made. Taking the schools individually, Atwater and Kenyon, make dicided improvement while Glenwood shows decided loss in the eighth with a slight improvement in the seventh.

Table 16.
GRAMMAR—BUCKINGHAM TESTS.

City	Seventh						Eighth					
	Total Boys	Total Girls	Total All	Avg. Boys	Avg. Girls	Avg. All	Total Boys	Total Girls	Total All	Avg. Boys	Avg. Girls	Avg. All
5. Atwater	10	3	13				8	4	12			
	0	0	0	0	0	0	60	5	65	7.5	1.2	5.4
								7	8	15		
							250	290	540	35.7	36.2	36.
9. Blackduck												
10. Dodge Center	7	6	13				8	10	18			
	75	15	90	10.7	2.5	6.9	105	320	425	13.1	29.1	22.4
11. Akely	8	13	21									
	25	100	125	3.1	7.7	6.	14	21	35			
							345	825	1170	24.	39.	33.4
12. Kenyon	12	13	25									
	20	10	30	1.7	.7	1.2	15	18	29			
							385	655	1040	29.6	40.3	36.
16. Glenwood	30	27	57									
	25	75	100	0.	2.7	1.7	17	17	34			
							920	1230	2150	54.	73.	63.
19. Luverne												
							31	28	59			
							815	1175	1990	26	42	34
20. Alexandria	25	27	52				27	25	52			
	100	180	280	4.	6.5	5.4	260	445	705	9.6	18.	15.5
No. Pupils	92	89	181				125	129	254			
Medians				2.	3.	2.				25.	37.6	33.7

TABLE IV.
GRAMMAR--BUCKINGHAM TESTS.

67

City	Sept. 1916.											
	SEVENTH						EIGHTH					
	TOTAL	TOTAL	TOTAL	AV.	AV.	AV.	TOTAL	TOTAL	TOTAL	AV.	AV.	AV.
	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All
5. Atwater							5	3	8			
							15	5	20	3.	1.6	2.5
12. Kenyon	10	13	23				12	14	26			
	10	10	20	1.	.7	.9	375	570	945	31.	40.	36.
16. Glenwood	23	22	45				14	14	28			
	25	75	100	.1	3.4	2.2	825	1015	1830	59.	72.	65.
No. Pupils	33	35	68				31	31	62			

City	Feb. 1917.											
	SEVENTH						EIGHTH					
	TOTAL	TOTAL	TOTAL	AV.	AV.	AV.	TOTAL	TOTAL	TOTAL	AV.	AV.	AV.
	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls	All
5. Atwater							5	3	8			
							105	95	200	21.	31.6	28.
12. Kenyon	10	13	23				12	14	26			
	140	165	305	14.	12.	13.	540	705	1245	45.	50.	48.
16. Glenwood	23	22	45				14	14	28			
	105	260	365	4.5	11.8	8.1	575	570	1145	41.	40.	41.
No. Pupils	33	35	68				31	31	62			

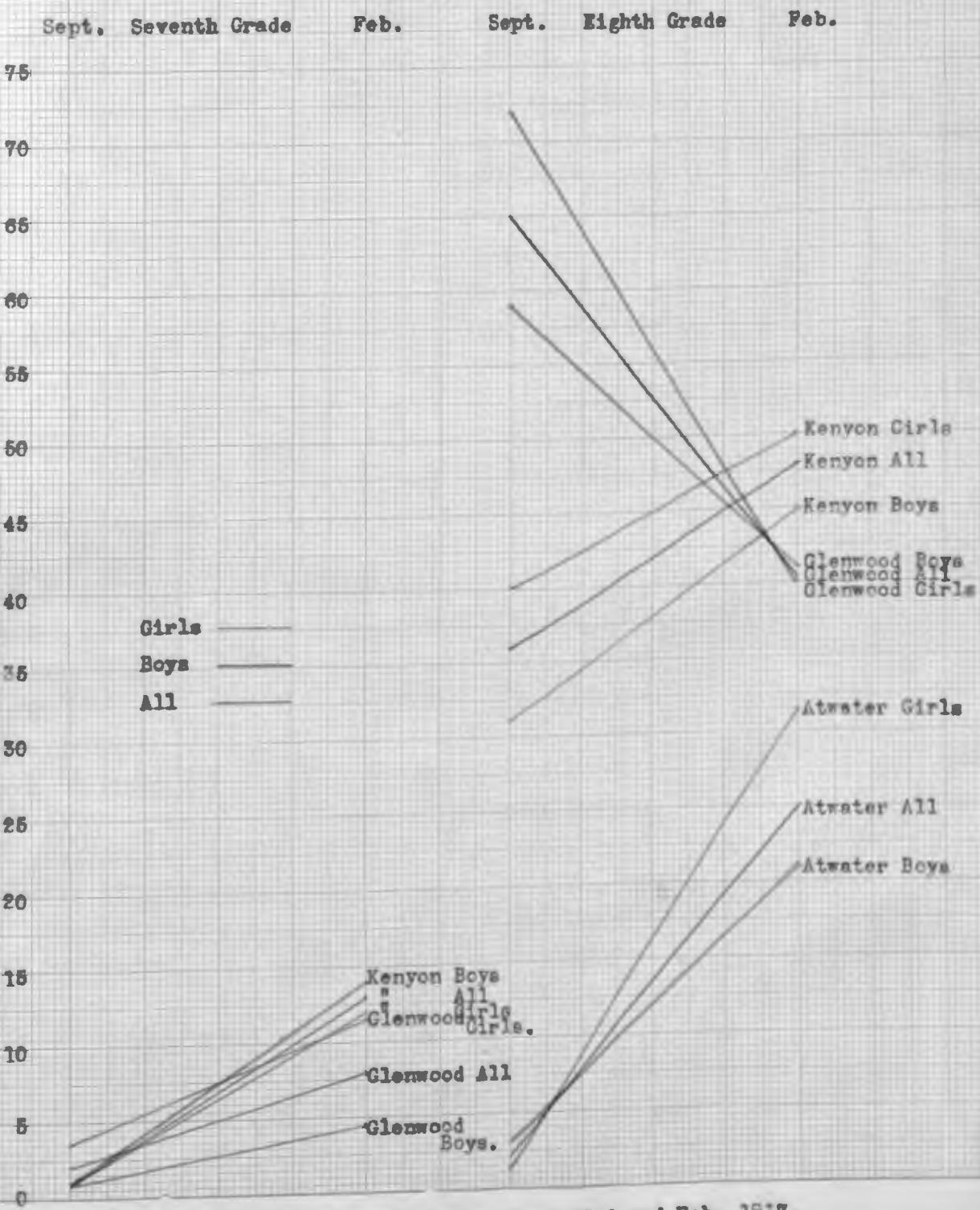


Fig. 11. Grammar-Buckingham Tests. Sept. 1916 and Feb. 1917.

Chapter IV.
Conclusions.

A study of all the factors considered in this study leads me to make these conclusions:

1. There has been some improvement in the language abilities of Minnesota school children as the result of the half year of work.

2. The study shows that there was some improvement in every field considered except quality in handwriting.

3. Comparison with standard scores show that Minnesota children are not up to standard being nearly one grade behind.

4. The Study shows that there were great variations in the language abilities of different grades of the same school.

5. It also shows that there are considerable variations of the same grades in different schools. The extended use of standard scales will tend to change this condition.

6. The only means the study has of showing sex differences is in the Grammar tests. The limited number of cases here show that the girls are superior to boys.

7. The study shows the following standards for Minnesota:

Subject.	Third	Fourth	Fifth	Sixth	Seventh	Eighth
Sept. Understanding of Sen.	15	24	29.4	37.1	42.5	46.7
Feb. * * *	9	20	35.	44.	48.	51.
Sept. Visual Vocabulary	2.9	21.3	20.6	30.6	36.7	41.
Feb. * * *	16.6	27.5	31.6	32.5	37.5	43.7
Sept. Spelling, Line J	60	85	94	97.8	97.2	97.8
Feb. * * *	75	91	97	97.2	97.5	98.3
Sept. * * Q	26.5	21.5	30.5	30.7	34.3	31.
Feb. * * *	15.	36	65	82.5	88.8	95.
Sept. * Buckingham	9.3	35.	60	74.	83.	86.3
Feb. * * *	38.	53.	72.5	83.	88.	92.

Subject		Third	Fourth	Fifth	Sixth	Seventh	Eighth
Sept. Language		2.52	3.58	4.47	4.47	5.69	5.69
Feb.	"	2.94	4.26	5.40	5.40	5.40	6.50
Sept. Handwriting	Quality 25. Speed 33.	31.	33.	35.	42.	44.	
Feb.	"	22.5 Speed 36.	32.5 56.	35. 63.	42. 72.	45. 77.	45. 81.
Sept. Grammar					2.	33.7	

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