An Educational Survey Test

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GROUP tests of mental ability have now definitely found their place in the field of mental measurement. The mental survey is well established. It is the belief of the writers that we also need group tests for educational surveys to determine roughly general educational attainment just as the mental tests determine general mental ability.

We, therefore, need some kind of educational scale by means of which we can sum up a child's educational attainment in a single value, comparable with the value obtained by our mental tests. In order to do this we must have a selection of short educational tests which cover the main subjects that the school teaches. It is obvious that if we attempt to do this we shall have to base our result upon a careful selection of a few items out of the several standard school subjects, particularly if our test is to be of such a nature as to be given at one sitting.

More specifically the problem is to devise a short educational test covering the main subjects of instruction that can be given in about thirty or forty minutes. This test should include all the important subjects that are ordinarily taught in the elementary school. Recognizing, of course, that five to eight minutes' work on each subject cannot give us an accurate measure of an individual's attainment in each subject, such as we might obtain by devoting thirty to fifty minutes to each subject, there is, nevertheless, great practical need of a short scale covering the chief subjects that will give a fair measure of the general attainment of the individual and a good measure of the group. By means of this we can obtain accurate measures of different grades, of different schools and of different school systems.

The exercises in our Educational Survey Test were selected from the Standard Educational Tests and Measurements. The following criteria for selecting the examples were kept in mind and given consideration where they did not interfere with the value of the test. Except in comprehension tests in reading, those tests which

were expressed in the most easily and readily understood language were given preference. Those tests, which, according to the judgments of those selecting them and their experience with them, seemed to be most commonly successful and least subject to unfavorable external factors, were selected. Exercises were selected at approximately equal intervals along the range of the Standard Scales, so that the short test represented a graduation of difficulty comparable to that of the long scale. And, other things being equal, the tests which required a minimum of time and space in answering and consequently a minimum of time in grading, were chosen.

THE TESTS.

I. *Vocabulary.* (Thorndike).

Look at the words below and write

The letter F under every word that means a Flower;

The letter N under every word that means a Boy's Name;

The letter B under every word that means a Book;

The letter G under every word that means good to be or do.

samuel, kind, lily, pansy, generous, modest, claude, courteous, merciful, reasonable, isaiah, chrysanthemum, considerate, reuben, ezra, ichabod, ledger, crocus, dahlia, jonquil, begonia, equitable.

2. ARITHMETIC. (Woody-Stone).

$3 \times 7 =$

Add

$$\begin{array}{r} 2 \\ 4 \\ 3 \\ \hline \end{array}$$

Subtract

$$\begin{array}{r} 13 \\ 8 \\ \hline \end{array}$$

Multiply

$$\begin{array}{r} 310 \\ 4 \\ \hline \end{array}$$

$1)1$

Subtract

$$\begin{array}{r} 50 \\ 25 \\ \hline \end{array}$$

Add

$$\begin{array}{r} 43 \\ 1 \\ 2 \\ 13 \\ \hline \end{array}$$

$\frac{1}{4} \text{ of } 128 =$

Subtract

$$\begin{array}{r} 567482 \\ 106493 \\ \hline \end{array}$$

Add

$$\begin{array}{r} 199 \\ 194 \\ 295 \\ 156 \\ \hline \end{array}$$

$\frac{7}{8} \times \frac{3}{4} =$

$.003) .0936$

If you buy 2 pencils for 7 cents each and a book for 65 cents. How much change should you receive from a two dollar bill?

Two girls receive \$2.10 for making buttonholes. One makes 42 and the other 28. How shall they divide the money?

$$1/3 + 1/3 =$$

$$7.3 - 3.00081 =$$

$$9)69 \text{ lbs. } 9 \text{ oz.}$$

$$25.09 + 100.4 + 25 + 98.28 + 19.3614 =$$

3. READING. (Kelly).

Answer these questions:

No. 1

The air near the ceiling of a room is warm, while that on the floor is cold. Two boys are in the room, James on the floor and Harry on a box eight feet high. Which boy has the warmer place?.....

No. 2

Think of the thickness of the peelings of apples and oranges. Put a line around the name of the fruit having the thinner peeling.
apples oranges

No. 3

If you would rather have a dollar than a little stone, do not put a line under dollar, but if you would rather have five dollars than a pencil, put a line under stone.

dollar

stone

No. 4

Here are some names of things. Put a line around the name of the one which is most nearly round in every way like a ball.

saucer

teacup

orange

pear

arm

No. 5

I have five plums and Mary has four plums. Jane comes along and we see that she hasn't any. We want to divide with Jane in such a way that we shall all three have the same number. I gave Jane two plums. How many must Mary give her?

No. 6

Read these carefully:

Bears are larger than bugs.

Houses are larger than bears.

Mountains are larger than houses.

Then bugs are not as large as mountains.

I have tried to make no false statement among these four. If I have succeeded, underline the word success. If I have failed underline the word failure.

success

failure

No. 7

It was a quiet, snowy day. The train was late. The ladies' waiting room was dark, smoky and close, and the dozen women, old and young, who sat waiting impatiently, all looked cross, low spirited or stupid.

In this scene, the women probably kept their wraps on, because they wished to be ready to take the train. Pretty soon the station agent came and put more coal in the stove, which was already red-hot in spots. Do you think this made the women happier?

No. 8

"Magnanimity in politics is not seldom the truest wisdom; and a great empire and little minds go together." (Burke)

Study Burke's quotation carefully. If he was in favor of territorial expansion as the goal of English politicians he was a standpatter. If he believed in the establishment of justice in human relations even at the sacrifice of territorial expansion, he was a progressive. Which was he, a standpatter or a progressive?

4. READING. (Thorndike).

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?.....

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 on down the road.

1. When did Jim and Dick come?.....
2. What did they do after eating the apples?.....
3. Who else came beside Jim and Dick?.....
4. How long did Tom say he would wait for them?.....
5. What happened after the boys ate the apples?.....

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.

1. What is it that might seem at first thought to be true, but really is false?.....
2. What might be the effect of his father's death upon the way a boy spent his time?.....
3. Who is mentioned in the paragraph as the person who desires to have all lessons completely done?.....

5. COMPLETION. (Trabue).

Make good sentences. Write only *one* word on each blank.

1. We are going school.
2. The sky blue.
3. The plays her dolls all day.
4. Boys and soon become and women.
5. The poor baby as if it were sick.
6. She if she will.
7. The poor little has nothing to ; he is hungry.
8. A home is merely a place one live comfortably.

9. To many things ever finishing any of them
a habit.
10. The knowledge of use fire is of
..... important things known by but unknown
animals.
11. One ought to great care to the right
of for one who bad habits it
..... to get away from them.

6. PUNCTUATION—GRAMMAR. (Starch).

Punctuate correctly:

1. We visited New York the largest city in America.
 2. I like to work he said especially in the morning.
- Cross out what is wrong, and leave the words so as to make a good sentence.
1. The paper reported (he; him) to be dead.
 2. I can do it as well as (they; them).
 3. The difference between summer and winter (is that; is) summer is warm
and winter is cold.
 4. I shall always remember the town because of (the good times I had; the
good time) and the many friends I made there.
 5. (Who; whom) do you mean?
 6. A different set of knives and forks (was; were) put on the table.
 7. (He sprang; springing) to the platform on which the dead man lay (and
shouted; he shouted).

7. GEOGRAPHY. (Hahn-Lackey).

Answer these questions:

1. In what direction are you facing when your back is toward the north?
.....
2. Name two other countries in North America besides the United States.
.....
3. Name two large bodies of water that border on Florida.
4. What is the cause of day and night?.....
5. Name a mountain range and a river between Europe and Asia.....
6. Give two reasons why cities usually grow up at falls in rivers.....
7. What and where are the following:
Nova Scotia
Calcutta
Good Hope
St. Elias
Moscow
8. Give one reason why Chicago rather than St. Louis has become the railroad
center of the middle west.....
9. Why does the southeast coast of Brazil get a comparatively heavy rainfall?
.....
10. Why does the temperature often rise when snow begins to fall?

8. HISTORY. (Van Wagenen).

Answer these questions:

1. In what did the American Indian live?
2. Who was first President of the United States?
3. Name any American general.
4. Who was President of the United States during the Civil War?
5. Name any one of the battles of the Revolutionary War.
6. Name two purchases of land that have been made by the United States.

7. What were the first four nations to make settlements in America?
8. What public improvement was under construction during each of the following periods:
 - 1806-1814
 - 1817-1825
 - 1904-1914
9. a. Who invented the telegraph?.....
 b. Who invented the telephone?.....
 c. Who laid the first successful Atlantic cable?.....
 d. Who wrote the Declaration of Independence?.....
 e. Who was Secretary of War during the greater part of the Civil War?....
10. In front of each of these questions below write the name of the President during whose administration the events took place.
 - War with Mexico?
 - Spanish American War?
 - Purchase of Florida?
 - Assertion of the Monroe Doctrine in the Venezuelan dispute?
 - Beginning of construction of Panama Canal?

The twenty-two words for measuring the vocabulary element in reading were selected from Scale A of Thorndike's Visual Vocabulary Scales,¹ at fairly equal intervals of difficulty from the least difficult to the most difficult. Two of the eighteen exercises in arithmetic were selected from the Stone Reasoning Tests. The remaining problems were taken from Woody's Arithmetic Scale²; five in addition, four in subtraction, four in multiplication, and three in division. They are arranged from the least to the most difficult, and represent, roughly, equal steps of difficulty as determined by Woody. Comprehension of meaning in reading is measured by two sets of exercises; the one taken from Kelly's Silent Reading Tests³ and the other from the Thorndike Scale Alpha.⁴ There are eight exercises in the former, and three exercises in the latter. The sentences for measuring language ability are from Trabue's Completion Test Language Scales.⁵ The usage of Grammar is measured by two sentences from Starch's Punctuation Scale, and by seven sentences from his Grammatical Scale A.⁶ The ten questions in

¹THORNDIKE, E. L. *The Measurement of Achievement in Reading; Word Knowledge*. Teachers' College Record. November, 1916.

²WOODY, C. *Measurements of Some Achievements in Arithmetic*. Teachers' College Contributions to Education. No. 80, 1916.

³KELLY, F. J. *The Kansas Silent Reading Tests*. Journal of Educational Psychology. Vol. VII. February, 1916. pp. 63-80.

⁴THORNDIKE, E. L. *An Improved Scale for Measuring Ability in Reading*. Teachers' College Record, November, 1915, and January, 1916.

⁵TRABUE, M. R. *Completion Test Language Scales*. Teachers' College Contributions to Education. No. 77, 1916.

⁶STARCH, D. *Educational Measurements*. Macmillan.

Geography show a fair sampling of the degrees of difficulty in the Hahn-Lackey Composite Scale⁷. The ten questions in History are from the Van Wagenen American History Scales, Information A and B. They represent an increasing range of difficulty.

These eight sets of exercises have been printed in booklet form with a view of economy of space and of convenience in giving, taking and scoring the tests. Half of page 1 contains blanks for the name, age, grade, and school of the pupil. On the other half the vocabulary test is so printed that the pupil must turn the page around in order to read the test. Pages 2, 3 and 4 follow page 1 as the right hand pages, always, of the booklet. Page five is the back of page 4 but printed in the reverse direction so that the pupil must turn the booklet around. With the booklet in this new position, pages 6, 7 and 8 follow as the right hand pages. Since the time element is very important in giving these tests, this arrangement makes the page opposite that one on which the pupil is working always reversed and thus prevents him from reading it. This saves his attention for the test on which he is working, and keeps him from becoming acquainted with another test outside the time allotted to it.

Since it was desirable to have the time limits for the tests short enough to prevent even the very brightest pupils from completing everything, the preliminary test sheets were given to a group of grade children and also to a group of college students, and records of the time required for each student for each test were kept. With these results as guides, one and one-half minutes were given for the Vocabulary test, five minutes for Arithmetic, two and one-half minutes for the "Kelly" reading, three and one-half minutes for the "Thorndike" reading, four minutes for language, one minute for Grammar, four minutes for Geography, and four minutes for History. This gives a total of twenty-five and one-half minutes. Allowing time for directing the pupils from one test to another, for writing their names, ages, grades, and schools on page 1, and for passing and collecting the papers, thirty minutes is sufficient for giving the entire set of tests to most of the grades, and perhaps thirty-five minutes for grades two and three.

It was one of the aims in constructing this series of tests to

⁷LACKEY, E. E. *A Scale for Measuring the Ability of Children in Geography*. Journal of Educational Psychology. Vol. IX. October, 1918.

reduce instructions to a minimum. No special instructions are necessary. The children are merely told to do what it tells them to do. The understanding of the very simple instructions printed at the beginning of each test may be assumed a prerequisite for the knowledge called for by the test.

In deciding the score values, the relative importance of the different subjects included in the tests was taken into consideration. About equal weight was given to Reading and to Arithmetic. History and Geography were weighted a little less and Grammar and Language combined again a little less. The difference in weight given to these subjects is, however, slight. The following table shows the method of scoring which was adopted:

Tests	No. of Elements	Points for Each	Highest Possible Score
Vocabulary,	22	$\frac{1}{2}$	11
Arithmetic,	18	2	36
Reading K,	8	2	16
Reading T,	11	1	11
Language,	11	1	11
Grammar,	9	1	9
Geography,	23	1	23
History,	24	1	24

By combining the three reading tests, and also the language and grammar tests, the highest possible scores rank the subjects in this order:

<i>Subject.</i>	<i>Highest Possible Score.</i>
Reading	38
Arithmetic	36
History	24
Geography	23
Grammar and Language	20
Total	141

By means of stencils and keys the test papers can be scored very rapidly.

After this much of the Test Construction had been completed a preliminary standardization of the work was attempted. The tests were given to 1,360 individuals in grades 2 to 8 inclusive, in high

school and in college. The results were scored and percentiles were calculated for the various ages and grades. The median percentile scores by ages and by grades are given in Tables I and II respectively.

TABLE I.

Age,	6	7	8	9	10	11	12	13	14	15	16	17	Adult
<hr/> Med. Score,	2	2	12	20	32	38	41	49	48	55	72	80	109
<hr/> No Cases,	6	143	154	177	208	196	162	124	84	49	18	11	<hr/> 28
													<hr/> Total, 1360

TABLE II.

Grade, ..	2	3	4	5	6	7	8	9	10	11	12	
Median Score, ..	3	13	25	36	47	61	67	77	76	75	83	
No. Cases, ..	233	212	234	250	206	83	73	16	19	12	5	Total 1333

A COMPARISON OF THE ABBREVIATED AND STANDARD FORMS

The next step consisted in establishing the reliability of the Abbreviated form by comparing the results obtained from it with the results obtained from the Standard Educational Measurements from which its tests were taken. In this process the long tests were given to as many pupils as possible who had taken the short forms. The children tested were from five different schools; a rather low grade city elementary school including all eight grades but in which only children from the sixth, seventh and eighth grades, took both tests; a grade school in a foreign district, but in which, however, the children were of about average mentality; a large grade school of medium standard including only the first six grades; the seventh and eighth grades in a village school; and the pupils in a rural high school. Grades 3, 4, 5, 6, 7, and 8 and the four years of high school were represented in the numbers who took the two forms of tests; altogether about 450 children, 247 taking both tests in vocabulary, 200 taking both in Arithmetic, 258 in Reading K, 270 in Reading T, 255 in Language, 208 in Grammar, 113 in Geography and 125 in History. The exact number, by classes and schools. tak-

ing each test can be seen by referring to Table III showing the coefficients of correlation.

The distribution tables for the short and long forms are too lengthy to be printed here. A study of them shows on the whole that the short form distributes the cases fairly well. We must be content here with a study of the median scores for each grade. Graphs 1 to 8 show the rise of median scores from grade to grade on both the short and long forms of each test. The continuous line, in each case represents the short form, and the broken line, the long form. The more closely the two curves tend to take the same form and direction, regardless of the distance between the two lines the greater is the correlation between the short and long forms of the tests, as far as such correlation can be estimated from the central tendencies of groups.

In most cases the curves agree fairly closely, this being particularly noticeable in Arithmetic, Reading K, Reading T and Trabue. We have hardly adequate data for this kind of a comparison on Geography. With History we have a close approximation except for the large divergence at Grade 11, which can be adequately accounted for by the very few cases tested.

In all cases the greatest irregularities occur in grades nine, ten, eleven and twelve, that is, in the high school. This might be explained by either one of two factors. Such a small number of pupils was tested in each of these grades that the sampling is insufficient, or the fact that these pupils were tested in subjects with which they were all about equally unfamiliar and consequently a gradual increase in scores in these grades could not be expected. Grade 11 is consistently lower in practically all the tests and on both scales, which fact would seem to denote a general inferiority of that grade rather than a poor correlation of the one test with the other. Fair measures of high school pupils will have to be obtained by a test containing high school subjects.

CORRELATIONS OF HOMOGENEOUS GROUPS

In working out the coefficients, each single class was first made a unit of comparison, except in a very few cases where the number in a class was too small to warrant getting a reliable coefficient, in which cases the small group was combined with another group near-

est like it, in the same school. The Spearman rank difference formula was used with these small homogeneous groups.

Table III gives the coefficients for each class in each school and for each of the tests. The numbers of cases used in each correlation are given in the column just preceding their corresponding coefficient. The averages of all the coefficients for each test have been found and are also presented in this table.

For the Vocabulary or Word's test, the coefficients range from .24 to .74, with an average coefficient of .48. The coefficients for Arithmetic range from .19 to .78 with seven out of nine groups showing correlations above .40, five above .50 and four above .60. Reading K gives a range of .15 to .83. Eight out of the eleven classes give coefficients above .40, seven above .50, and five above .60. For Reading T, the range is from .11 to .86, with nine of twelve coefficients above .40, eight above .50 and five above .60.

TABLE III. COEFFICIENTS OF CORRELATION.

School Grade	Words		Arith.		Read. K		Read T	
	No.	r.	No.	r.	No.	r.	No.	r.
E. Col. 4,	19	.64	18	.19	16	.71	14	.76
" " 5,	27	.37	23	.71	27	.15	22	.86
" " 6,	29	.40	25	.56	21	.48	21	.53
" " 7,	19	.74	14	.78	17	.83	18	.26
" " 8,	15	.24	13	.47	9	.54	9	.55
First Ave.								
3B			26	.60				
" 3A "					32	.66	30	.66
" 4B "			21	.67	35	.71	35	.62
" 4A "								
" 5B "					24	.66	26	.59
" 5A "	32	.66	31	.35				
" 6B "					25	.54		
" 6A "	27	.39	29	.48			27	.47
Fairfield								
H. S.	42	.64			34	.27	32	.26
W. Jeff.								
7	18	.36					17	.11
W. Jeff.								
8	19	.41					19	.60
Lane Ave.								
7					12	.34		
Lane Ave.								
8								
Total,	247	.59	200	.56	258	.65	210	.77
Average,		.48		.53		.51		.51

TABLE III (Continued).

School Grade	Trabue No.	r.	Grammar No.	r.	Geography No.	r.	History No.	r.
E. Col. 4,	13	.34						
" " 5,	23	.57	31	.09	30	.55	30	.55
" " 6,	21	.42	26	.36	26	.50	18	.87
" " 7,	17	.66	21	.90	21	.62	19	.62
" " 8,	8	.17	12	.17	12	.69	11	.43
First Ave. 3B,								
First Ave. 3A,								
" " 4B,	36	.51						
" " 4A,	31	.30	25	.48				
" " 5B,			24	.38	24	.41		
" " 5A,								
" " 6B,	24	.55						
" " 6A,								
Fairfield H. S.,	33	.26	34	.41			11	.89
W. Jeff. 7,	17	.41					17	.57
W. Jeff. 8,	19	.60	35	.52			19	.81
Lane Ave. 7,	12	.60						
Lane Ave. 8,								
Total,	255	.55	208	.44	113	.55	125	.50
Average,		.45		.41		.55		.68

Trabue correlations extend from .17 to .66 with eight of twelve above .40 and six above .50. The coefficients in grammar range from .09 to .90; the four out of eight above .40, being .41, .48, .52 and .90. The geography coefficients run from .41 to .69; of the five coefficients, four are above .50 and two above .60. History correlations extend from .43 to .89. Of the seven classes compared six are above .50, five above .60 and three above .80.

The averages of all the coefficients for each test are shown in the last row of the Table. These average coefficients range from .41 (grammar) to .68 (history).

The next to the last row on the Table shows the correlation coefficients (Pearson's Product Moment) for all cases tested on both the long and the short scales. These larger and more heterogeneous groups show coefficients ranging from .44 (grammar) to .77 (reading T), denoting on the whole a very sensible degree of resemblance between the short and long scales.

In addition to this, comparisons were also made between several of the Long Scales with the total score of the Short form. The cases were ranked first according to the total scores for the short form, and then according to each of the scores for the long tests and the average of these ranks was found. This average rank represented the rank of the pupil on the long scale and was correlated with the rank according to the short form total score.

Twenty-four cases in a 5B class were used for comparing the total short form with the long scale, Reading Thorndike, Reading Kelly and Geography. The comparison showed a correlation of .716. The same cases, when the sum of the scores of only the Reading T, Reading K and Geography tests of the short form was compared with the sums of the scores of the corresponding long scales, gave .667.

Forty-three children in grades 5, 6, 7 and 8 took the short form and also the long scales, Visual Vocabulary, Arithmetic, Reading Kelly, Grammar and History. The average rank of these long tests was used with the rank according to the total score on the short form and a correlation coefficient of .84 was obtained.

Finally a comparison was made, using thirteen cases from grades 7 and 8, between all the long tests and the whole short form. The thirteen cases were the only ones in the entire number who had been tested, who had taken all the long tests and also the short form. The same rank method was followed here, and the correlation coefficient was .80.

It is reasonable to conclude, therefore, that a correlation of between 75 and 85 is very likely a true measure of the short form as compared with the several standard forms. The more of the latter that are used the closer will be the agreement with the rating of the short scale up to a certain point. The use of all the long standard forms will unquestionably give a more accurate pedagogical picture of a pupil than our shortened scale, but on the other

hand given only thirty minutes within which to sum up a pupil's pedagogical knowledge, the short form will be infinitely better than anything that could be achieved by any of the long forms within the same amount of time. Although several of the correlation coefficients are fairly low, we must remember that this is the case only when we compare each subject of the short scale. This is a very severe test of each particular part of the scale. Furthermore, comparing a more or less homogeneous group such as is contained in any one grade, we hereby increase considerably the severity of the test. Remembering these things, it is surprising and gratifying to find the short form always giving positive and nearly always giving reasonably high coefficients. Since, however, in actual practice the short scale will always be used as a whole and never in parts we may conclude that it will give us a fairly good measure of an individual and a very good measure of a grade and unquestionably as accurate a measure of a whole school as could be obtained by the use of several long scales involving days and days of testing.

On the other hand, it is not intended for use by the teacher who is seeking detailed and accurate knowledge of her pupil's ability in any one subject or who is planning to use Educational Measurements for diagnosing the particular difficulties and weaknesses of her students.

CONCLUSIONS

1. The shortened form of the standard educational measurements gives correlation coefficients ranging from .41 to .68 when the separate tests in the scale are compared with the corresponding long scales from which they were derived. The inference from this fact is that the separate parts of the short scale are reliable measures of attainment in the separate subjects which they attempt to measure, and that fairly good results will be obtained if the object is to ascertain individual differences in the separate school subjects. At least the results will indicate where further investigation would be necessary or profitable.

2. When the total result of the short form is compared with the total of the results of the long scales a coefficient of about .786 is obtained, indicating an excellent correlation. This means that prac-

tically the same results will be obtained by the use of the short form as by the use of the separate long scales, if a measure of general attainment is desired.

3. The short form represents economy in time, labor and cost. The following table shows the time required to give and score both the long scales and the short form for one class of thirty pupils.

Long Scales.		
Scale	Mins. Required to Give	Mins. Required to Score
Words,	20	20
Arithmetic,	80	240
Reading K,	5	30
Reading T,	30	45
Trabue,	7	30
Grammar,	15	30
Geography,	30	60
History,	45	45
Total,	232	500
Total (giving and scoring) 732 minutes=12+ hours.		

Short Form.		
Scale	Mins. Required to Give	Mins. Required to Score
Total,	30	30
Total (giving and Scoring) 60 minutes=1 hour.		

This shows a saving of eleven hours time for every class of thirty pupils tested by the short form. In a single school of twelve such classes the saving of time would amount to one hundred and thirty-two hours, and in a school system of five such schools, the saving would amount to six hundred and sixty hours. This economy of time represents the same economy of labor. The economy in cost is evident also, both in the cost of labor and of test material.

4. The short form makes possible greater efficiency in administration and supervision, for it includes in a single value the measure of the pupil's attainment in general education and puts it on a comparable basis with his measure of capacity in general intelligence.