

A STUDY OF HIGH SCHOOL PUPILS TO DETERMINE THE EFFECT  
OF STUDENT COUNCIL PARTICIPATION  
ON THE FORMATION OF CERTAIN HABITS OF CITIZENSHIP

By

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B. A. M.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES.....	(i)
<u>Chapters</u>	
I. INTRODUCTION.....	1
Review of previous studies.	
Purpose of this study.	
sts used.	
Technique employed.	
II. EQUATING THE GROUPS.....	5
Socio-Economic Background	
Mental Age	
Sex	
Grade Level	
III. DETERMINATION OF THE INITIAL STATUS.....	9
Group A	
Group B	
IV. APPLICATION OF THE EXPERIMENTAL FACTOR.....	14
V. DETERMINATION OF THE FINAL STATUS.....	15
Group A	
Group B	
VI. COMPUTATION OF THE EXPERIMENTAL COEFFICIENT.....	18
BIBLIOGRAPHY.....	22
APPENDIX.....	24

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LIST OF TABLES

<u>TABLE</u>	<u>PAGE</u>
I. Sims Score, Otis Score, Mental Age, and Sex of Each Member of Groups A and B.....	7
II. Initial Test, Group A: Raw Scores, Derived Scores, and Derived Averages on Chassell-Upton Citizenship Scales....	12
III. Initial Test, Group B: Raw Scores, Derived Scores, and Derived Averages on Chassell-Upton Citizenship Scales....	13
IV. Final Test, Group A: Raw Scores, Derived Scores, and Derived Averages on Chassell-Upton Citizenship Scales....	16
V. Final Test, Group B: Raw Scores, Derived Scores, and Derived Averages on Chassell-Upton Citizenship Scales....	17
VI. Change in Members of Group A, Based on the Difference Between the Initial and Final Test Scores on Chassell- Upton Citizenship Scales.....	19
VII. Change in Members of Group B, Based on the Difference Between the Initial and Final Test Scores on Chassell- Upton Citizenship Scales.....	20

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## CHAPTER I

### INTRODUCTION

Student participation in school government probably ranks first among the extra-curricular activities which claim to give training in citizenship. Upon the acceptance of this hypothesis depends much of the justification for the widespread interest and activity in student government.

Studies attempting to validate the hypothesis stated above have employed usually one of two methods. The first method involved individual or group judgment derived from observing, administering, and supervising these activities. One of the best examples of this type of study is reported by Rugg.<sup>(1)</sup> He analyzed fifty published articles dealing with student participation in school government and found that thirty-three of the articles mentioned training in citizenship as one of the values derived from the activity. He found that training in citizenship ranked first among the alleged outcomes of student participation.

The second method is to secure the opinions of the participants themselves. Rugg<sup>(2)</sup> secured letters

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(1) Rugg, Earl--"Special Types of Activities; Student Participation in School Government." Twenty-fifth Yearbook, National Society for the Study of Education. Part II, 1926, p. 129.

(2) Above citation, page 138.

from two hundred high school students located in cities throughout the United States. The students expressed the opinion that student participation encouraged worthy citizenship.

Rugg<sup>(3)</sup> makes the statement, however, that these "assertions are not proved by quantitative evidence." Koos<sup>(4)</sup> expresses the opinion that "it will be possible partially to control the conditions, so that we may in time ascertain whether the values are being achieved." In answer to this challenge, the writer undertook a quantitative study which is reported herein.

An attempt is made to ascertain experimentally the answer to the question, "Does participation in student government by students of high school grade aid in the formation of habits of citizenship?" The problem at the outset presented two major difficulties:

- (a) Difficulty in securing adequate measuring instruments in the form of valid and reliable tests.
- (b) A technique with which to proceed.

(3) Rugg, Earl--"Special Types of Activities; Student Participation in School Government." Twenty-fifth Yearbook, National Society for the Study of Education. Part II, 1926, p. 138.

(4) Koos, Leonard V.--"Evaluating Extra-Curricular Activities." Twenty-fifth Yearbook, National Society for the Study of Education. Part II, 1926, Page 233.

A careful survey of the objective tests was made and the three following ones were selected:

- (a) Sims Score Card for the Measurement of Socio-Economic Status.
- (b) Otis Self-Administering Test of Mental Ability--Higher Examination, Form A.
- (c) Chassell-Upton Citizenship Scales, Forms G and H.

The following procedure was thought to be the most reliable one: The Equivalent-Groups experimental method suggested by McCall<sup>(5)</sup> seemed most adequate in this work. Thirty-nine students who were members of the Student Council of Lincoln High School at Kansas City, Missouri, were selected and paired with thirty-nine students of the same school who were not members of the Student Council. The items used for pairing follow:

- (a) Sex
- (b) Grade Level
- (c) Socio-Economic Background
- (d) Mental Age

Each of the students was rated on Forms G and H of the Chassell-Upton Citizenship Scales in the early part of the second semester of the school year 1928-29,

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(5) McCall, William--"How to Experiment in Education."  
New York, MacMillan Co., 1923.  
Pages 161-186.

and rated again on the same scale in the latter part of the same semester. The change for each member of the two groups and group averages were computed in an effort to determine whether differences existed and were modified in the groups. These differences were treated statistically to determine whether they were significant.

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CHAPTER IIEQUATING THE GROUPSSocio-Economic Background

The Sims Score Card for the measurement of Socio-Economic Status was selected for this part of the work because:

- (a) It is possible, by this device, to measure quantitatively the socio-economic background and to express it in a single score.
- (b) It is possible to administer this scale in the single period given over to the home room.
- (c) The coefficient of correlation for reliability is .95 plus or minus .01 for this scale.<sup>(6)</sup>
- (d) The writer feels that this scale is a valid one.

The Sims Score Card was administered to 986 students--all the students present on the days of the testing--by ten teachers. The scores of the student council members were listed. Those students in each home room group whose scores clustered (varied within

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(6) Sims, Verner Martin--"The Measurement of Socio-Economic Status." Bloomington, Illinois, Public School Publishing Company, 1928. Pages 13-14.

five points) around the score of the student council member were selected for further testing.

#### MENTAL AGE

In order to determine the mental age of the students, the Otis Self-Administering Test of Mental Ability, Higher Examination, Form A, was used because:

- (a) it is easily administered,
- (b) it has a flexible time limit and can be given in the period devoted to the home room,
- (c) it has a convenient method of computing M. A.'s,
- (d) it has a coefficient of reliability plus.917 plus or minus .009.<sup>(7)</sup>

This test was given to 331 students--forty-six student council members and two hundred eighty-five students in the home room groups whose scores on the Sims Scale clustered around the student council members' scores. The mental age of the student council members was determined. The student in the home room group whose mental age most nearly approached this mental age was paired with the student council member.

In Lincoln high school, the students are separated into advisory groups on the basis of sex and grade level, hence it was possible to have exact pairing on these two points.

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(7) Otis, Arthur S.--"Manual of Directions and Key for Otis Self-Administering Tests of Mental Ability." Page 12. (See Appendix)

TABLE I

SIMS SCORE, OTIS SCORE, MENTAL AGE,  
AND SEX OF EACH MEMBER  
OF GROUPS A AND B

EXPERIMENTAL		CONTROL	SIMS SCORE		OTIS SCORE		MENTAL AGE		SEX	
GROUP A		GROUP B	A	B	A	B	A	B	A	B
1	J. W.	M. S.	15	16	28	29	14-4	14-6	F	F
2	E. S.	M. P.	14	15	35	34	15-10	15-8	F	F
3	O. B.	W. H.	23	22	40	38	16-8	16-5	M	M
4	F. B.	N. C.	17	16	31	32	15-0	15-2	F	F
5	E. B.	M. D.	18	19	31	29	15-0	14-8	F	F
6	M. N.	E. N.	17	17	39	36	16-6	16-2	F	F
7	B. H.	R. J.	14	15	29	28	14-6	14-4	M	M
8	R. H.	L. H.	21	21	29	26	14-6	14-0	M	M
9	H. S.	F. M.	18	19	27	27	14-2	14-2	M	M
10	L. R.	C. L.	15	12	29	29	14-8	14-8	M	M
11	H. G.	W. H.	20	17	29	30	14-8	14-10	F	F
12	C. B.	E. F.	17	15	34	33	15-8	15-6	F	F
13	M. S.	V. W.	17	18	33	32	15-6	15-4	F	F
14	L. W.	L. W.	8	10	25	27	13-7	14-2	F	F
15	D. E.	E. J.	22	21	32	32	15-4	15-4	M	M
16	C. C.	G. B.	22	22	46	44	17-8	17-5	F	F
17	F. F.	C. F.	24	25	35	35	15-10	15-10	F	F
18	M. P.	F. R.	13	13	36	35	16-0	15-10	F	F
19	M. B.	L. T.	13	13	35	34	15-10	15-8	M	M
20	A. L.	M. K.	20	26	33	33	15-6	15-6	F	F
21	M. J.	N. J.	17	15	42	42	17-0	17-0	F	F
22	A. J.	H. K.	25	21	35	35	15-10	15-10	M	M
23	L. W.	M. W.	19	23	48	34	17-11	15-8	F	F
24	S. D.	H. E.	14	11	28	28	16-4	16-4	F	F
25	M. B.	D. G.	10	9	37	38	16-3	16-5	F	F
26	F. K.	M. J.	15	17	25	24	13-7	13-5	F	F
27	B. J.	W. S.	20	19	30	32	14-10	15-2	M	M
28	C. T.	R. S.	16	13	28	27	14-4	14-2	F	F
29	W. D.	J. F.	16	16	28	32	14-4	14-10	M	M
30	C. D.	M. P.	18	16	36	36	16-0	16-0	M	M
31	G. H.	G. N.	7	10	28	26	14-4	14-0	F	F
32	L. T.	F. R.	20	23	35	36	15-10	16-0	F	F
33	E. M.	E. M.	7	10	38	32	16-5	14-10	F	F
34	E. J.	L. J.	28	20	16	16	11-7	11-7	M	M
35	G. G.	J. S.	17	14	14	13	11-0	10-10	M	M
36	R. J.	M. H.	22	20	26	20	13-10	12-6	F	F
37	A. F.	E. L.	22	21	15	14	11-3	11-0	F	F
38	A. H.	L. B.	15	11	24	27	13-5	14-2	M	M
39	A. H.	A. M.	16	16	21	21	12-8	12-8	M	M

Due to the fact that in six cases there was no student in the home room group who had a score near enough to the student council member's score for pairing, only thirty-nine pairs out of a possible forty-eight were obtained for the experiment. The student council members make up the experimental group, hereafter to be called Group A. The paired students who were not members of the student council make up the control group, hereafter spoken of as Group B.

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CHAPTER IIIDETERMINATION OF THE INITIAL STATUS

In order to measure progress in citizenship training the Chassell-Upton Citizenship Scales were selected because:

- (a) they provide a scoring device which makes it possible to record progress in the formation of habits of citizenship,
- (b) the reliability of these scales, found by taking the average correlation between ten pairs of the scale is plus .895, <sup>(8)</sup>
- (c) the writer feels that this is a valid measure.

The students' advisers (teachers X) were asked to score each member of Groups A and B on Forms G and H of the Chassell-Upton Citizenship Scales (in the early part of the semester). One other teacher (teacher Y) was asked to score each of the members of Groups A and B on Forms G and H of the same test, at the same time.

Using the scoring device furnished with the test, a raw score was obtained for each member of Groups A and B from the ratings of teachers X. Similarly, a raw score was obtained for each member of Groups A and B from the reports of teachers Y. Since the initial

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(8) Chassell, Clara F; Upton, Siegfried Maia; Chassell, Laura M.--"Scales for Measuring Habits of Good Citizenship." Teachers College Record, Vol. 23, June 1922, pages 66-67.

status for each student had to be expressed in a single score, it was necessary to average the scores of teachers X and Y.

At this point two procedures occurred to the writer as possible ones; first, to average the raw scores of teachers X with the raw scores of teachers Y and obtain a raw average. The disadvantage of this technique lies in the fact that the raw scores of one teacher and the raw score of another teacher are probably not statistically comparable because of the:

- (a) subjective character of the measuring instrument (due to possible differences in viewpoints on the part of the observers),
- (b) lack of equal opportunities of the various teachers to observe the students,
- (c) possible variability of behavior on the part of the student under different circumstances,
- (d) lack of a clear definition of traits by the authors of the scales.

Since there was some question as to whether the raw score of teachers X and teachers Y were comparable and could be averaged into a single score, a second method, called the "derived average" technique, was used to offset this criticism.

The standard deviation of the scores assigned Group A by teachers X was computed; it was 17.0. The standard deviation of the scores given to Group A by teachers Y was 12.95. The standard deviation of the scores of teachers Y was divided by the standard deviation of the scores of teachers X to obtain a value for computing the scores of teachers X to the same standard deviation basis as the scores of teachers Y. This value was .76. The scores of teachers X were multiplied by .76 and "derived scores" were obtained. The "derived scores" of teachers X were averaged with the raw scores of teachers Y to get what was termed a "derived average." This "derived average" represents the initial status of each member of Group A.

In a similar manner, the standard deviation for the scores assigned Group B by teachers X was computed; it was 16.5. The standard deviation for the scores of teachers Y was 16.0. The value which will reduce the scores of teachers X to the same standard deviation basis as the scores of teachers Y was .96. The scores of teachers X were multiplied by .96 and "derived scores" were obtained. The "derived scores" of teachers X were averaged with the raw scores from teachers Y to get the "derived average" which represents the initial status of Group B.

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TABLE II.

INITIAL TEST, GROUP A  
 RAW SCORES, DERIVED SCORES, AND DERIVED AVERAGES  
 ON CHASSELL-UPTON CITIZENSHIP SCALES

PUPIL NO.	PUPIL INITIAL	TEACHER X		TEACHER Y Raw Score	DERIVED AVERAGE
		Raw Score	Derived Score		
1	I. W.	75.0	57.0	52.5	54.7
2	E. S.	92.5	70.3	59.0	64.6
3	O. B.	73.0	55.4	87.5	71.4
4	F. B.	79.0	60.0	65.5	62.7
5	E. B.	75.0	57.0	63.0	60.0
6	M. N.	66.0	50.1	63.0	56.5
7	B. H.	49.5	37.6	41.5	39.5
8	R. H.	40.5	30.7	59.0	44.8
9	H. S.	56.0	42.5	67.0	54.7
10	L. R.	44.0	33.4	69.0	51.2
11	H. G.	46.5	35.3	55.5	45.4
12	C. B.	48.5	36.8	54.0	45.4
13	M. S.	62.5	47.5	67.0	57.2
14	L. W.	60.0	45.6	53.5	49.5
15	D. E.	64.5	49.0	88.5	68.7
16	C. C.	93.0	70.6	74.5	72.5
17	F. F.	67.5	51.3	63.5	57.4
18	M. P.	65.0	49.4	55.0	52.2
19	M. B.	53.5	44.4	53.5	43.9
20	A. L.	55.5	42.1	57.0	49.5
21	M. J.	83.0	63.0	66.5	64.7
22	A. J.	15.0	11.4	76.0	43.7
23	L. W.	72.0	54.7	77.0	65.8
24	S. D.	77.0	58.5	69.0	73.7
25	M. B.	77.5	58.9	67.5	63.2
26	F. K.	48.5	36.8	61.0	48.9
27	B. J.	29.5	22.4	71.5	46.9
28	C. T.	49.0	37.2	15.5	26.3
29	W. D.	82.5	62.7	44.5	53.6
30	C. D.	34.5	26.2	59.5	42.3
31	G. H.	69.5	52.8	63.5	58.2
32	L. T.	47.0	35.7	65.0	50.3
33	E. M.	69.5	52.8	60.5	56.6
34	E. J.	36.0	27.3	90.5	58.9
35	G. G.	55.0	41.3	56.5	49.1
36	R. J.	45.5	34.5	73.0	53.7
37	A. E.	75.5	57.3	55.5	56.4
38	A. H.	60.0	45.6	56.5	51.0
39	A. H.	57.5	43.7	56.0	49.8

TABLE III

INITIAL TEST, GROUP BRAW SCORES, DERIVED SCORES, AND DERIVED AVERAGES  
ON CHASSELL-UPTON CITIZENSHIP SCALES

PUPIL NO.	PUPIL INITIAL	TEACHER X		TEACHER Y Raw Score	DERIVED AVERAGE
		Raw Score	Derived Score		
1	M. S.	55.0	52.8	30.5	41.6
2	M. P.	47.5	45.6	47.5	46.5
3	W. N.	61.0	58.5	35.0	46.8
4	N. C.	63.5	60.9	60.5	60.7
5	M. D.	53.0	50.8	71.5	61.2
6	E. N.	65.0	62.4	67.0	64.7
7	R. J.	24.0	23.0	57.0	40.0
8	L. H.	56.0	53.7	57.0	55.3
9	F. M.	41.5	39.8	46.0	47.9
10	C. L.	48.0	46.0	62.5	54.2
11	W. H.	67.5	64.8	47.5	56.2
12	E. F.	50.0	48.0	29.0	38.5
13	V. W.	58.0	55.6	67.0	61.3
14	L. W.	37.5	36.0	57.5	46.7
15	E. J.	64.0	61.4	22.0	41.7
16	G. B.	67.0	64.3	67.0	65.6
17	C. F.	49.0	47.0	74.0	60.5
18	F. R.	66.0	63.3	67.0	65.1
19	L. T.	63.0	60.4	62.5	61.4
20	M. K.	62.0	59.5	63.0	61.2
21	H. J.	64.0	61.4	53.0	57.2
22	N. K.	33.0	31.6	42.5	37.0
23	M. W.	64.5	61.9	65.5	63.7
24	H. E.	65.5	62.8	52.5	57.6
25	D. G.	41.5	39.8	72.0	55.9
26	M. J.	60.0	57.6	75.0	66.3
27	W. S.	39.5	37.9	43.0	40.4
28	R. S.	52.0	49.9	48.0	49.9
29	I. F.	40.0	38.4	64.5	51.4
30	M. P.	32.0	30.7	66.5	48.6
31	G. H.	70.0	67.2	81.5	74.3
32	F. R.	38.5	36.9	73.0	54.9
33	E. M.	73.0	70.0	66.0	68.0
34	L. J.	5.0	4.8	8.0	6.4
35	J. S.	15.0	14.4	45.0	29.7
36	M. H.	65.0	62.4	26.5	44.4
37	E. L.	58.0	55.6	61.5	58.5
38	L. B.	59.5	57.1	45.0	51.0
39	A. M.	93.5	89.7	66.0	77.8

CHAPTER IVAPPLICATION OF THE EXPERIMENTAL FACTOR

During the period of this experiment there was no change from the regular procedures and activities of the Student Council. The members of Group A pursued their regular school programs, and carried on their customary school duties. In addition, they participated in the activities of the Student Council, which include the following:

- (a) Attending student council meetings.
- (b) Reporting to the groups concerning these meetings.
- (c) Planning and executing three school socials.
- (d) Organizing a court with regular procedure, which tries students for minor offenses.
- (e) Planning and executing fire drills.
- (f) Organizing a book exchange.

The members of Group B pursued their regular school programs, and carried on their regular school duties. They took no active part in the activities of the student council.

In neither case were the students aware that they were under observation.

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CHAPTER VDETERMINATION OF THE FINAL STATUS

Teachers X and Teachers Y were again asked to score the members of Groups A and B on forms G and H of the Chassell-Upton Citizenship Scales in the latter part of the same semester. A raw score was obtained for each member of Groups A and B from teachers X and teachers Y.

The standard deviation of the scores for Group A from teachers X was 16.0, and of teachers Y, 15.25. The factor was .95. The scores of teachers X were multiplied by .95 and "derived scores" were obtained. The "derived scores" of teachers X were averaged with the raw scores of teachers Y and "derived averages" were used to represent the final status of each member of Group A.

In a similar manner, the standard deviation of the scores assigned Group B by teachers X was found to be 19.2 and from teachers Y, 16.0. The factor was .82. "Derived scores" were obtained, and averaged with the raw scores of teachers Y. The "derived averages" were used to represent the final status for each of the members of Group B.

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TABLE IV

FINAL TEST, GROUP ARAW SCORES, DERIVED SCORES, AND DERIVED AVERAGES  
ON CHASSELL-UPTON CITIZENSHIP SCALES

PUPIL NO.	PUPIL INITIAL	TEACHER X		TEACHER Y Raw Score	DERIVED AVERAGE
		Raw Score	Derived Score		
1	I. W.	95.5	90.7	99.5	95.1
2	E. S.	87.0	82.6	74.0	78.3
3	O. B.	90.0	85.5	91.5	88.5
4	F. B.	64.0	60.8	69.5	65.1
5	E. B.	63.0	59.8	69.0	64.4
6	M. N.	76.0	72.2	67.0	69.6
7	B. H.	74.0	70.3	65.5	67.5
8	R. H.	73.0	69.3	62.0	65.6
9	H. S.	70.0	66.5	78.0	72.2
10	L. R.	71.0	67.4	56.0	61.7
11	H. G.	66.0	62.7	65.0	63.8
12	C. B.	67.5	64.1	64.0	64.0
13	M. S.	66.5	63.1	80.0	71.5
14	L. W.	61.5	58.4	70.0	64.2
15	D. E.	68.0	64.6	73.0	68.8
16	C. C.	97.5	92.6	67.0	79.8
17	F. F.	90.0	85.5	53.5	69.5
18	M. P.	67.0	63.6	79.5	71.5
19	M. B.	64.0	60.8	37.5	49.1
20	A. L.	55.0	52.2	72.5	62.3
21	M. J.	99.0	94.0	70.5	82.2
22	A. J.	38.0	36.1	64.0	50.0
23	L. W.	59.5	56.5	74.5	65.5
24	S. D.	86.0	81.7	68.5	75.1
25	M. B.	76.5	72.6	70.0	71.3
26	F. K.	78.5	74.5	70.0	72.2
27	B. J.	67.5	64.1	37.0	50.5
28	C. T.	67.0	63.6	30.0	46.8
29	W. D.	95.5	90.7	68.0	79.3
30	C. D.	23.5	22.3	35.5	28.9
31	G. H.	77.5	73.6	76.5	75.0
32	L. T.	58.0	55.1	56.5	55.8
33.	E. M.	87.5	83.1	68.5	75.3
34	E. J.	56.5	53.6	95.5	74.5
35	C. G.	53.5	50.8	60.5	55.6
36	R. J.	95.0	90.2	90.0	90.1
37	A. F.	70.0	66.5	50.0	58.2
38	A. H.	56.0	53.2	58.0	55.6
39	A. H.	57.5	64.1	41.5	52.8

TABLE VFINAL TEST, GROUP BRAW SCORES, DERIVED SCORES, AND DERIVED AVERAGES  
ON CHASSELL-UPTON CITIZENSHIP SCALES

PUPIL NO.	PUPIL INITIAL	TEACHER X		TEACHER Y Raw Score	DERIVED AVERAGE
		Raw Score	Derived Score		
1	M. S.	50.5	41.4	30.5	35.9
2	M. P.	44.5	36.4	64.0	50.2
3	W. H.	83.5	68.4	37.5	52.9
4	N. C.	36.0	29.5	65.0	47.2
5	M. D.	50.0	41.0	60.5	50.7
6	E. W.	68.5	56.1	67.0	61.5
7	E. J.	51.5	42.2	66.0	54.1
8	L. H.	82.5	67.6	42.5	55.0
9	F. M.	39.5	32.3	39.5	35.9
10	C. L.	46.5	38.1	56.5	47.3
11	W. H.	68.0	55.7	73.5	64.6
12	E. F.	67.0	54.9	20.0	37.4
13	V. W.	51.5	42.2	67.0	54.6
14	L. W.	64.0	52.4	64.5	58.4
15	E. J.	67.0	54.9	46.0	50.4
16	C. B.	75.0	61.5	67.0	64.2
17	C. F.	75.5	61.9	64.5	63.2
18	F. R.	74.0	60.6	67.0	63.8
19	L. T.	69.5	56.9	66.5	61.7
20	M. K.	56.0	45.9	46.5	46.2
21	T. J.	67.5	55.3	59.0	57.1
22	H. K.	47.5	38.9	43.5	41.2
23	M. W.	54.0	44.2	60.5	52.3
24	N. E.	75.5	61.9	58.5	60.2
25	D. G.	50.5	41.4	84.5	62.9
26	M. J.	83.0	68.0	83.5	75.7
27	W. S.	81.0	66.4	65.5	65.9
28	R. S.	68.5	56.1	66.5	61.3
29	I. F.	60.5	49.6	63.0	56.3
30	M. P.	11.0	9.0	67.0	38.0
31	G. H.	56.5	46.3	80.0	63.1
32	F. R.	40.0	32.8	85.0	58.9
33	E. M.	91.5	75.0	61.5	68.2
34	L. J.	9.0	7.3	17.5	12.4
35	J. S.	13.5	11.0	55.0	33.0
36	M. H.	64.5	52.8	72.0	62.4
37	E. L.	53.0	43.4	67.0	55.2
38	L. B.	60.5	49.6	34.5	42.0
39	A. M.	95.5	78.3	69.5	73.9

CHAPTER VICOMPUTATION OF THE EXPERIMENTAL COEFFICIENT

The changes in terms of the difference between the initial status and the final status for each member of Group A was computed. These changes ( $c_1$ ) were shown in a frequency distribution and the following results were found:

- (a) The mean of the distribution of changes was 12.85.
- (b) The standard deviation of the distribution of changes was 10.45.
- (c) The standard deviation of the mean of the distribution of changes was 1.6.

The changes in terms of the difference between the initial status and the final status for each member of Group B were computed. These changes ( $C_2$ ) were thrown into a frequency distribution with the following results:

- (a) The mean of the distribution of changes was 0.
- (b) The standard deviation of the distribution of changes was 8.0.
- (c) The standard deviation of the mean of the distribution of changes was 1.2.

A comparison of the mean of the distribution of changes for group A with the mean of the distribution

TABLE VI

CHANGE IN MEMBERS OF GROUP A BASED ON THE  
DIFFERENCE BETWEEN THE INITIAL AND  
FINAL TEST SCORES ON CHASSELL-UPTON  
CITIZENSHIP SCALES

PUPIL NO.	PUPIL INITIAL	INITIAL TEST SCORES	FINAL TEST SCORES	C1
1	I. W.	54.7	95.1	40.4
2	E. S.	64.6	78.3	13.7
3	O. B.	71.4	88.5	17.1
4	F. B.	62.7	65.1	2.4
5	E. B.	60.0	64.4	4.4
6	M. N.	56.5	69.6	13.1
7	B. H.	39.5	67.9	28.4
8	R. N.	44.8	65.6	20.8
9	H. S.	54.7	72.2	17.5
10	L. R.	51.2	61.7	10.5
11	H. G.	45.4	63.8	18.4
12	C. B.	45.4	64.0	18.6
13	L. W.	57.2	71.5	14.3
14	M. S.	49.5	64.2	14.7
15	D. E.	68.7	68.8	.1
16	C. C.	72.5	79.8	7.3
17	F. F.	57.4	69.5	12.1
18	M. P.	52.2	71.5	19.3
19	M. B.	48.9	49.1	.2
20	A. L.	49.5	62.3	12.8
21	M. I.	64.7	82.2	17.5
22	A. J.	43.7	50.0	6.3
23	L. W.	65.8	65.5	-.3
24	L. D.	63.7	75.1	11.4
25	M. B.	63.2	71.3	8.1
26	F. C.	43.9	72.2	28.3
27	B. J.	46.9	50.5	3.6
28	C. T.	26.3	46.8	20.5
29	W. D.	53.6	79.3	25.7
30	C. D.	42.8	28.9	-13.9
31	G. H.	58.1	75.0	16.9
32	L. T.	50.3	55.8	5.5
33	E. M.	56.6	75.8	19.2
34	E. J.	58.9	74.5	15.6
35	G. G.	49.1	55.6	6.5
36	R. J.	53.7	90.1	36.4
37	A. F.	56.4	58.2	1.8
38	A. H.	51.0	55.6	4.6
39	A. N.	49.8	52.8	3.0

TABLE VII

CHANGE IN MEMBERS OF GROUP B BASED ON THE  
DIFFERENCE BETWEEN THE INITIAL AND  
FINAL TEST SCORES ON CHASSEL-UPTON  
CITIZENSHIP SCALES

PUPIL NO.	PUPIL Initial	INITIAL TEST SCORES	FINAL TEST SCORES	C <sub>1</sub>
1	M. S.	41.6	35.9	-5.7
2	M. P.	46.5	50.2	3.7
3	W. H.	46.7	52.9	6.2
4	N. C.	60.7	47.2	-13.5
5	M. D.	61.1	50.7	-10.4
6	E. N.	64.7	61.5	-3.2
7	R. J.	40.0	54.1	14.1
8	L. H.	55.3	55.0	-.3
9	F. M.	42.9	35.9	-7.0
10	C. L.	54.2	47.3	-6.9
11	W. H.	56.1	64.6	8.5
12	E. F.	38.5	37.4	-1.1
13	V. W.	61.3	54.6	-6.7
14	L. W.	46.7	58.4	11.7
15	E. J.	41.7	50.4	8.7
16	G. B.	65.6	64.2	-1.4
17	C. F.	60.5	63.2	2.7
18	F. R.	65.1	63.8	-1.3
19	L. T.	61.4	61.7	.3
20	M. K.	61.2	46.2	-15.0
21	N. J.	57.2	57.1	-.1
22	N. K.	37.0	41.2	4.2
23	M. W.	63.7	52.3	-11.4
24	H. E.	57.6	60.2	2.6
25	D. G.	55.9	62.9	7.0
26	M. J.	66.3	75.7	9.4
27	W. S.	40.4	65.9	15.5
28	R. S.	48.9	61.3	12.4
29	I. F.	51.4	56.3	4.9
30	M. P.	48.6	38.0	-10.6
31	G. H.	74.3	63.1	-11.2
32	F. R.	54.9	58.9	4.0
33	E. M.	68.0	68.2	.2
34	L. J.	6.4	12.4	6.0
35	J. S.	29.7	33.0	3.3
36	M. H.	44.4	62.4	18.0
37	E. L.	58.5	55.2	-3.3
38	L. B.	51.0	42.0	-9.0
39	A. M.	77.8	73.9	-3.9

of changes for Group B, reveals a positive and significant difference in favor of Group A. The standard deviation of the difference is 2.0.

In an effort to determine the reliability of this difference, the Experimental Coefficient was computed according to the formula,  $\frac{D}{2.78 \text{ SDD}}$ .

The experimental coefficient was 2.3. The interpretations of such an experimental coefficient according to McCall<sup>(9)</sup> are:

- (a) If the experiment was repeated a large number of times, one can be practically certain that a positive difference will exist in favor of the Experimental Group.
- (b) The difference is 2.3 larger than it needs to be in order that one might be practically certain that participation in the activities of student government by students of high school grade does aid in the formation of certain desirable habits of citizenship.

This experiment leads one to conclude that participation in the activities of student government by students of high school grade does aid in the formation of such habits of citizenship as are measured by the Chassell-Upton Citizenship Scales.

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APPENDIX

## I. Manuals of directions for:

- a. Sims Score Card for Socio-Economic Status,
- b. Otis Self-Administering Tests of Mental Ability.

## II. Tests:

- a. Sims Score Card for Socio-Economic Status.
- b. Otis Self-Administering Tests of Mental Ability, Higher Examination, Form A.
- c. Chassell-Upton Citizenship Scales, Forms G and H.

## III. Computations:

- a. Standard deviations for scores from teachers X and Y on initial test, Group A.
  - b. Standard deviations for scores from teachers X and Y on initial test, Group B.
  - c. Standard deviations for scores from teachers X and Y on final test, Group A.
  - d. Standard deviations for scores from teachers X and Y on final test, Group B.
  - e. Standard deviations, Means, and standard deviations of the means of the changes found by comparing the initial test score with the final test score on Chassell-Upton Citizenship Scales of each member of Groups A and B.
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# MANUAL OF DIRECTIONS

FOR THE

SIMS

SCORE CARD FOR SOCIO-ECONOMIC STATUS

BY

VERNER M. SIMS

Louisiana Polytechnic Institute, Ruston, Louisiana

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PUBLIC SCHOOL PUBLISHING COMPANY  
BLOOMINGTON, ILLINOIS

## MANUAL OF DIRECTIONS

### PURPOSE OF THE SCORE CARD

The Score Card under consideration in this Manual was developed by Verner M. Sims, of the Louisiana Polytechnic Institute, Ruston, Louisiana, for the purpose of providing a simple, convenient, and objective device for ascertaining and recording the general cultural, social, and economic background furnished by the homes of school children. The need for such a device is clearly evident to anyone who has had occasion to apply almost any educational or psychological test to pupils or who has been desirous of appraising the environments of children in various other connections. The obvious merit of the score card as a device is that it permits quantitative records and statistical comparisons. Hence, home conditions need no longer be recorded as "average" or "poor" or "good," but may be given a numerical rating that is certainly far more precise than the usual verbal characterizations.

### DEVELOPMENT OF THE SCORE CARD

The present Score Card is the product of somewhat extended experimentation carried on at the School of Education, Yale University.<sup>1</sup> It represents a simplified revision of the third form of score card tried by Mr. Sims. Users of the present card will find it instructive to read the author's account of the inception of the device, how and why it was developed into its present form, the statistical justification of its component questions and of the method of scoring them. This account appears in *The Measurement of Socio-Economic Status*, by V. M. Sims, Public School Publishing Co., 1927, which will be sent postpaid to users of this score card for 25c.

### RANGE OF APPLICABILITY

The Score Card is intended for use with pupils of Grades IV to XII, inclusive. It can be applied, of course, either to individual pupils or to groups of pupils. About 20 to 25 minutes should be available for administering.

### MATERIAL NEEDED

The examiner will need one copy of this Manual of Directions, one copy of the Score Card for each pupil to be examined, and in addi-

<sup>1</sup> The author is indebted to Doctors Hartshorne and May of Teachers College, Columbia University, with whom he cooperated during the later stages of the work, for helpful criticisms and for an allotment from the funds of the Character Education Inquiry for clerical assistance.

tion a "desk" copy of the Score Card, to be retained by him and used as a key to facilitate scoring the pupils' responses.

### CONDUCTING THE EXAMINING

These directions have been developed by trial to insure that every child shall understand exactly what he is to do. All the questions likely to be encountered have been anticipated in the directions, but any sensible question asked by a child should be answered. Give the instructions slowly, clearly, and with serious interest, with the expectation that the pupils will respond to your own mood.

Distribute the blanks face up, saying: "Do nothing until I explain what you are to do."

As soon as the blanks are distributed, say: "Fill in the blanks at the top of the page (point to the lines). Write your whole name. Give your age in years and months. That is, tell how many years old you were on your last birthday and how many months ago that was. Write the grade you are in at school after the word 'Grade.' The date to-day is.....; write it after the word 'Date.'

"The next question asks whether you have spent two years in any grade. Answer 'Yes' or 'No.' If you have spent more than two years in any grade, write after the next question what grades these were.

"Question 5 asks whether you have skipped any grades. Answer 'Yes' or 'No.' If you have skipped any grades, write after the next question what grades these were.

"On the next line, insert the city and state of your home address.

"In question 7, state how many years you have lived in this town.

"Question 8 asks whether you attended school in any other towns. Answer 'Yes' or 'No.' If you have attended school in any other towns, name them on the dotted line.

"Then write the name of your school.

"Now read the first line below 'If you have brothers or sisters in this school, write their names and grades on these lines.' If you have, put the name of your brother or sister where it says 'name,' and the grade he or she is in where it says 'grade.' There is room for two names, in case you have more than one brother or sister in this school.

"In the following questions you will underline, that is, draw a line under, the correct answer to each question. Are you a boy or a girl? If a boy, underline the word 'boy.' If a girl, underline the word 'girl.' Is that clear?"

NOTE: In this and the following items, the examiner should make sure that the pupils understand how to make their answers; that is, by *drawing* a line under the right answer. Younger children who are not accustomed to tests often do the thing wrong.

Then say: "The next answers are at the right. If you are living at home with your parents, underline the word 'Yes.' If you are not living at home with your parents, underline the word 'No.'"

“The next question asks whether you are living in the home of someone else, such as a relative, adopted parents, guardian. Give the right answer by underlining ‘Yes’ or ‘No.’ Or, are you living in an institution, such as a boarding school, an orphan asylum, or a home for children? Underline the right word. Of course, if you have answered either of the other two questions ‘Yes,’ the answer to this will be ‘No.’”

When certain that the first page has been completed by all the pupils, say: “Now turn the page. Notice the questions. These questions are a good test of your ability to observe things around you. I will explain each question as we come to it. Be especially careful of your answers, and answer all of the questions. Use your own judgment in answering. Wait for instructions on each question. Don’t ask me anything if you can help it.

1. “Now read the first question. It says: ‘Have you a telephone in your home?’, that is, at the place where you live? If you have a telephone, draw a line under ‘Yes’ at the right of the question. If you have no telephone, draw a line under ‘No.’ This means a private telephone which you can use whenever you want to. If the telephone which you have is a pay station (where you put a nickel in the slot), answer ‘No.’ Look at me as soon as you are ready for the next question.

2. “Is your home heated by a furnace in the basement? Draw a line under the right answer. Of course, if your home is heated by a stove or stoves or anything other than by a furnace, you will answer ‘No.’ Do you understand what you are to do?

“Look at me when you are ready for the next question.

3. “Do you have a bathroom that is used by your family alone? Underline the right answer. If you have a roomer living with you and he uses the bathroom, you may still answer ‘Yes;’ but if the bathroom is used by another family or you have no bathroom at all, answer ‘No.’

4. “Do you have a bank account in your own name? This means an account in a city bank, not a school bank. If you have such an account, underline ‘Yes;’ if you have not, underline ‘No.’

5. “Did your father go to college? Any college other than business college is counted. Underline either ‘Yes’ or ‘No.’

6. “Did your mother go to college? Underline either ‘Yes’ or ‘No.’

7. “Did your father go to high school? Underline. Any school above the grade school is considered as high school. Of course, if question 5 is answered ‘Yes,’ then question 7 will be ‘Yes’ also.

8. “Did your mother go to high school? Underline. If question 6 is answered ‘Yes,’ then question 8 is ‘Yes’ also.”

The examiner will perhaps need to assist the pupils with these questions concerning education of the parents. In most cases where there is doubt, the answer is 'No.' Insist that the pupils give some answer. Ask them if they have heard their parents speak of going to a high school or academy. If they have not, the answer is usually 'No,' unless they went to college, when, of course, it is 'Yes.'

9. "Does your mother (or the lady of the home in which you live) regularly attend any lecture course of which you know? Underline either 'Yes' or 'No.' A lecture course is a number of talks given once a week or once every two weeks, in some church, or school, or hall, or home, and people go in to listen to them. This does not mean going to a regular church service.

10. "Do you have your own room in which to study? If you do not have a special place to study, but study in the room with the rest of the family, or wherever you happen to take a notion to study, then answer 'No.' If you have a room of your own or a room that you share with a brother or sister, then answer 'Yes.'

11. "Do you take private lessons in music? 'Private lessons' means that you or your folks have to pay for them. They may be lessons in piano, violin, singing, etc. Underline the right answer.

12. "Do you take private lessons in dancing? 'Private,' again, means lessons for which you or your folks have to pay. Underline the right answer.

13. "Does your mother belong to any clubs or organizations of which you know—for example, a sewing club, a card club, a church club, etc.? Underline 'Yes' and write the name of the club on the line below if you know of one to which your mother belongs. [Examiner will point out line, and see that children understand.] If you don't think she belongs to one, underline 'No.' If you think she belongs to one, but don't know the name of it, underline 'Yes' and leave the name out.

14. "Do you belong to any clubs or organizations where you have to pay dues? Underline 'Yes' or 'No,' and write the name or names of the clubs if you belong to any. Remember it says 'where you have to pay dues.' If you belong to some club or organization, but don't have to pay dues in it, then answer 'No.'

15. "Does your family (your father and mother) attend concerts? Concerts are musical programs, perhaps an organ recital, a band concert, an orchestra program, a program by a singer or a pianist. Underline the word 'Never' if you do not remember your parents going to such a concert. Underline 'Occasionally' if you can remember once or twice that they have gone to such a concert. Underline 'Frequently' if they go four or five times a year or oftener.

16. "Where do you regularly spend your summers? Underline the right answer. If you spend them at home, underline 'At Home.' If you usually go to the country (or living in the country, usually go to the city) for a visit or go to camp, to the mountains, to the shore, or any other place for a few weeks during the summer, then underline 'Away From Home.' Don't underline both places.

17. "How often do you have dental work done? 'Never' or 'When Needed' or 'Once a Year' or 'Oftener' than once a year? Underline only one of these. If the work is done by a school dentist, don't count that. The question means work done at a private dentist's where your father has to pay for it. If you have a regular time for having dental work done, whether or not you need it, having your teeth examined and perhaps cleaned, then underline the words which seem to tell how often you have this done. If you go to a dentist just when you need work done, that is, have a toothache, etc., then underline 'When Needed.' If you have never had any work done, underline 'Never.'

18. "How many servants, such as a cook, a housekeeper, a chauffeur, or a maid, do you have in your home? If there are any servants or people that work in your home for pay, underline the right number, for example, 'One Part-Time,' etc. If there are no servants, underline 'None.'

19. "Does your family own an auto which is not a truck? Underline the word that tells how many autos your family owns. If you do have an auto, write the make of the auto on the line where it says to write it.

20. "How many magazines are regularly taken in your home? 'Regularly' means that you get them through the mail or that they are delivered at regular intervals, such as once a week or once every two weeks. If you don't get any magazine regularly, then underline 'None.' If you get one or more, then underline the right number and write the names of one, two, or three of them on the lines under the question where it says to write them. Do the best you can at spelling them.

21. "About how many books are in your home? (Be very careful with this question. A row of books three feet long [examiner illustrate with hands] would not have more than 25 books in it.) If you have no books, then underscore 'None.' If all the books in your home would make a row about three feet long, underline where it says '1 to 25.' If you have a small bookcase full of books or several rows of books, underline where it says '26 to 125.' Perhaps you may have even more, a bookcase full and many more, or two bookcases full.

Underline where it says '126 to 500.' Or, it may be that you have a room at home where the walls are lined with books—a library. If you have, then perhaps you should underline where it says 'More,' that is, more than 500. Use your own judgment, but be very careful.

22. "How many rooms does your family occupy? That is, how many rooms are there in your house or apartment or tenement or flat which are used by your family and any persons who belong to your household? If you have relatives living with you, or have servants who sleep in your house, or if you rent one or more rooms to roomers, count in all their rooms also. Underline the total number of rooms. Bathrooms, closets, and pantries don't count. If you live in a two-family house, count only the rooms used by your own family and those living with you, that is, relatives, servants, and roomers.

"Next, how many persons occupy these rooms? Count all the members of your family, beginning with yourself, and any other persons—relatives, servants, roomers—that live in your home. Servants who come in by the day are not included. When you have counted, underline the right number.

23. "Write your father's occupation on this line. That is, your father's work. For example, he may be a doctor, a plumber, a barber, a carpenter, a keeper of a store, a salesman, a machinist, etc.

"If your father is not living, then write his occupation when he was living. However, if you have a step-father, you may write his occupation. Please don't omit this question. I want you to answer it. Ask questions if you are in doubt as to what to do."

(The examiner will assist pupils with this question. The object is to find out the occupation of the person who is making the living for the family. It is essential that the pupils answer it.)

"Does he own part, all, none, of his business? Draw a line under the word which answers the question. That is, if he owns part of his business, underline 'Part,' etc.

"Does he have any title, such as president, manager, foreman, boss, etc.? If he does have such a title, draw a line under the word 'Yes,' and write the title on the line where it says to write it. If he does not have a title that you know of, then underline 'No' and don't write anything.

"How many persons work for him? Draw a line under the right number. If none do, then draw a line under 'None.'

"Now take a few minutes to look over your questions. Be sure that you have answered all of them. Ask any questions that are necessary."

Before collecting the blanks the examiner should look them over, one by one, for omissions. By questioning the pupil it will often be

possible to supply the information lacking. Use all reasonable effort to get every question answered by every child as accurately as possible. A special interview should be sought to fill up blanks wherein *more than three* questions remain unanswered, otherwise the scoring plan is interfered with.

### SCORING THE RESPONSES

Read all these directions before doing any scoring.

If more than one blank is to be scored, prepare a key by marking on an unused blank the credits which are assigned for each possible response. Keep the key-blank with this Manual of Directions for future use. It is a good plan to use red ink for inserting these credits, which are as follows:

- Questions 1 to 14:<sup>1</sup> credit 3 for each 'Yes,' 0 for each 'No.'
- Question 15: Never, 0; Occasionally, 3; Frequently, 3.
- Question 16: At Home, 0; Away from Home, 3.
- Question 17: Never, 0; When Needed, 0; Once a year, 3; Oftener, 3.
- Question 18: None, 0; One Part Time, 3; One or More All the Time, 4.
- Question 19:<sup>1</sup> None, 0; One, 3; Two or More, 4.
- Question 20:<sup>1</sup> None, 0; One, 2; Two, 3; Three or More, 4.
- Question 21: None, 0; 1 to 25, 2; 26 to 125, 4; 126 to 500, 5; More, 6.
- Question 22: Insert on the margin of the key-blank the following correspondences between room-person ratio and units of credit:

<i>Ratio</i>	<i>Credit</i>
0.0 to 0.50	0
0.51 to 1.00	3
1.01 to 1.50	4
1.51 to 2.00	5
2.01 and up	6

To find the ratio, divide the number of rooms occupied by the number of persons occupying, carrying the quotient to one decimal place.<sup>2</sup> (Time will be saved by scoring Question 22 in all the blanks before proceeding to Question 23.)

<sup>1</sup> The supplementary question in Nos. 13, 14, 19, and 20 is introduced to make the child more careful in filling out the card; it is not scored, itself.

<sup>2</sup> In illustration, if 6 rooms are reported occupied by 8 persons, the ratio is  $\frac{6}{8}$ , or 0.7, and is given 3 points credit.

Question 23: Insert on the margin of the key-blank the following correspondences between class of occupations and units of credit: Group I, credit 8; Group II, 6; Group III, 4; Group IV, 2; Group V, 0.

To classify the father's occupation into its proper group, consult the following lists, which should be clearly in mind before proceeding.

### Classification of Occupations

*Group I.* Professional men, proprietors of large businesses, and higher executives. Typical occupations are illustrated:

Professional men like architects, artists, authors, clergymen, college administrators, dentists, editors of large papers, engineers (civil, electrical, mechanical), inventors, journalists, lawyers, physicians, teachers (college).

Important public officials, like senators, congressmen, mayors, postmasters of large towns.

Important private officials, like higher executives of large corporations.

Proprietors of businesses and managers employing more than 10 men and owning part or all of their business, like agents (insurance, real estate, railroad, steamship, etc.) large buyers, clothiers, large contractors, hotel owners and managers, manufacturers, merchants, publishers, etc.

Also bankers, brokers, inspectors (government and railroad, but not shop inspectors).

*Group II.* Commercial service, clerical service, large land owners, managerial service of a lower order than in Group I, and business proprietors employing from five to ten men.

Accountants, bookkeepers, cashiers, commercial travellers, large-scale farmers, high-school teachers, musicians, buying and selling agents (insurance, real estate, etc.) working for someone else, proprietors of businesses (clothiers, merchants, publishers, etc.) employing five to ten men, managers of small corporations, assistants in governmental employ, etc.

*Group III.* Artisan proprietors, petty officials, printing trades employees, skilled laborers with some managerial responsibility, shop owners and business proprietors employing one to five men.

Bakers, barbers, blacksmiths, cleaners and dyers, cobblers, machinists, plumbers, tailors, and other artisans owning their own business; clerks in stores, farmers, foremen, railroad conductors and engineers, shop inspectors, linotypers, detectives, mail clerks, police sergeants, fire captains, etc.

*Group IV.* Skilled laborers (with exception of printers), who work for someone else, building trades, transportation trades, manufacturing trades involving skilled labor, personal service. Small shop owners doing their own work.

Bakers, blacksmiths, cabinet-makers, carpenters, chefs, cooks, electricians, engineer's assistants, firemen, janitors, locksmiths, mailmen, policemen, tenants, tinsmiths, tanners, sailors, switchmen, waiters. Small shop owners employing no help.

*Group V.* Unskilled laborers, common laborers, helpers, "hands," peddlers, varied employment, venders, unemployed (unless it represents the leisured class or retired).

Bootblacks, drivers (truck and wagon), delivery men, fish peddlers, furnace tenders, night watchmen, suit pressers, messengers, and all common labor.

In classifying occupations be sure to consider the number of persons employed, titles, and whether or not the business is owned. That is, keep in mind the responses to all the questions of No. 23.

Record on the margin of the pupil's blank (using Roman numerals) the occupation group to which you judge his father belongs. By reference to the key-blank, record also on the pupil's blank (using Arabic numerals) the corresponding number of credits.

(Time will usually be saved by scoring Question 23 in all the blanks before proceeding further.)

A credit has now been assigned to each of the replies to the 23 questions that have been answered. Add these credits and enter the sum at the end of the blank as the total credits (T.C.)

Divide this sum by the actual number of questions answered. That is, if the child has answered all questions, divide by 23; if one question has been omitted, divide by 22, etc. (This is necessary to make provision for any questions unanswered.)

This quotient, carried to one decimal place and the decimal neglected, is the score, the *Socio-Economic Status*.

The accompanying table will facilitate the derivation of the score if as many as 20 questions are answered.\*

The table is read as follows: The first column gives all possible total credits, the second column gives the score when 23 questions are answered, the third column gives the score when 22 questions are answered, etc.

#### INTERPRETING THE RESULTS: LEVELS OF SOCIO-ECONOMIC STATUS

For comparative purposes it is necessary to have some idea of the significance of a given score. A numerical score as such means but little; it is only when compared with other scores within the group examined and with the scores of other groups that it comes to have meaning. Use of the word *status* implies relative position, and it is well to recognize the fact that the condition being measured is usually of significance in connection with the group within which the child lives. The questions may not have like significance in different communities. To possess all of the items called for in the Score Card may in one community indicate an extremely high socio-economic level, in another it may indicate but an average level. The status or condition being measured is very much a relative matter. For this reason comparisons are most reliable when made within the same or similar groups.

Even in this stage of its use, however, it is helpful to examiners to have before them a typical distribution of scores, so that they may

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\*If a fewer number are answered the blank should be returned to the examinee for completion.

TABLE FOR CONVERTING TOTAL CREDITS FROM 1 TO 82 INTO SCORES WHEN  
23, 22, 21, OR 20 QUESTIONS HAVE BEEN ANSWERED

T.C.	Questions Answered				T.C.	Questions Answered				T.C.	Questions Answered			
	23	22	21	20		23	22	21	20		23	22	21	20
1	0	0	0	1	28	12	13	13	14	56	24	25	27	28
2	1	1	1	1	29	13	13	14	15	57	25	26	27	29
3	1	1	1	2	30	13	14	14	15	58	25	26	28	29
4	2	2	2	2	31	13	14	15	16	59	26	27	28	30
5	2	2	2	3	32	14	15	15	16	60	26	27	29	30
6	3	3	3	3	33	14	15	16	17	61	27	28	29	31
7	3	3	3	4	34	15	15	16	17	62	27	28	30	31
8	3	4	4	4	35	15	16	17	18	63	27	29	30	32
9	4	4	4	5	36	16	16	17	18	64	28	29	30	32
10	4	4	5	5	37	16	17	18	19	65	28	30	31	33
11	5	5	5	6	38	17	17	18	19	66	29	30	31	33
12	5	5	6	6	39	17	18	19	20	67	29	30	32	34
13	6	6	6	7	40	17	18	19	20	68	30	31	32	34
14	6	6	7	7	41	18	19	20	21	69	30	31	33	35
15	7	7	7	8	42	18	19	20	21	70	30	32	33	35
16	7	7	8	8	43	19	20	20	22	71	31	32	34	36
17	7	8	8	9	44	19	20	21	22	72	31	33	34	36
18	8	8	9	9	45	20	20	21	23	73	32	33	35	37
19	8	9	9	10	46	20	21	22	23	74	32	34	35	37
20	9	9	10	10	47	20	21	22	24	75	33	34	36	..
21	9	10	10	11	48	21	22	23	24	76	33	35	36	..
22	10	10	10	11	49	21	22	23	25	77	33	35	37	..
23	10	10	11	12	50	22	23	24	25	78	34	35	..	..
24	10	11	11	12	51	22	23	24	26	79	34	36	..	..
25	11	11	12	13	52	23	24	25	26	80	35	36	..	..
26	11	12	12	13	53	23	24	25	27	81	35	..	..	..
27	12	12	13	14	54	23	25	26	27	82	36	..	..	..
					55	24	25	26	28					

know approximately what to consider a high, what to consider an average, what to consider a low score. For this purpose we present in tabular form the percentile rank and the descriptive interpretation attaching to various possible scores. These percentiles are based upon scores from a fairly unselected group of 686 sixth, seventh, and eighth-grade children from the schools of New Haven, Connecticut. Users of this Manual will understand that these percentiles and interpretations relate to conditions at New Haven; they should be considered as merely provisionally applicable elsewhere.

The table is read as follows: A score of 36 is the maximal possible score and represents an indeterminately high level (theoretically perfect) of socio-economic status; a score of 29.2 represents the 94.5 percentile and corresponds to the highest status found in the New Haven group; a score of 24.5 represents the 88.5 percentile and corresponds to a very high status; a score of 10 represents the 50 percentile and corresponds to a medium status within the group, etc. The numbers 1 to 10, preceding the descriptive levels, represent suggested ratings that might be used to designate strata of homes graded from 0 (no home at all) to 10 (theoretically perfect home).

## PROVISIONAL LEVELS OF SOCIO-ECONOMIC STATUS

Score	Corresponding Percentile	Suggested Rating	Corresponding Level of Socio-Economic Status
36	....	10	Indeterminately High
29.2	94.5	9	Highest
24.5	88.5	8	Very High
17.6	78.8	7	High
13.2	65.5	6	Medium High
10	50	5	Medium
7.5	34.5	4	Medium Low
5.1	21.2	3	Low
3.2	12.5	2	Very Low
1.8	5.5	1	Lowest
0.0	....	0	Indeterminately Low

## REPORTS

Users of this Score Card will confer a favor upon the author and the publisher and will assist in the perfecting of this device if they will report results to the publishers and also proffer constructive criticisms for the improvement of the Score Card and the Manual of Directions. Address all such reports to the Public School Publishing Company, Bloomington, Illinois.

# OTIS SELF-ADMINISTERING TESTS OF MENTAL ABILITY

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## MANUAL OF DIRECTIONS AND KEY For Intermediate and Higher Examinations

CONTENTS	PAGE
INTRODUCTORY . . . . .	I
SPECIAL FEATURES . . . . .	I
HISTORICAL . . . . .	I
ACKNOWLEDGMENTS . . . . .	2
DIRECTIONS FOR ADMINISTERING . . . . .	2
DIRECTIONS FOR SCORING . . . . .	2
RECORDING SCORES . . . . .	3
STANDARDIZATION . . . . .	3
PRACTICE EFFECT . . . . .	3
INTERPRETATION OF RESULTS . . . . .	4
REPORT TO AUTHOR . . . . .	7
APPLICATION OF RESULTS . . . . .	8
THE PERCENTILE GRAPH . . . . .	10
DIRECTIONS FOR DRAWING A PERCENTILE CURVE . . . . .	11
RELIABILITY AND VALIDITY . . . . .	12

### INTRODUCTORY

**Contents.** In this manual will be found the complete directions for administering and scoring the Intermediate and Higher Examinations, directions for interpreting the scores in the light of the educational problems which the tests will help solve, and directions for applying the results of the test to the solution of those problems.

**Scope.** The Higher Examination together with the Intermediate Examination constitute the Otis Self-Administering Tests of Mental Ability, covering the range from the 4th grade to the university. The Higher Examination is designed for high school students and college freshmen. The Intermediate Examination is designed for Grades 4 to 9. The Higher and Intermediate Examinations are similar in form, but they differ in content and difficulty.

**Forms.** Each examination is issued in two alternative forms, Form A and Form B, alike except in content.

### SPECIAL FEATURES

**Self-administration.** In each of these examinations provision is made for the student to read for himself on the first page of the examination booklet all the directions needed for the examination. As the 75 items constituting each examination are in a single list, these are answered by the examinee without interruption. The examiner, therefore, has merely to distribute the blanks, see that all understand the printed directions, and give the signal to begin. He may then leave the class in charge of an assistant. For this reason the tests have been called "self-administering" tests.

**Simplified scoring.** In addition to the underlining of the correct one of several alternative answers, as is customary in group tests of mental ability, provision is made in these examinations for placing the number of the answer in a single column at the edge of each page. This simplifies the scoring to the extent that the whole examination can be scored in less than one minute.

**Variety of test material.** The form of the examinations admits of the use of a wide variety of types of questions instead of the limited number of types in the ordinary examination.

**Flexible time limit.** Provision is made for administering the examinations with a time limit of either 20 or 30 minutes. The 20-minute time limit may be used for general survey purposes or with normal school and college students. The 30-minute time limit should be used when time allows, as it will give a more accurate measure.

**Ease of figuring IQ's.** A chart is provided by which the IQ of the examinee can be found directly from the score and age in years and months merely by locating a point on the intersection of two lines. No arithmetical calculation or reference to tables is necessary.

**Improved Percentile Graph.** There is provided in each package of Examinations a new form of percentile graph on which percentile curves may be drawn, if desired, showing vividly the distributions of scores of any group or groups of examinees. With each percentile graph is furnished a scale chart by which the drawing of the percentile curves is reduced to the simplest terms.

**Interpretation Chart.** A chart is provided upon which the scores of a class or school may be plotted and the pupils divided into fast-moving, regular, and slow-moving groups and regraded within these groups, or otherwise classified, merely by drawing lines on the chart. Account is taken of mental ability, brightness, and chronological age in classifying by this method. It is not necessary to use the Interpretation Chart in order to interpret scores in these tests. However, it will be found a distinct aid and convenience.

### HISTORICAL

These examinations are modeled after a group test of mental ability designed by the author in January, 1918, for use in a large commercial establishment in Connecticut. In that test the principle of self-administration was embodied, involving the single list of questions, the printed initial directions, and the provision for answers in single columns.

ACKNOWLEDGMENTS

The author is indebted to many persons for helpful suggestions and criticisms in connection with the Self-Administering Tests of Mental Ability. Special mention is due the following, who gave hearty cooperation in the administration of tests for standardization purposes: Mr. J. C. Amon, High School Principal, Bellevue, Pennsylvania; Mr. H. H. Murphy, Superintendent of Schools, Hastings, New York; Mr. T. H. Schutte, Director of Training School, State Teachers' College, Moorhead, Minnesota; Dr. John P. Herring, Director of Bureau of Educational Research, Bloomsburg State Normal School, Bloomsburg, Pennsylvania; Dr. Virgil E. Dickson, Director of Bureau of Reference, Research, and Guidance, Oakland, California; Dr. E. E. Lewis, Superintendent of Schools, Rockford, Illinois; Mr. Henry D. Rinsland, Director of Department of Research and Guidance, Ardmore, Oklahoma; Mr. E. D. Price, Superintendent of Schools, Enid, Oklahoma; and Mr. Franklin Thomas, Professor of Civil Engineering, California Institute of Technology, Pasadena, California. Mrs. Otis has devoted many hours to scoring, tabulating, and correlating.

DIRECTIONS FOR ADMINISTERING

**Who may administer examination.** Any teacher after a little preparation can satisfactorily administer either the Intermediate or Higher Examination. The best preparation for administering either is to take it. The principal should invite his teachers to take the examination and score their own papers. Any teacher who is interested in mental-ability testing should welcome the opportunity to experience the taking of an examination, as this will give her the best appreciation of what the examination tests. Those administering an examination should realize that it is very important that conditions be uniform throughout the school and must be the same in the school being tested as in every other school where the examination has been given. For this reason, everything which needs to be said in administering the test is given below in boldface type, and the teacher should give these instructions verbatim, reading if necessary. If one teacher urges the students to work as rapidly as possible and another teacher urges them to work as carefully as possible, the results may be entirely different and not comparable. The teacher, therefore, should say nothing that is not prescribed, except to make clear the meaning of what is on the first page of the examination blank.

**When to give examination.** The best time to give the examination is probably at the opening of school in the morning, although the time of day probably does not have a serious effect upon the score.

**Directions for administering.** To administer either the Intermediate or the Higher Examination, Form A or Form B, begin by addressing the students as follows:

"We are going to give you this morning [afternoon] some new and interesting tests. We will now pass the test papers and as soon as you receive a paper you may begin to read the first page and do as it directs, filling the blanks, etc. Do not open or turn over the paper. Part of the test is to see if you can follow directions."

Have monitors pass the papers, one to each student, right side up. See that every student is supplied with two pencils (or a pen) and an eraser.

Allow a reasonable time for all to finish reading the first page and trying the samples. A few laggards may be disregarded. Then say, "Is there any one who does not understand the first page?" Give any explanations necessary to make sure that all understand what is explained on the first page.

If a time limit of 20 minutes is to be used, say, "This will be a short test. You will be told to stop at the end of 20 minutes instead of 30. Find the number 20 in the upper left-hand corner of the page and make a ring around it." Be sure that all do this.

Then say, "Now turn the page and begin." No further instructions are necessary.

If the principal or superintendent is administering the examination, he may now leave the class in charge of the teacher or an assistant, with instructions to give no further directions and answer no questions; to stop the work at the end of exactly 30 (or 20) minutes and have the papers collected. The person in charge during the examination will do well to move quietly about the room at the beginning of the examination and see that all are indicating the answers in a proper manner. If an examinee is found who is not placing the numbers in the parentheses, he should be told to do so.

DIRECTIONS FOR SCORING

The correct answers to the 75 items of both forms of the Intermediate and Higher Examinations are given on the margins of this manual. To score the examination, open the manual to the pages containing the answers to the form of the examination to be scored, fold open the manual and clip the pages together. Place the manual over the examination paper so that the appropriate Key is adjacent to the answers given on the examination paper. Place a check mark after each correct answer or a cross after each incorrect or omitted answer, or both checks and crosses.

If two answers are given for any one item, count the item wrong. This is quite likely to occur with Item 55 in Form A of the Higher Examination.

Number 37 in Form A and Number 57 in Form B of the Higher Examination count as wrong if the alphabet has been marked in any way.

If a paper is found in which the examinee has omitted to place the numbers in the parentheses but has otherwise indicated the answers, the scorer should write in the parentheses the numbers representing the answers of the examinee so far as these may be determined, and then score accordingly, but deduct one point from the total score for failure to follow the direction to place the numbers in the parentheses.

If the examinee has failed to make all his letters like printed capitals, score the paper as if all letters were printed capitals, but deduct one point for failure to follow the direction.

Whenever an examinee has used an irregular method of taking the examination, score the paper according to the obvious intent of the examinee and then deduct one point for each general direction not followed. Indicate such deduction by placing a -1 with a circle around it opposite the first instance where the direction has not been followed. Let his score represent the fairest measure of his ability that can be estimated.

The score in the examination is the number of correct answers. First, count up the correct answers and write the number on

- 27. ( 1 )
- 28. ( 4 )
- 29. ( L )
- 30. ( 1 )
- 31. ( 5 )
- 32. ( 3 )
- 33. ( 4 )
- 34. ( 3 )
- 35. ( 1 )
- 36. ( 2 )
- 37. ( 2 )
- 38. ( 4 )
- 39. ( Y )
- 40. ( 30 )
- 41. ( 5 )
- 42. ( 2 )
- 43. ( N )
- 44. ( 1 )
- 45. ( 4 )
- 46. ( 3 )
- 47. ( 2 )
- 48. ( S )
- 49. ( B )
- 50. ( 3 )
- 51. ( L )

( 2 ) 54  
( 11 ) 44  
( 16 ) 34  
( 2 ) 24  
( 23 ) 14  
( 0 ) 04  
( 1 ) 69  
( 4 ) 89  
( 2 ) 79  
( 4 ) 69  
( 5 ) 59  
( 2 ) 49  
( 2 ) 39  
( 11 ) 29  
( 1 ) 19  
( 1 ) 09  
( 9 ) 59  
( 11 ) 58  
( 4 ) 57  
( 3 ) 56  
( 2 ) 55  
( 6 ) 54  
( 4 ) 53  
( 5 ) 52

the margin of the last page. Then verify the score by counting the incorrect and omitted answers. Thus, suppose the number of correct answers counted is 40. Count the incorrect and omitted answers beginning 41, 42, etc., and see that you end with 75. Then enter the score in the space provided on the first page of the blank. Do not trust the counting of correct answers only, as it is very easy to make a mistake. The checking of correct answers should be gone over by a second scorer, for even the best scorers will make mistakes.

RECORDING SCORES

**The Class Record.** The scores should be entered on the Class Record which is provided with each package of examination blanks. Before entering the scores, arrange the papers of a class either in alphabetical order or in the order of magnitude of the score, according to preference. Next, enter the name of each student and his age in years and months. Then enter his score in the proper column according to the time limit used. Directions for filling the remaining columns will be given under "Interpretation of Results."

**20-Minute time limit.** If a 20-minute time limit has been used, the scores may be transmuted into terms of 30-minute time-limit scores in order that they may be compared with norms or other 30-minute scores. This may be done by means of Table 1.

TABLE 1<sup>1</sup>

20-MIN.	30-MIN.								
1	1	16	20	31	40	46	59	61	71
2	2	17	22	32	41	47	60	62	71
3	4	18	23	33	43	48	61	63	72
4	5	19	24	34	44	49	62	64	72
5	6	20	26	35	45	50	63	65	73
6	7	21	27	36	46	51	64	66	73
7	9	22	28	37	48	52	64	67	74
8	10	23	30	38	49	53	65	68	74
9	11	24	31	39	50	54	66	69	74
10	13	25	32	40	51	55	67	70	75
11	14	26	33	41	53	56	68	71	75
12	15	27	35	42	54	57	68	72	75
13	17	28	36	43	55	58	69	73	75
14	18	29	37	44	56	59	70	74	75
15	19	30	39	45	58	60	70	75	75

STANDARDIZATION

**Selection of items.** In selecting items for the Intermediate and Higher Examinations, the Advanced Examination was drawn upon freely. An equal number of items of other types, some of which are new, were included in order that the examination might cover a large variety of questions and therefore afford a more comprehensive measure of mental ability. Preliminary editions containing more than enough items were administered to about 1000 high school students in Oakland, California, and Rockford, Illinois, and to 1000 grammar school

<sup>1</sup> This table was derived from a study of 20- and 30-minute scores in the Higher Examination only. It is therefore only approximate for the Intermediate Examination. It is assumed, however, that the 20-minute time limit will seldom be used with the Intermediate Examination.

pupils in Moorhead, Minnesota. These students were divided in each case into two groups, a "good group" and a "poor group." The same number were taken from each grade for both groups. The good group constituted the young students, and the poor group the old students. These groups had reached the same average educational status, therefore, but at different rates. Now it is the rate at which a student can progress through school that the mental-ability test is chiefly used to predict. Therefore this is believed to be the best criterion by which to judge the validity of each item that goes into the test. The number of times each item was passed by each group was then found and only those items chosen which showed a distinct gain in number of passes by the good group over the number of passes by the poor group in spite of the fact that the median age of the good group was over two years less than that of the poor group. Each item justified its inclusion, therefore, because it distinguished between students who progressed slowly and those who progressed rapidly.

**Arrangement in order of difficulty.** The items in each form of each examination have been arranged in the order of difficulty, according to the number of passes of each item by the students taking the preliminary editions.

**Difference in difficulty between forms.** Since it is customary to administer Form A of any test first, it was deemed best to let Form A of the Intermediate and Higher Examinations contain only items from Form B of the Advanced Examination. If it is desired to administer the Intermediate or Higher Examination to students who have had Form A of the Advanced Examination, Form A of the Intermediate or Higher Examination should be used. Similarly Form B of the Intermediate or Higher Examination should be used after Form B of the Advanced Examination.

Upon careful comparison of the present forms of the Higher Examination, a slight difference in difficulty was discovered between Forms A and B. This was allowed to remain, however, partly in order to preserve the grouping of items and partly because this was found to be an additional advantage, as will be shown.

Form B of the Higher Examination is slightly harder than Form A. Wherever possible, Form A should be given first. If Form B is given first, however, 4 points must be added to each score in Form B in order to make the scores comparable with those in Form A given first, or before comparing with norms which refer to Form A only.

Form B of the Intermediate Examination is just equal in difficulty to Form A. Whenever possible, give Form A first. If Form B is given first, however, the scores are directly comparable with the norms.

PRACTICE EFFECT

Whenever a second form of a test is given after a first form, especially when the two forms have been made very much alike, students tend to do better on the second test. The effect of the first test is generally termed "practice effect," but it may include a number of effects. Among these is general familiarity with the method, resulting in ability to get under way more quickly, lessened nervousness, memory of mode of attack of certain types of problems, etc.

A study was made of the effect of practice when a second form of the Intermediate or Higher Examination was given the

- 1. ( 4 )
- 2. ( 2 )
- 3. ( 3 )
- 4. ( 2 )
- 5. ( 5 )
- 6. ( 3 )
- 7. ( 4 )
- 8. ( 2 )
- 9. ( 1 )
- 10. ( 4 )
- 11. ( 11 )
- 12. ( 2 )
- 13. ( 5 )
- 14. ( 2 )
- 15. ( 1 )
- 16. ( 3 )
- 17. ( 3 )
- 18. ( 9 )
- 19. ( 3 )
- 20. ( 2 )
- 21. ( 6 )
- 22. ( 4 )
- 23. ( T )
- 24. ( 2 )
- 25. ( 2 )
- 26. ( 1 )

( 2 ) 52 next day after the first form. The average gain in the second score was 4 points in each case. Therefore in such a case 4 points would have to be subtracted from the score in the second test to make allowance for the effect of practice.

( 9 ) 52 If Form B of the Higher Examination is given the next day after Form A, the additional difficulty of Form B, amounting to 4 points, just makes up for the 4 points gained due to practice effect. Therefore the scores in Form B so given are just equal to the corresponding scores in Form A, and in such a case no allowance needs to be made either for practice effect or for difference in difficulty between the forms. The average of the two forms so given is also directly comparable with scores in Form A and with the norms.

( 3 ) 69 In case of the Intermediate Examination, however, since Form A and Form B are of equal difficulty, 4 points must be subtracted from the scores in Form B given the next day after Form A to make them comparable with Form A given first and with the norms. It follows that 2 points must be subtracted from the average of the scores of an individual in Forms A and B in tests a day apart in order to compare them with scores in Form A given first and with the norms.

( 8 ) 59 It remains for further investigation to reveal the effect of practice after other amounts of time. Presumably, however, practice effect gradually diminishes with time and may be negligible after the lapse of a year.

INTERPRETATION OF RESULTS

( 1 ) 49 **Mental ability and brightness.** There are two aspects of the mental quality of an individual which must not be confused. One is his degree of mental ability and the other his degree of brightness. The term "mental ability" refers to that innate mental quality which increases with age, whereas the term "brightness" refers to that constant quality which determines the rate of growth of the mental ability of an individual and the degree of mental ability which he will eventually reach.

( 8 ) 60 Mental ability is measured by the individual's score in the test. A measure of his brightness is obtained by comparing his score with that of others of his own age. The distinction is best shown by reference to the Interpretation Chart.

( 3 ) 59 **The Interpretation Chart.** An Interpretation Chart is provided in each package of Examinations to facilitate the interpretation of scores. Interpretation Charts for the Intermediate and Higher Examinations are given on the two sides of the same sheet. In the sample Interpretation Chart shown in Figure 1 (page 9) a point is plotted for each of the 276 pupils in Grades 5 to 8 of a grammar school. The height of each point represents the score of an individual in the Intermediate Examination according to the scale at the left. The horizontal position of each point represents the age of the individual according to the scale at the foot of the chart.

( 1 ) 55 The normal or "average" individual of the age of just 10 years is expected to make a score of just 23 points.<sup>1</sup> The normal individual of the age of just 11 years is expected to make a score of just 31 points, etc., as indicated by the heavy curved line through the middle of the chart (best seen in the blank chart). This may be called the normal curve and shows the norm or normal score to be expected from an individual of any given

<sup>1</sup> Unless otherwise stated the score referred to is the 30-minute time-limit score.

age. The curve becomes level at the age of 18 years, as shown in the Interpretation Chart for the Higher Examination, and may be considered as extending to the right indefinitely beyond 18 years at the same level. The derivation of this curve will be described below.

**Mental maturity.** A child's mental ability increases from birth, year by year, month by month, just as does his height, until he reaches his maximum, when he is said to have reached mental maturity. The normal curve may be thought of as the curve of growth in mental ability of the hypothetical exactly normal individual.

The age at which mental maturity is reached is difficult to decide, since the amount of mental development during the last year in which there is any development is very slight. In the Interpretation Chart for the Higher Examination the age at which mental maturity is reached is taken to be 18 years.

While individuals may reach mental maturity at about the same age, they nevertheless reach it with widely differing amounts of mental ability, just as they reach mature adult stature at differing heights. The degree of mental ability at which the normal individual reaches mental maturity is also very difficult to determine, since it is not possible to obtain a large group of completely unselected individuals (chosen at random from the whole population) at the various ages between 15 and 18. The norm for adults (persons of 18 years or over), however, has been called 42 in the Higher Examination, as shown by the upper limit of the normal curve. This is the equivalent of 59 points in the Intermediate Examination. The choice of this norm for adults is only an estimate based on all available data.

**Derivation of norms.** The positions of the normal curves in the two charts were established according to the judgment of the author upon consideration of (1) the median scores of the various age groups among about 35,000 students whose scores in the Higher or Intermediate Examinations have been reported to date, (2) the median scores of the several grade groups in relation to the median ages of these grade groups, (3) the norms for the various ages obtained from the norm table for the Advanced Examination by means of tables for converting scores into terms of the Higher and Intermediate Examinations, (4) the correlations between scores in the Higher and Intermediate Examinations and mental ages by the Herring Revision of the Binet-Simon Tests, and (5) correspondence between the Intermediate and Higher Examinations themselves. The position of the normal curve in neither chart accords exactly with any of these data, but it constitutes in either case a sort of average of the various groups of data.

The aim has been to establish scores which are normal for unselected age groups, not merely for public school pupils. The scores of high school students, therefore, tend to average somewhat higher than the norms.

**True mental age.** Originally the term "mental age" referred to the degree of mental ability which is normal for a given age. Thus, "having a mental age of 15 years" meant "having a degree of mental ability just normal for the age of 15 years." This degree of mental ability is measured by a score of 36 in the Higher Examination. Having a mental age of 17, according to this definition, meant making a score just normal for 17-year-olds, which is a score of 41. Mental ages so found may be

- 27. ( 4 )
- 28. ( A )
- 29. ( 1 )
- 30. ( 3 )
- 31. ( 4 )
- 32. ( H )
- 33. ( 2 )
- 34. ( 4 )
- 35. ( 2 )
- 36. ( 3 )
- 37. ( 1 )
- 38. ( 3 )
- 39. ( 4 )
- 40. ( 2 )
- 41. ( 3 )
- 42. ( 5 )
- 43. ( E )
- 44. ( 2 )
- 45. ( D )
- 46. ( 3 )
- 47. ( 3 )
- 48. ( 2 )
- 49. ( W )
- 50. ( 5 )
- 51. ( 1 )

called true mental ages. There is no age for which a score above 42 is the norm; therefore, of course, no score above 42 can be expressed as a true mental age.

The term "Mental Age" (capitalized), however, has now come to have a special meaning and to denote measures of mental ability — i.e., scores — in the Binet-Simon Tests. Binet Mental Ages below about 13 years are true mental ages. Above that, especially above 16 years, they are merely scores. They are called Mental Ages merely for the sake of consistency. The Binet Mental Age of 17, for example, represents a degree of mental ability considerably above that which is normal for the age of 17 or, indeed, for any age.

The Binet Mental Age of 16 years is generally taken as the norm for adults in figuring IQ's. There is a growing opinion among psychologists, however, that the Binet Mental Age which is the norm for adults is appreciably lower than 16 years.<sup>1</sup> The correlations between the Binet Scale and the Higher Examination confirm this belief. The correspondence between Binet Mental Ages and Scores in the Higher Examination, as indicated in the Interpretation Chart, is based partly upon the correlation between the Higher Examination and the Herring Revision of the Binet-Simon Tests and partly upon the age norms. At any rate, Binet Mental Ages appear to express degrees of mental ability in excess of that normal for the corresponding chronological ages even below the age of 15 years. For this reason IQ's obtained by the method provided herein<sup>2</sup> may be slightly higher than those obtained by the Binet Scale for the older students, but it is believed that they more nearly correspond with what the Binet IQ's of these students were when they were younger.<sup>3</sup>

**Measures of mental ability.** Each of the six scales at the left side of the Interpretation Chart for the Higher Examination is a measure of mental ability. The scales are so placed that values having the same height are corresponding measures of mental ability as far as may be determined. Thus a score of 40 points in the Higher Examination with a 30-minute time limit is the equivalent of a score of 31 in the Higher Examination with a 20-minute time limit, a score of 57 in the Intermediate Examination, a score of 120 in the Advanced Examination, a Binet Mental Age of 15 years, and a T-score of 64.<sup>4</sup>

Any individual whose score is plotted above the normal curve may be considered as brighter than normal, and any individual whose score is plotted below the normal curve may be considered as duller than normal.<sup>5</sup> The distance at any point above or below the normal curve is a measure of the brightness of the individual. A 14-year student making a score of 35 in the Higher Examination has a lesser degree of mental ability but a greater degree of brightness than a 15-year student making a score of 37.

**Measures of brightness.** Brightness is generally measured in terms of the Intelligence Quotient (IQ), which is customarily found by dividing the individual's Binet Mental Age by his

chronological age (decimal point dropped). In the case of mental-ability tests other than the Binet Tests it is customary to give Binet Mental Age equivalents of scores in order that these may be used in finding IQ's. It has been found, however, that IQ's so derived have an appreciably wider range than those obtained by means of the Binet Tests and are therefore not comparable with the latter. Now the IQ was invented for use with the Binet Tests and should retain its original significance, or else it will become relatively meaningless. It seems that the term "Intelligence Quotient" is coming to have a legal recognition, but IQ's as sometimes derived from group tests of mental ability bear little relation to IQ's derived by the Binet Tests. It is the purpose of the author to use the term "IQ" only in its original significance.

Unless it is distinctly understood how IQ's were derived in any case, however, they should be designated by some means such as National IQ's, Otis IQ's, or Binet IQ's. The term "IQ," when not so qualified or understood, must be interpreted as referring to actual Intelligence Quotients found by means of the Binet Tests.

**Validity of Mental Age equivalents.** It follows from the above statements regarding the greater range of IQ's for each age group when obtained by group tests than when obtained by the Binet Tests, that Binet Mental Age equivalents are actual equivalents for normal children only. Thus a score of 38 in the Intermediate Examination corresponds to a Binet Mental Age of 12 years when made by a child of approximately 12 years. But if made by a 10-year child, for example, it represents a Binet Mental age of only 11½ years, since according to the chart a 10-year child making a score of 38 has an IQ of only 115. This lack of constant correspondence between scores and Binet Mental Ages is inherent in all group tests and is due to the lesser accuracy of group tests. This phenomenon seems not to be generally appreciated, as witnessed by the now prevalent custom of converting scores into Binet Mental Age equivalents. There is no Binet Mental Age equivalent of a score in any group test of mental ability which is valid for all ages of individuals. For that reason it is believed that the most scientific method of obtaining IQ's from scores in group tests, which are comparable with Binet IQ's, is by comparison of the variabilities of scores of individuals of the various age groups in the group test and in Binet Tests, as described below.

Mental Age equivalents as such are not necessary to the use of the Higher or Intermediate Examinations. Scores are quite sufficient as measures of mental ability and IQ's as measures of brightness. IQ's can be obtained from scores in the Otis Self-Administering Tests without Mental Age equivalents.

In order to compare scores with Mental Age equivalents of scores in other group tests or to find IQ's comparable with those obtained from other group tests, however, Binet Mental Age equivalents are given to scores in both examinations. These may be obtained from the Interpretation Chart for the Higher Examination. Binet Mental Age equivalents of scores in the Intermediate Examination are given also in Table 2 on the next page.

**Derivation of IQ Scale.** According to Dr. Terman,<sup>1</sup> IQ's found by the Stanford Revision of the Binet-Simon Tests are distributed very closely in accordance with the law of normal

<sup>1</sup> L. M. Terman, *Measurement of Intelligence* (Houghton Mifflin Company, Boston), page 79.

<sup>1</sup> See Lewis M. Terman, "Mental Growth and the IQ," *Journal of Educational Psychology*, September, 1921.

<sup>2</sup> See "Measures of brightness" below.

<sup>3</sup> See "Validity of Mental Age equivalents" below.

<sup>4</sup> For the meaning and significance of a T-score, see William A. McCall, "A Uniform Method of Scale Construction," *Teachers College Record*, January, 1921.

<sup>5</sup> Here "normal" means exactly median in brightness. The term "normal," however, is often used to refer to all individuals whose scores are reasonably close to the norms for their respective ages.

- 1. ( 4 )
- 2. ( 2 )
- 3. ( 3 )
- 4. ( 2 )
- 5. ( 2 )
- 6. ( 3 )
- 7. ( 3 )
- 8. ( 3 )
- 9. ( 3 )
- 10. ( H )
- 11. ( 1 )
- 12. ( W )
- 13. ( 8 )
- 14. ( 4 )
- 15. ( 1 )
- 16. ( 5 )
- 17. ( 40 )
- 18. ( 3 )
- 19. ( 4 )
- 20. ( 5 )
- 21. ( 7 )
- 22. ( 5 )
- 23. ( 5 )
- 24. ( 4 )
- 25. ( 3 )
- 26. ( 4 )

TABLE 2

BINET MENTAL AGE EQUIVALENTS OF SCORES IN THE INTER-MEDIATE EXAMINATION

SCORE	MA	SCORE	MA	SCORE	MA	SCORE	MA	SCORE	MA
1	7-4	16	9-0	31	11-0	46	13-1	61	15-11
2	7-5	17	9-2	32	11-2	47	13-3	62	16-1
3	7-6	18	9-3	33	11-3	48	13-5	63	16-3
4	7-7	19	9-5	34	11-5	49	13-7	64	16-6
5	7-8	20	9-7	35	11-6	50	13-10	65	16-8
6	7-9	21	9-8	36	11-8	51	14-0	66	16-11
7	7-10	22	9-10	37	11-10	52	14-2	67	17-2
8	7-11	23	10-0	38	12-0	53	14-4	68	17-5
9	8-0	24	10-1	39	12-1	54	14-6	69	17-8
10	8-2	25	10-3	40	12-2	55	14-8	70	17-10
11	8-4	26	10-4	41	12-4	56	14-10	71	18-0
12	8-5	27	10-6	42	12-6	57	15-0	72	18-3
13	8-7	28	10-7	43	12-8	58	15-2	73	18-5
14	8-9	29	10-9	44	12-10	59	15-5	74	18-7
15	8-11	30	10-10	45	12-11	60	15-8	75	18-9

distribution and with the middle 50 per cent falling within the range of IQ's from 92 to 108.

Due partly, no doubt, to the form of the Intermediate and the Higher Examinations, the steps in difficulty between items being smaller in the first part of each examination than in the last part, the distributions of scores of the several age groups have approximately the same variability, as far as can be determined. These distributions tend to be approximately normal, and are such that the middle 50 per cent of scores of each age group tend to fall within 8 points above and below the norm for that age. Fortunately, therefore, each point in the score of an individual above or below the norm for his age represents a point in IQ above or below 100. If an individual's score exceeds the norm for his age by 12 points, his IQ is 112.

**How to find the IQ of an individual.** The IQ of an individual may be found in either of two ways. One is as follows: Add to 100 the number of points by which a pupil's score exceeds the norm for his age, or subtract from 100 the number of points by which a pupil's score falls below the norm for his age. A simple and easy way to obtain the same result is to add 100 to the score of the individual and subtract from this sum the score which is the norm for his age. (The norm for individuals over 18 years may be taken as 42 points in the Higher Examination and as 59 points in the Intermediate Examination.) Thus, if a 15-year student's score in the Higher Examination is 34, the norm for his age being 36, his IQ is  $34 + 100 - 36 = 98$ .

A second method of finding an IQ is to plot the score of the individual in the appropriate Interpretation Chart by placing a dot on the horizontal line representing his score and on the vertical line representing his age. If the dot falls on a curve, the IQ of the individual will be stated at the end of the curve in the IQ column at the right. Thus, if a student of 15 years, 4 months, makes a score of 31 in the Higher Examination, his IQ is 94. If the point falls between two curves, the IQ may be estimated closely enough by noting its position relative to the curve above or below.

The IQ of each student may be entered after his name on the Class Record, in the column headed "IQ."

**Age norms.** The norms in the Intermediate or Higher Examination for the various ages may be read from the appropriate Interpretation Chart by noting the points at which the normal curve cuts the vertical age lines, or may be taken from Table 3 or Table 4.

TABLE 3

AGE NORMS IN INTERMEDIATE EXAMINATION (30-MINUTE TIME LIMIT)

YEARS	8	9	10	11	12	13	14	15	16	17	18 or over
0	7	15	23	31	38	44	49	53	56	58	59
1	8	16	24	32	39	44	49	53	56	58	
2	8	16	24	32	39	45	50	53	56	58	
3	9	17	25	33	40	45	50	54	57	58	
4	10	18	26	34	40	46	50	54	57	58	
5	10	18	26	34	41	46	51	54	57	58	
6	11	19	27	35	41	46	51	55	57	59	
7	12	20	28	35	42	47	51	55	57	59	
8	12	20	28	36	42	47	52	55	58	59	
9	13	21	29	36	43	48	52	55	58	59	
10	14	22	30	37	43	48	52	56	58	59	
11	14	22	30	37	43	49	53	56	58	59	

TABLE 4

AGE NORMS IN HIGHER EXAMINATION (30-MINUTE TIME LIMIT)

YEARS	12	13	14	15	16	17	18 or over
0	23	28	32	36	39	41	42
1	24	28	32	36	39	41	
2	24	29	33	37	39	41	
3	25	29	33	37	40	41	
4	25	29	33	37	40	41	
5	25	30	34	37	40	41	
6	26	30	34	38	40	42	
7	26	30	34	38	40	42	
8	27	31	35	38	40	42	
9	27	31	35	38	41	42	
10	27	31	35	39	41	42	
11	28	32	36	39	41	42	

**Norms for college students.** The scores of 2516 college students in the Higher Examination have been reported to date from 21 colleges and universities. Ten of the 21 used 20-minute time limits. Reducing all the scores to a 30-minute basis, the median score of these 2516 students is 53 points. The median scores of the 21 colleges and universities were as follows (30-minute time limit): 37, 39, 45, 46, 51, 51, 52, 53, 53, 54, 55, 55, 56, 56, 57, 59, 61, 62, 62, 64, and 65.

Various percentile scores of the 2516 college students are shown in Table 5.

**Index of Brightness.** The measure of brightness used in connection with the Otis Group Intelligence Scale is the Index of Brightness. The relation between IQ's obtained by the Higher Examination and the Index of Brightness as found by the Advanced Examination is shown in the IQ and IB columns

( 8 ) .52  
( 3 ) .47  
( 4 ) .32  
( 9 ) .22  
( 2 ) .11  
( 1 ) .00  
( 3 ) .69  
( 4 ) .89  
( 5 ) .67  
( 6 ) .66  
( 10 ) .59  
( 11 ) .64  
( 3 ) .63  
( 4 ) .62  
( 45 ) .19  
( 242 ) .60  
( 3 ) .59  
( 5 ) .58  
( 4 ) .57  
( 33 ) .56  
( 5 ) .55  
( 2 ) .54  
( 2 ) .53

27. ( 4 )  
28. ( 4 )  
29. ( 2 )  
30. ( 1 )  
31. ( 3 )  
32. ( 2 )  
33. ( 5 )  
34. ( 5 )  
35. ( 360 )  
36. ( 4 )  
37. ( T )  
38. ( F )  
39. ( 3 )  
40. ( 126 )  
41. ( M )  
42. ( 1 )  
43. ( O )  
44. ( 36 )  
45. ( 50 )  
46. ( 3 )  
47. ( 3 )  
48. ( 5 )  
49. ( 4 )  
50. ( 3 )  
51. ( 6 )  
52. ( 1 )

TABLE 5  
SHOWING VARIOUS PERCENTILE SCORES OF 2516 COLLEGE STUDENTS IN THE HIGHER EXAMINATION

Percentile	(Lowest)			(Median)				(Highest)		
	0	3	10	25	50	75	90	97	100	
20-MINUTE BASIS	16	25	30	36	41	49	55	61	75	
30-MINUTE BASIS	20	32	39	46	53	62	67	71	75	

in the Interpretation Chart. This same correspondence holds good for IQ's obtained by the Intermediate Examination. If IQ's are used, it is not necessary to find IB's. Both IQ's and IB's serve the same purpose.

**Percentile Rank.** Another measure of brightness is called the "Percentile Rank." If a student exceeds 75 per cent of unselected individuals of his own age in score, he is said to have a Percentile Rank (PR) of 75, and the same for any other per cent. The scale of Percentile Ranks extends, therefore, from 0 to 100. A PR of 50 represents exact normality and corresponds to an IQ or IB of 100.

Assuming distributions of scores for the various age groups to be in accord with the law of normal distribution, the Percentile Rank of an individual may be found from his IQ or IB by reference to the PR column at the right of the Interpretation Chart for the Higher Examination. This correspondence holds also between IQ's, IB's, and PR's for the Intermediate Examination. If desired, the student's PR may be entered also on the Class Record. This is optional.

**Grade status.** Table 6 shows the grade status corresponding to various 30-minute scores in the Intermediate and Higher Examinations. For example, a score of 11 in the Intermediate Examination is a grade status of 3.5 — that is, it is the norm for the end of the fifth month of the third grade; a score of 30 in the Higher Examination is the norm for the beginning of the eighth grade. These values are based on the tables of norms and Table 31 of *Statistical Method in Educational Measurement* (World Book Company).

TABLE 6

INTERMEDIATE EXAMINATION						HIGHER EXAM.	
GRADE SCORE	STATUS	GRADE SCORE	STATUS	GRADE SCORE	STATUS	GRADE SCORE	STATUS
11	3.5	26	5.0	41	7.0	30	8.0
12	3.6	27	5.1	42	7.2	31	8.2
13	3.7	28	5.2	43	7.3	32	8.5
14	3.8	29	5.3	44	7.5	33	8.7
15	3.9	30	5.5	45	7.6	34	9.0
16	4.0	31	5.6	46	7.8	35	9.4
17	4.1	32	5.7	47	7.9	36	9.8
18	4.2	33	5.8	48	8.1	37	10.0
19	4.3	34	6.0	49	8.3	38	10.4
20	4.4	35	6.1	50	8.5	39	10.8
21	4.5	36	6.3	51	8.7	40	11.0
22	4.6	37	6.4	52	9.0	41	11.6
23	4.7	38	6.6	53	9.2	42	12.0
24	4.8	39	6.7	54	9.5	43	12.6
25	4.9	40	6.9	55	9.8		

Tables 7 and 8 show the distributions of mental ages of 12,169 9th-grade pupils in the Intermediate Examination and the scores of 12,001 12th-grade pupils in the Higher Examination.

TABLE 7

SHOWING MENTAL AGES OF 12,169 PUPILS IN GRADE 9B OF CHICAGO, ILLINOIS, FOR EACH CHRONOLOGICAL AGE, AS DETERMINED BY THE INTERMEDIATE EXAMINATION<sup>1</sup>

MENTAL AGE	CHRONOLOGICAL AGE												TOTALS	ME- DIAN C. A.
	11	12	13	14	15	16	17	18	11-11	12-11	13-11	14-11		
	10	10	10	10	10	10	10	10	10-11	10-11	10-11	10-11		
18 to 18-11	1	15	79	43	13	2	1		154					13.9
17 to 17-11	5	51	258	262	58	15	2	1	652					14.1
16 to 16-11	4	84	518	608	210	28	9	2	1464					14.3
15 to 15-11	2	81	632	888	296	68	8	4	1979					14.3
14 to 14-11	6	83	750	1133	457	91	13	8	2541					14.4
13 to 13-11	1	49	460	807	394	87	12	8	1818					14.6
12 to 12-11		45	481	869	484	101	10	18	2028					14.7
11 to 11-11		17	162	377	256	90	24	11	917					14.9
10 to 10-11		6	72	150	128	65	24	9	451					15.0
9 to 9-11		1	11	26	20	15	7	5	91					15.4
8 to 8-11				10	12	10	3	5	40					15.10
7 to 7-11	1			2	2	2		1	9					15.3
Totals	20	432	3423	5176	2339	574	133	72	12169					
Median M. A.	16-0	15-2	14-8	14-4	13-8	13-1	12-3	12-3						

Median C. A. of whole group, 14 : 5. Median M. A. of whole group, 14 : 4.

TABLE 8

SHOWING DISTRIBUTION OF SCORES OF 12,001 PUPILS IN THE 12TH GRADE OF 370 HIGH SCHOOLS OF ILLINOIS IN THE HIGHER EXAMINATION, FORM A<sup>2</sup>

SCORE	AGE								TOTALS
	13	14	15	16	17	18	19	20	
	10	10	10	10	10	10	10	or	
71-75			5	11	5	2			23
66-70		2	27	59	60	12	1	3	171
61-63		3	36	209	193	49	7	4	501
56-60	1	3	66	356	356	115	19	12	918
51-55		9	114	501	682	226	60	25	1626
46-50		5	86	680	968	394	118	37	2288
41-45		3	72	506	1029	595	174	45	2314
36-40		9	35	423	820	479	171	58	1986
31-35		1	25	217	456	358	113	36	1206
26-30			10	75	215	183	90	28	601
21-25			1	23	78	70	44	5	221
16-20				5	10	25	15	2	77
11-15					3	8	3	4	21
6-5						5	4	4	13
1-5							1	2	3
Totals	1	26	482	3073	4909	2421	830	259	12001

Median age, 17 : 6. Median score, 42. Norm for 17 : 6, 42.

REPORT TO AUTHOR

When a large number of tests have been used in one survey, the author requests that scores be sent him tabulated on the Report to Author. For each age group (12 years to 12 years 11 months, etc.) give the number of individuals whose scores fall within each interval of score (0-4, 5-9, etc.).

In filling out Reports to Author, the scores of all the 9th-year students in the city may be reported on one sheet, the scores of all 10th-year students in the city on another, etc. Do not report scores of students of different years or pupils of different grades on the same sheet. Reports containing less than 200 scores will not be needed.

<sup>1</sup> This table was kindly furnished by Dr. E. E. Keener, Research Assistant, Department of Education, Chicago, Illinois.

<sup>2</sup> These data were kindly furnished by Dr. C. W. Odell, Associate, Bureau of Educational Research, University of Illinois.

APPLICATION OF RESULTS

**Purposes of mental-ability tests.** The chief administrative purposes for which mental-ability tests are given are: (1) the division of the pupils of a grade or the students of a class into more homogeneous divisions, usually in order that instruction of different degrees of enrichment may be given, (2) the regrading of pupils so that the pupils of each grade are more homogeneous in mental ability and are therefore more easily taught together, (3) the division of pupils of a school into groups which will progress at different rates.

The reader should consult *Intelligence Tests and School Reorganization*, by L. M. Terman and others (World Book Company), for a detailed discussion of the purposes and uses of tests of mental ability in regrading and classifying.

**Division of classes.** If it is desired to divide the students of a class into more homogeneous groups for instruction purposes, this may be done either on the basis of score or on the basis of IQ. Division on the basis of score would be made as follows:

**Classification according to score.** Find the distribution of the scores of the class. If the scores are plotted on the Interpretation Chart, this may be done by placing in the column under "totals" at the left the number of dots on each horizontal line. (If desired, the frequencies of the various class intervals, 0-4, 5-9, etc., may be entered in the same column. These will be used in drawing a percentile curve on the Percentile Graph.) By means of this distribution the class may be divided into any number of divisions for differentiated instruction. Thus, let us suppose it is desired to divide a class into three divisions, A, B, and C, on the basis of score. This would be done as follows: Count down the distribution until one third the total number of scores has been counted. At this point draw a line across the distribution to mark the lower limit of score of Group A. Next count down another third and draw another line marking off Group B from Group C. Referring now to the Class Record, where each student's score appears opposite his name, the division designation, A, B, or C, may be placed opposite each student's name in the column headed "Classification."

This method is illustrated in the sample Interpretation Chart in Figure 2. Here 105 9th-year students are divided into three classes of 35 students each on the basis of score.

**Classification according to brightness.** If it is desired to divide the students of a class into divisions on the basis of brightness, this may be done by dividing the distribution of IQ's in the same way as suggested above for dividing the distribution of scores. To find the distribution of IQ's, count the dots between each two adjacent curves, including those which touch the lower but not the upper curve. Place the number of dots in the column headed "Totals" at the right, as shown in the sample charts. As a check on accuracy in counting the dots, it will be well to add these numbers and see that the sum corresponds to the number of students in the class.

**Considerations governing method of classification.** Two methods of classification have been described. Which should be used? It will be found that the dispersion of scores of any age group is so great in comparison with the rather narrow range of age norms for high school ages, that the resulting classifications by the two methods are very nearly the same. Even when classified by IQ, the superior division consists of students whose scores are nearly all higher than those of the

next division, etc. It remains for further research to discover which is the better method. It is possible that if the classification is made for the purpose of determining groups which will cover the curriculum of the high school in different amounts of time, classification on the basis of IQ may be the better method, whereas if it is to establish sections which will take work of differing degrees of intensity, classification on the basis of score may be the better.

**Regrading.** If it is felt that the pupils of a school are very badly graded, so that the 6th grade, for example, is believed to contain some pupils who could do satisfactory work in the 7th or 8th grade and some who should be in the 5th grade to do the best work, the pupils may be regraded on the basis of score in a mental-ability test. The ideal grading would be that in which the pupils of the 6th grade all make scores higher than those in the 5th grade and lower than those in the 7th grade, etc. Practically this is impossible.

The next best procedure is to select those pupils from the 6th grade who make very high or very low scores and to promote or demote these. No hard and fast rule can be laid down for this. The number of pupils to be shifted depends partly on the amount of overlapping of ability between grades and partly on the character of the instruction possible in the school. Where relatively individual instruction is possible, homogeneous grouping is not so essential. It is probably best to begin re-grouping slowly, taking first those whose scores deviate most from the median score of the grade and whose scholarship in the judgment of the teacher accords with their scores, and promoting or demoting these pupils one grade or one-half grade. If conditions warrant or seem to require it, they may be further promoted or demoted later. Later, also, more pupils may be regraded, until by degrees the grades will become more nearly homogeneous.

**Multiple-track plan.** A plan of school organization called the "multiple-track plan," in use in Oakland, California, and elsewhere, is one in which the pupils of the school are divided into groups (generally three, sometimes five) which progress at different rates. Thus there may be fast-moving, normal, and slow-moving classes, covering the first eight grades in say 7, 8, and 9 years, respectively.

A situation illustrating the need of reclassification is that shown in the sample Interpretation Chart in Figure 1. In this chart are plotted the scores of 276 pupils in Grades 5 to 8 of a grammar school. The scores of the different grades are plotted by different marks. It will be seen that the different grades overlap very markedly. Each grade contains both young pupils making high scores, who are therefore very bright, and old pupils making low scores, who are therefore very dull.

Division of pupils into groups to progress at different rates should be made on the basis of brightness. It is recommended by Terman that the brightest 15 per cent of the pupils of a school be placed in fast-moving classes (where numbers permit) and the dullest 15 per cent in slow-moving classes. The selection of these pupils should be made, therefore, on the basis of IQ (or IB or PR). A convenient method of making the division is illustrated in Figure 1 in the case of the 276 pupils. Of this number 15 per cent is about 40. Therefore the brightest 40 (according to IQ) should be placed in the fast-moving group and the dullest 40 in the slow-moving group.

The method of making the division by means of the chart

- 26. ( 3 )
- 27. ( 5 )
- 28. ( 3 )
- 29. ( 1 )
- 30. ( 4 )
- 31. (250)
- 32. ( 4 )
- 33. ( 6 )
- 34. ( 5 )
- 35. ( L )
- 36. ( 1 )
- 37. ( 4 )
- 38. ( 2 )
- 39. ( 8 )
- 40. ( 4 )
- 41. ( 2 )
- 42. ( 2 )
- 43. ( 3 )
- 44. (50)
- 45. ( 1 )
- 46. ( 2 )
- 47. ( 4 )
- 48. ( Q )
- 49. (44)
- 50. ( 5 )
- 51. ( 4 )

(No. 75 revised)  
75. (14)  
( 5 )  
74. ( )  
( 8 )  
73. ( )  
72. ( )  
71. (22)  
70. (4)  
69. (1)  
68. (12)  
67. (3)  
66. (1)  
65. (45)  
64. (5)  
63. (4)  
62. (32)  
61. (4)  
60. (4)  
59. (R)  
58. (15)  
57. (5)  
56. (3)  
55. (3)  
54. (2)  
53. (R)  
52. (1)  
51. (4)

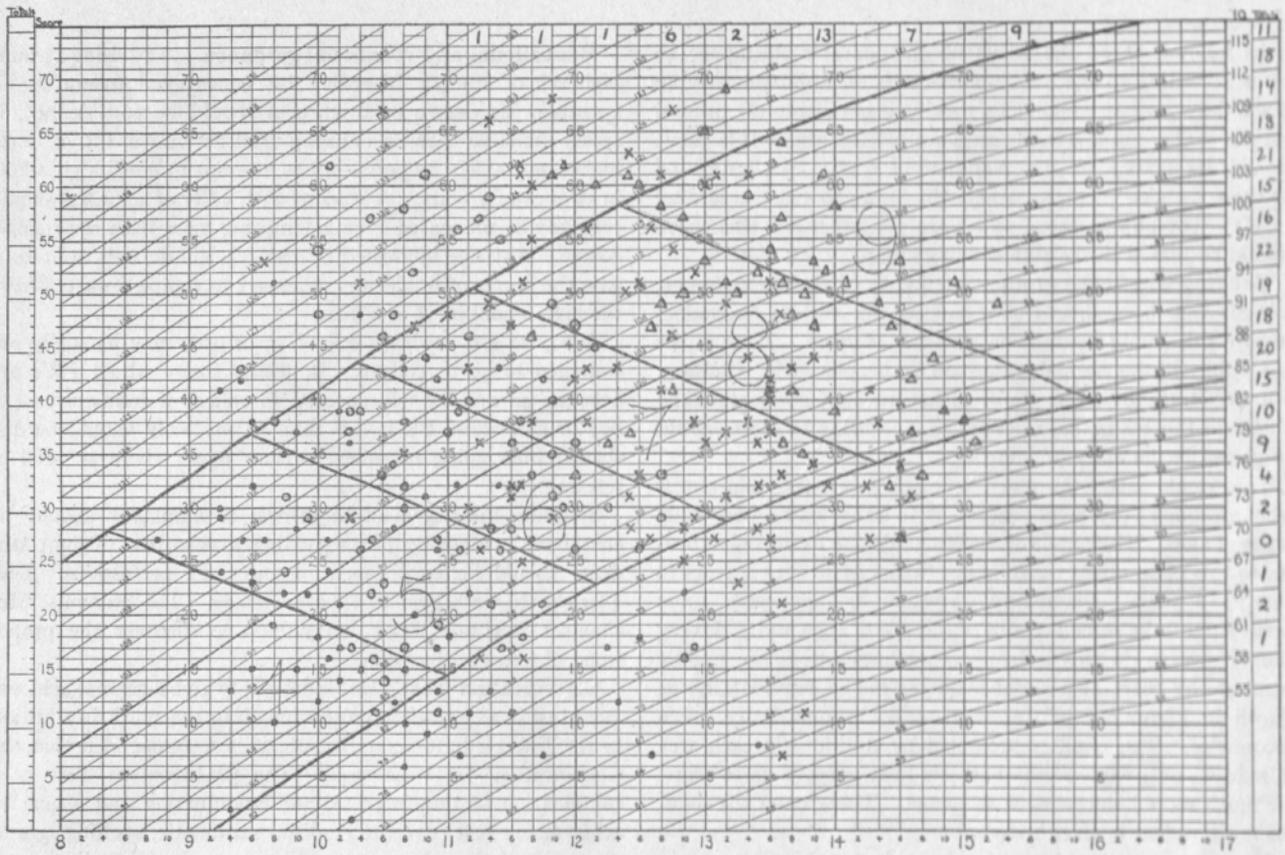


FIG. 1

INTERPRETATION CHART. For Higher Examination

Classes plotted *ninth year* Number *105* Form used *A* Time limit *30* min. Date *Oct. 1* 19*22*

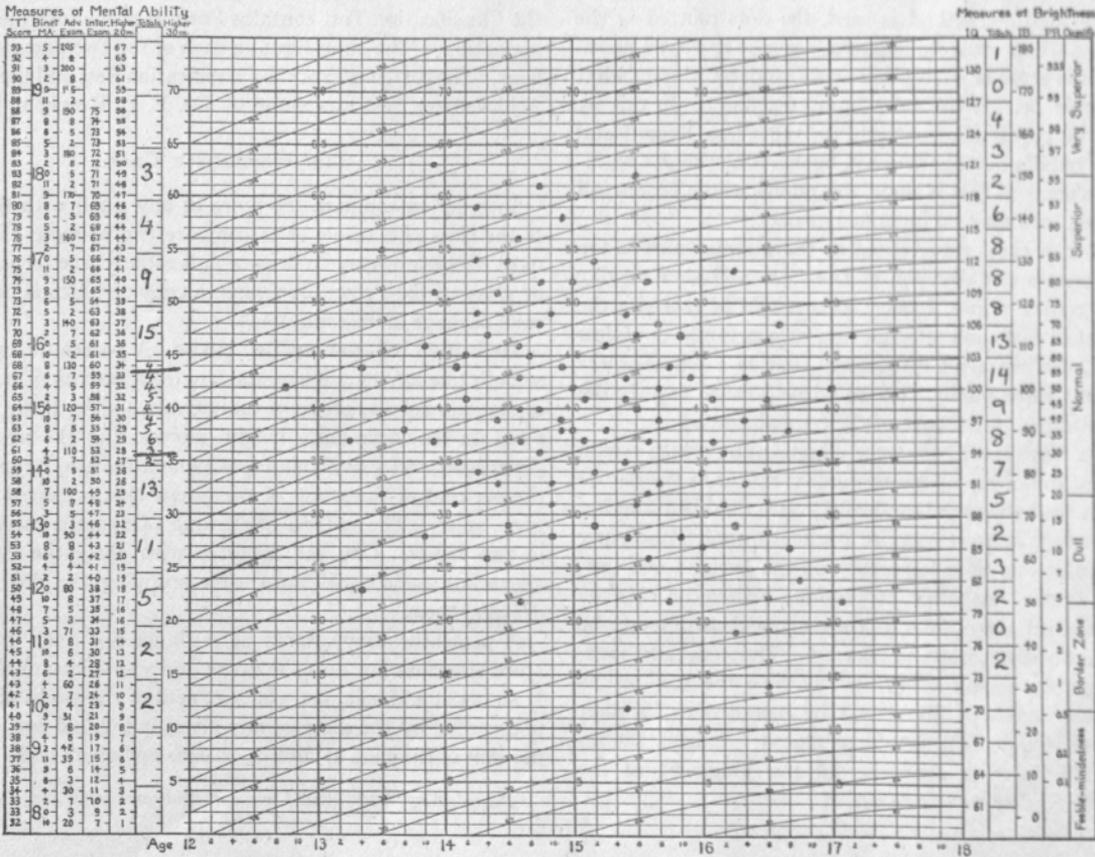


FIG. 2

- 1. ( 3 )
- 2. ( 20 )
- 3. ( 3 )
- 4. ( G )
- 5. ( T )
- 6. ( 2 )
- 7. ( 2 )
- 8. ( )
- 9. ( 450 )
- 10. ( 4 )
- 11. ( 4 )
- 12. ( 6 )
- 13. ( 5 )
- 14. ( 3 )
- 15. ( 3 )
- 16. ( 4 )
- 17. ( 3 )
- 18. ( 8 )
- 19. ( 3 )
- 20. ( 17 )
- 21. ( 4 )
- 22. ( 1 )
- 23. ( 2 )
- 24. ( 2 )
- 25. ( 5 )

is as follows: Find the curve which separates the upper 40 cases according to IQ. If no curve cuts off approximately 40 cases, draw a curve which does, making it parallel to the printed curves. The pupils whose scores are plotted above this curve should be placed in the fast-moving class. Similarly find or draw a curve which separates the lower 40 cases according to IQ. The pupils whose scores are plotted below this curve should be placed in the slow-moving group.

**Grading within the group.** The pupils of the three groups, fast-moving, normal, and slow-moving, are still to be graded. Ideally this would be done on the basis of score. Thus, if the 196 pupils in the normal group are to be placed in Grades 5, 6, 7, and 8, the lowest fourth or 49, according to score, would be placed in the 5th grade, the next 49, according to score, would be placed in the 6th grade, etc.

This would result, however, in placing in one grade pupils who, although very homogeneous as to score, had a very wide range of ages. The pupils of the 6th grade, for example, according to this plan, might range in age from a little over 9 years to nearly 16 years. Practically, therefore, it may seem more desirable to take some account of the age of the child. A very simple way to do this is by drawing lines across the middle band of the chart at a slight slant instead of horizontally, as shown in Figure 1; in this way age is automatically taken account of. The pupils represented by the dots in each area so marked out, while somewhat less homogeneous as to score, are much more homogeneous as to age. The greater the slant, the more weight is given to age.

In the sample chart provision is made for skipping certain pupils into the 9th grade, demoting others into the 4th grade, and dividing the remaining pupils into four groups of 40 each which would be placed in the 5th, 6th, 7th, and 8th grades.

If the slanting-line method is used, the dots plotted in the Interpretation Chart must be identified, or else it will be necessary to plot the score of each pupil again to determine in what grade he should be. It has been found feasible to do this by numbering the pupils consecutively on the Class Record and writing each pupil's number in small figures near the dot representing his score. If this is done, the pupils whose scores fall within a given area may be identified at once.

The number of cases represented in the sample chart is too small to illustrate the division of the fast- and slow-moving groups into grades — and, indeed, in a school of this size the establishment of fast- and slow-moving classes would doubtless entail grave administrative difficulties; but in a school where there are many more pupils, this would be done in exactly the same way as shown in the case of the normal group.

It must be remembered that the classification which would be effected by any of the above methods is rather in the nature of a goal to be worked toward gradually. It is doubtful whether it would ever be wise to reorganize a school completely on any of these plans at one time, especially on the basis of one test. It would be better, doubtless, to promote or demote extreme cases, as explained above, and as these show themselves to be properly placed others may be shifted. The teachers' independent judgments should weigh equally with the test results in determining which pupils should be regraded or in what grade any individual pupil should be placed. Indeed, the regrading should be done according to the judgment of the teachers *in the light of the test results.*

**Educational and vocational guidance.** In advising a young high school student regarding his educational future or his vocation, his degree of brightness should be considered. It seems probable that an entering student with a PR of 90 or higher may safely be permitted to attempt to finish high school in 3½ or even 3 years. A student with a PR of 50 or less should certainly be prevented from attempting more than the regular course. Any one interested in research will do well to investigate the degree of brightness necessary to complete successfully the high school in 3½ or 3 years.

A boy or girl having a PR of 75 or over may be safely encouraged to go to college. Doubtless many whose PR's are between 50 and 75 will succeed in college if industrious. A boy or girl whose PR is less than 25 probably should be dissuaded from going to college. Here again there is need of research.

Similarly the degree of brightness of a student should be considered in advising him regarding a vocation. Bright students should be encouraged to enter the professions. Dull ones should be helped to choose a trade. The Stenquist Mechanical Aptitude Tests<sup>1</sup> may help to discover the proper trend of a boy's education.

**Classification Test.** If it is desired to give a general achievement test in any grade from the fourth to the ninth in addition to the Intermediate Examination, it is recommended that the Classification Test<sup>1</sup> be used. The Classification Test is a combination of the Intermediate Examination and a general achievement test covering reading, arithmetic, spelling, grammar and diction, geography, history and civics, literature, vocabulary, physiology and hygiene, and general information, including music and art. Form A of the Classification Test contains Form A of the Intermediate Examination, and Form B of the Classification Test contains Form B of the Intermediate Examination. The time limit on each of the two parts is one-half hour. The correlation of the Classification Test and the Stanford Achievement Test was found by Dr. E. E. Keener to be .83.

#### THE PERCENTILE GRAPH

In order to compare the score of any pupil with the scores of the class as a whole or to compare two or more classes, the most effective way is to draw a percentile curve for each grade or class on the Percentile Graph, a copy of which is included in each package of Examinations.

**Definition of percentile curve.** A percentile curve is a smooth line having a horizontal length representing 100 per cent of the scores of any group of individuals and so drawn that any point on the curve has a height representing the amount of a given score and a horizontal position on the graph representing the per cent of the scores of the group that is exceeded by the given score. The method of drawing a percentile curve is given in full below. One not familiar with percentile curves will appreciate their significance after studying the directions for drawing them.

A percentile curve shows at a glance not only the median score of a class but also the range and variability of the scores. It shows at a glance just what per cent of the scores of the class is exceeded by the score of any given individual and just what per cent of the class attains or exceeds any given score. Two or

<sup>1</sup> Published by World Book Company, Yonkers-on-Hudson, New York.

more curves on the same graph show very vividly the amount of overlapping of the scores of different classes.

#### DIRECTIONS FOR DRAWING A PERCENTILE CURVE

**General procedure.** The steps taken in drawing the percentile curve are: (1) distributing the scores, (2) finding the subtotals — number of cases to and including those in each class interval, (3) reducing these subtotals to per cents of the number of cases in the group, (4) locating points in the graph representing these per cents, and (5) drawing a smooth curve through these points.

Provision is made for distributing the scores of two groups of individuals on one Percentile Graph sheet, and from these distributions two percentile curves may be drawn. This does not mean, however, that only two curves may be drawn on one graph. The scores of additional groups may be distributed on other Percentile Graph sheets or any sheet of paper and as many curves drawn on one graph as may be conveniently distinguished.

**Distributing the scores.** In one of the columns headed "Tallying," distribute the scores of a class by putting a short mark opposite the interval of score within which the score of each individual falls. The sample Percentile Graph (Fig. 3) shows that in the freshman class two individuals had scores between 60 and 64, two had scores between 55 and 59, five had scores between 50 and 54, etc. If the scores of a class have been plotted on an Interpretation Chart, the number of scores falling within each interval of score may be copied directly on to the Percentile Graph sheet in figures, as shown in the sample in the case of the sophomore class. This will save distributing the scores again. The number of tallies or the figure in the Tallying column which tells the number of scores falling within any given interval of scores is called a "frequency." The frequency of freshman scores between 45 and 49, for example, is 8.

**Finding the subtotals.** Begin at the bottom of the column of frequencies and place in the square to the right of each frequency the sum of the frequencies up to and including those in that group. In the "Subtotal" column, under "Freshman," there is 1 score in the first interval, a subtotal of 2 to and including the second interval, a subtotal of 4 to and including the third interval, etc., and 50 to and including the last interval. This last "subtotal" (50) should equal the number of students in the class, as entered at the top of the column.

**Reducing subtotals to per cents.** In the column headed "Per cents," write opposite each subtotal the per cent that subtotal is of the whole number of students in the class. In the sample, under Freshman, 1 is 2 per cent of 50, 2 is 4 per cent of 50, 4 is 9 per cent of 50, etc., and 50 is 100 per cent of 50.

It is not necessary to reduce subtotals to per cents when use is made of the Scale Chart printed on the back of the Percentile Graph. The manner of using the Scale Chart is given below.

**Locating points in the graph.** First place a dot at the left edge of the graph on the horizontal line representing the lower limit of the lowest class interval containing a score. Next, place on the next line above, a dot having a distance to the right of the left margin of the graph equal to the first number in the per cents column, according to the scale at the foot of the graph. (In the sample the second dot in the percentile curve for the freshmen is placed 2 units from the edge of the graph.) Next, place on the next line above, a dot having a distance to

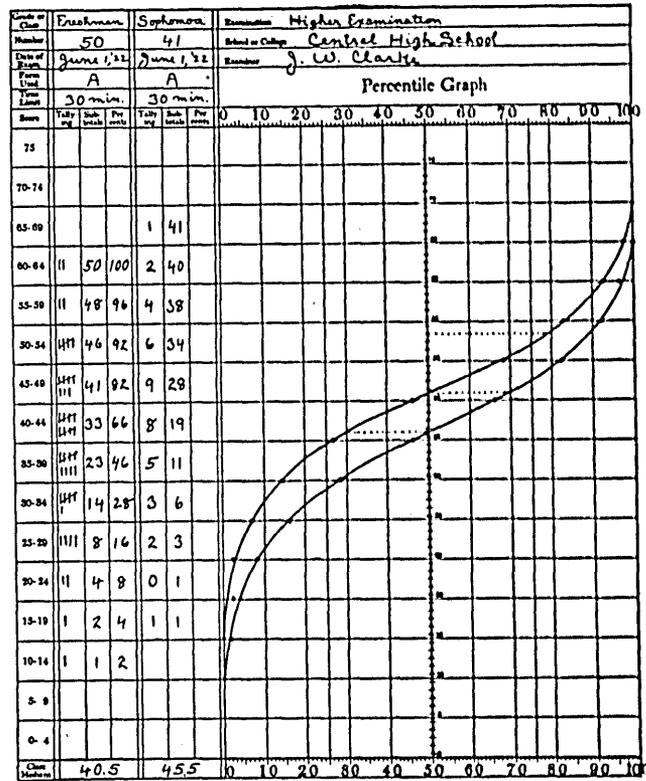


FIG. 3

the right of the margin representing the next per cent, etc. (The third dot represents 4 per cent, etc., and the last dot represents 100 per cent.)

**Use of Scale Chart.** The Scale Chart on the back of the Percentile Graph is provided to simplify the process of plotting the points in the graph. It is used as follows: Let us take the case of the freshman class, there being 50 students in the class. Find Scale 50 on the Scale Chart according to the numbers at the right. This line is divided into exactly 50 equal parts by the slanting lines in the chart. Each space, therefore, represents  $\frac{1}{50}$  or 2 per cent of the width of the graph. The second dot in the freshman percentile curve is to be placed just  $\frac{2}{50}$  of the distance to the right of the margin. This is just 1 space on Scale 50. The third dot is to be placed just 2 spaces to the right of the margin, the fourth point just 4 spaces to the right of the margin, etc., according to Scale 50 in the Scale Chart. By the use of Scale 41 the points have been plotted in the same way for the sophomore class.

By folding the Scale Chart on the proper scale and applying it to the Percentile Graph,<sup>1</sup> the width of the graph may be divided into any number of equal parts from 40 to 100. By letting 2 or 4 graduations represent 1 unit or letting 1 graduation represent 2 units, the width of the graph may be divided into any number of equal parts from 10 to 200.

**Drawing the curve.** Draw a smooth curve through the dots plotted as described above. This is the percentile curve.

**Finding median score of class.** The point where the percentile curve cuts the 50-percentile line represents the median

<sup>1</sup> If only one Percentile Graph is at hand, the proper distances may be transferred from the Scale Chart on the back by means of a strip of paper.

score of the group.<sup>1</sup> This may be read on the vertical scale along the 50-percentile line. The median scores of the freshman and sophomore classes in the sample are 49.5 and 45.5, respectively. These medians may be entered at the foot of the data columns as shown.

**Finding variability of scores.** The points at which the curve cuts the 25 and 75 percentile lines represent the lower and upper quartile scores of a distribution. The interval between these is the interquartile range — a very convenient measure of the scatter of the distributions. In the sample Percentile Graph the interquartile ranges for the two classes are about 14 points each (freshmen, 33.5 to 47, and sophomores, 39 to 53).

**Overlapping of classes.** It will be seen by a glance at the percentile curves that the sophomore class is only slightly better than the freshman class and that the distributions of scores of the two classes overlap very markedly. A convenient way to express this overlapping is to say that 30 per cent of the sophomore class fall below the median of the freshman class, or that 30 per cent of the freshman class exceed the median of the sophomore class.

**Percentile rank in class.** If an individual makes a score exceeding 25 per cent of the scores of his class, he is said to have a percentile rank of 25 in his class; and the same for other percentages. The percentile rank of any individual among the members of his class may be found from the percentile curve representing the scores of his class as follows: Suppose an individual in the sophomore class has made a score of 53. Find the point 53 on the vertical scale in the Percentile Graph and move the pencil horizontally to the point at the same height on the percentile curve. This point represents on the horizontal scale a percentile rank of 79. The percentile rank of the individual among the members of his class is, therefore, 79, which means that his score exceeds the scores of 79 per cent of his class. A score of 53 represents a Percentile Rank of 89 among the members of the freshman class.

In so far as mental ability, as measured by this examination, is an indication of the scholarship to be expected from a student, the percentile rank of a student in class may be taken as showing how he should stand in this regard to the class as a whole.

The meaning of "percentile rank in class" must be distinguished from that of "Percentile Rank," a measure of brightness, referring to the rank of an individual among a large unselected group of his own age.

#### RELIABILITY AND VALIDITY

**Reliability.** By "reliability" is meant the degree to which the scores of the test are consistent in measuring whatever the test measures. Reliability is determined by means of correlation between different forms of the same test. The coefficients of correlation were found between Forms A and B of both examinations as follows:

Higher Examination, Grades 7 to 12:		
Group I, Form A first, 128 cases, $r = .917 \pm .009$	} avg. .921	
Group II, Form B first, 125 cases, $r = .925 \pm .009$		
Intermediate Examination, Grades 4 to 9:		
Group I, Form A first, 215 cases, $r = .953 \pm .006$	} avg. .948	
Group II, Form B first, 212 cases, $r = .943 \pm .007$		

<sup>1</sup>The value so found may not be exactly the same as the median found in the usual way by counting to the middle paper in order of score, but if not, the median score found by means of the curve is considered to represent the distribution better and to be in that sense more accurate.

The values of the probable error of a score determined from these groups were respectively 2.56 and 2.68 points for the Higher Examination and 2.85 and 2.78 for the Intermediate Examination. The probable error of a score in either examination, therefore, is slightly over  $2\frac{1}{2}$  points. This means that the score in either examination will be correct within about  $2\frac{1}{2}$  points in half the cases. As has been shown, this means also that the probable error of an IQ is about  $2\frac{1}{2}$  points.

**Validity.** There is no direct method, of course, of finding the true validity of the tests — the degree to which they measure the hypothetical quality we call mental ability. The method of standardization is perhaps the best assurance as to the validity of the tests. Various other indications are available, however. The coefficient of correlation between the Higher Examination and the Advanced Examination taken two years earlier was .889 for 180 cases in Grades 7 to 12. The average of four coefficients of correlation between the Higher and Intermediate Examinations, averaging about 100 cases each in groups covering Grades 7 to 9, was .842. The correlation between scores in the Higher Examination and "scholarship" is reported by Clarence W. Proctor, Principal of High School, Bangor, Maine, as follows:

Grade 11, number of cases 240,  $r = .55$   
Grade 12, number of cases 204,  $r = .57$

The correlation between scores in the Higher Examination and scholarship as reported by the teachers of 157 high school freshmen in Oakland, California, was .59.

The correspondence between scores in the Higher Examination and letter ratings used in connection with Alpha is shown in Table 9.

TABLE 9

ALPHA RATINGS	ALPHA SCORES	SCORES IN HIGHER EXAMINATION
A . . . .	135-212	58-75
B . . . .	105-134	49-57
C+ . . . .	75-104	39-48
C . . . .	45-74	28-38
C- . . . .	25-44	20-27
D . . . .	15-24	15-19
E . . . .	0-14	0-14

**A high score.** One student has been reported to have made a perfect score of 75 points in the Higher Examination in 20 minutes. This student is characterized by the professor of educational psychology of the college as follows:

"The person is a young man just past 21 years of age. He had very poor high school training due to the fact that the schools in his section of North Carolina are not what they should be. He is finishing college in  $3\frac{1}{2}$  years with about 8 quarter-hours to spare. I have looked up his college record and find that he has grades of A's or B's. There are no C's, D's, or F's. He won the scholarship medal at college before he came to this institution. (He entered here as a senior.) He is a good mixer, and I do not believe that he puts in very many hours on his studies.

"The father is a rather successful farmer. In fact, from what I can gather, he is the best farmer in his neighborhood. An older brother is a professor in a college. I have had this young man in several classes. It is my firm conviction that he could finish the average college course in two years."

**Test Service Bulletins.** The reader is invited to send to the World Book Company for free copies of the Test Service Bulletins for further information about testing.



# SIMS SCORE CARD FOR SOCIO-ECONOMIC STATUS

## FORM C

Score.....

- 1 Name .....
- 2 Age.....Years and.....Months
- 3 Grade.....Date .....
- 4 Have you spent two years in any grade?.....If so, what grades?.....
- 5 Have you skipped any grades?.....If so, what grades?.....
- 6 Home address: City.....State.....
- 7 How many years have you lived in this town? .....
- 8 Have you attended schools in any other towns?.....If so, name them .....
- 9 Name of your School.....

Don't answer any of the questions below until you are told what to do.  
If you have brothers or sisters in this school, write their names and grades on these lines:

Name .....Grade .....

Name .....Grade .....

In the Following Questions Underline the Correct Answer:

Are you a **Boy?** a **Girl?** (Underline correct answer)

Are you living at home with your parents?.....**Yes** **No**

Are you living in the home of someone else, such as a relative, adopted parent, guardian, etc?.....**Yes** **No**

Are you living in an institution, such as an orphan asylum or a home for children?.....**Yes** **No**

**Underline the Right Answer**

1. Have you a telephone in your home?.....**Yes** No
2. Is your home heated by a furnace in the basement?.....**Yes** No
3. Do you have a bathroom that is used by your family  
alone? .....**Yes** No
4. Do you have a bank account in your own name?.....**Yes** No
5. Did your father go to college?.....**Yes** No
6. Did your mother go to college?.....**Yes** No
7. Did your father go to high school?.....**Yes** No
8. Did your mother go to high school?.....**Yes** No
9. Does your mother (or the lady of the home in which  
you live) regularly attend any lecture courses of which  
you know? .....**Yes** No
10. Do you have your own room in which to study?.....**Yes** No
11. Do you take private lessons in music?.....**Yes** No
12. Do you take private lessons in dancing?.....**Yes** No
13. Does your mother belong to any clubs or organizations  
of which you know?.....**Yes** No  
If you know of any, write the name of one of them on  
this line (.....)
14. Do you belong to any organizations or clubs where you  
have to pay dues?.....**Yes** No  
If you do, write the names of the organizations that you  
belong to on these lines (.....  
.....  
.....)
15. Does your family attend concerts?  
**Never** **Occasionally** **Frequently**
16. Where do you regularly spend your summers?  
**At Home** **Away From Home**
17. How often do you have dental work done? (Underline only one)  
**Never** **When Needed** **Once a Year** **Oftener**

18. How many servants, such as a cook, a housekeeper, a chauffeur, or a maid, do you have in your home?

None    One Part Time    One or More All the Time

19. Does your family own an auto which is not a truck?

None    One    Two or More

If your family does own an auto, write the make of the auto on this line (.....)

20. How many magazines are regularly taken in your home?

None    One    Two    Three or More

If any are taken, write the names of three of them—or as many as are taken—on these lines (.....  
.....)

21. About how many books are in your home? (Be very careful with this one. A row of books three feet long would not have more than twenty-five books in it.)

None    1 to 25    26 to 125    126 to 500    More

22. How many rooms does your family occupy?

2    3    4    5    6    7    8    9    10    11    12    More

How many persons occupy these rooms?

2    3    4    5    6    7    8    9    10    11    12    More

23. Write your father's occupation on this line (.....)

Does he own **Part All None** of his business? (Underline)

Does he have any title, such as president, manager, foreman, boss, etc.?.....**Yes No**

If he does have such a title, write it on this line (.....)

How many persons work for him? (Underline the right number)

None    1 to 5    5 to 10    More Than 10

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Total Credits..... ÷ No. Answered..... = Score.....

# OTIS SELF-ADMINISTERING TESTS OF MENTAL ABILITY

By ARTHUR S. OTIS

Formerly Development Specialist with Advisory Board, General Staff, United States War Department

## HIGHER EXAMINATION: FORM A

20

For High Schools and Colleges

Score.....

*Read this page. Do what it tells you to do.*

*Do not open this paper, or turn it over, until you are told to do so. Fill these blanks, giving your name, age, birthday, etc. Write plainly.*

Name..... Age last birthday..... years  
First name, initial, and last name

Birthday..... Class..... Date..... 192...  
Month Day

School or College..... City.....

This is a test to see how well you can think. It contains questions of different kinds. Here is a sample question already answered correctly. Notice how the question is answered:

Which one of the five words below tells what an apple is?

1 flower, 2 tree, 3 vegetable, 4 fruit, 5 animal.....( 4 )

The right answer, of course, is "fruit"; so the word "fruit" is underlined. And the word "fruit" is No. 4; so a figure 4 is placed in the parentheses at the end of the dotted line. This is the way you are to answer the questions.

Try this sample question yourself. Do not write the answer; just draw a line under it and then put its number in the parentheses:

Which one of the five words below means the opposite of north?

1 pole, 2 equator, 3 south, 4 east, 5 west.....( )

The answer, of course, is "south"; so you should have drawn a line under the word "south" and put a figure 3 in the parentheses. Try this one:

A foot is to a man and a paw is to a cat the same as a hoof is to a — what?

1 dog, 2 horse, 3 shoe, 4 blacksmith, 5 saddle.....( )

The answer, of course, is "horse"; so you should have drawn a line under the word "horse" and put a figure 2 in the parentheses. Try this one:

At four cents each, how many cents will 6 pencils cost?.....( )

The answer, of course, is 24, and there is nothing to underline; so just put the 24 in the parentheses. If the answer to any question is a number or a letter, put the number or letter in the parentheses without underlining anything. Make all letters like printed capitals.

The test contains 75 questions. You are not expected to be able to answer all of them, but do the best you can. You will be allowed half an hour after the examiner tells you to begin. Try to get as many right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. No questions about the test will be answered by the examiner after the test begins. Lay your pencil down.

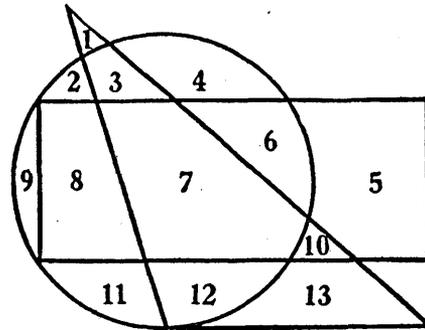
*Do not turn this page until you are told to begin.*

## EXAMINATION BEGINS HERE:

1. The opposite of hate is (?)  
1 enemy, 2 fear, 3 love, 4 friend, 5 joy..... ( )
2. If 3 pencils cost 5 cents, how many pencils can be bought for 50 cents?..... ( )
3. A bird does not always have (?)  
1 wings, 2 eyes, 3 feet, 4 a nest, 5 a bill..... ( )
4. The opposite of honor is (?)  
1 glory, 2 disgrace, 3 cowardice, 4 fear, 5 defeat..... ( )
5. A fox most resembles a (?)  
1 wolf, 2 goat, 3 pig, 4 tiger, 5 cat..... ( )
6. Quiet is related to sound in the same way that darkness is related to (?)  
1 a cellar, 2 sunlight, 3 noise, 4 stillness, 5 loud..... ( )
7. A party consisted of a man and his wife, his two sons and their wives, and four children in each son's family. How many were there in the party?..... ( )
8. A tree always has (?)  
1 leaves, 2 fruit, 3 buds, 4 roots, 5 a shadow..... ( )
9. The opposite of economical is (?)  
1 cheap, 2 stingy, 3 extravagant, 4 value, 5 rich..... ( )
10. Silver is more costly than iron because it is (?)  
1 heavier, 2 scarcer, 3 whiter, 4 harder, 5 prettier..... ( )
11. Which one of the six statements below tells the meaning of the following proverb? "The early bird catches the worm."..... ( )
  1. Don't do the impossible.
  2. Weeping is bad for the eyes.
  3. Don't worry over troubles before they come.
  4. Early birds like worms best.
  5. Prompt persons often secure advantages over tardy ones.
  6. It is foolish to fret about things we can't help.
12. Which statement above tells the meaning of this proverb? "Don't cry over spilt milk.".... ( )
13. Which statement above explains this proverb? "Don't cross a bridge till you get to it.".... ( )
14. An electric light is related to a candle as an automobile is to (?)  
1 a carriage, 2 electricity, 3 a tire, 4 speed, 5 glow..... ( )
15. If a boy can run at the rate of 6 feet in  $\frac{1}{4}$  of a second, how many feet can he run in 10 seconds? ( )
16. A meal always involves (?)  
1 a table, 2 dishes, 3 hunger, 4 food, 5 water..... ( )
17. Of the five words below, four are alike in a certain way. Which is the one not like these four?  
1 bend, 2 shave, 3 chop, 4 whittle, 5 shear..... ( )
18. The opposite of never is (?)  
1 often, 2 sometimes, 3 occasionally, 4 always, 5 frequently..... ( )
19. A clock is related to time as a thermometer is to (?)  
1 a watch, 2 warm, 3 a bulb, 4 mercury, 5 temperature..... ( )
20. Which word makes the truest sentence? Men are (?) shorter than their wives.  
1 always, 2 usually, 3 much, 4 rarely, 5 never..... ( )
21. One number is wrong in the following series. What should that number be?  
1 4 2 5 3 6 4 7 5 9 6 9..... ( )
22. If the first two statements following are true, the third is (?) All members of this club are Republicans. Smith is not a Republican. Smith is a member of this club.  
1 true, 2 false, 3 not certain..... ( )
23. A contest always has (?)  
1 an umpire, 2 opponents, 3 spectators, 4 applause, 5 victory..... ( )
24. Which number in this series appears a second time nearest the beginning?  
6 4 5 3 7 8 0 9 5 9 8 8 6 5 4 7 3 0 8 9 1..... ( )
25. The moon is related to the earth as the earth is to (?)  
1 Mars, 2 the sun, 3 clouds, 4 stars, 5 the universe..... ( )
26. Which word makes the truest sentence? Fathers are (?) wiser than their sons.  
1 always, 2 usually, 3 much, 4 rarely, 5 never..... ( )

27. The opposite of awkward is (?)  
 1 strong, 2 pretty, 3 short, 4 graceful, 5 swift. . . . . ( )
28. A mother is always (?) than her daughter.  
 1 wiser, 2 taller, 3 stouter, 4 older, 5 more wrinkled. . . . . ( )
29. Which one of the six statements below tells the meaning of the following proverb? "The burnt child dreads the fire." . . . . . ( )
1. Frivolity flourishes when authority is absent.
  2. Unhappy experiences teach us to be careful.
  3. A thing must be tried before we know its value.
  4. A meal is judged by the dessert.
  5. Small animals never play in the presence of large ones.
  6. Children suffer more from heat than grown people.
30. Which statement above explains this proverb? "When the cat is away, the mice will play." ( )
31. Which statement above explains this proverb? "The proof of the pudding is in the eating." ( )
32. If the settlement of a difference is made by mutual concession, it is called a (?)  
 1 promise, 2 compromise, 3 injunction, 4 coercion, 5 restoration. . . . . ( )
33. What is related to disease as carefulness is to accident?  
 1 doctor, 2 surgery, 3 medicine, 4 hospital, 5 sanitation. . . . . ( )
34. Of the five things below, four are alike in a certain way. Which is the one not like these four?  
 1 smuggle, 2 steal, 3 bribe, 4 cheat, 5 sell. . . . . ( )
35. If 10 boxes full of apples weigh 400 pounds, and each box when empty weighs 4 pounds, how many pounds do all the apples weigh? . . . . . ( )
36. The opposite of hope is (?)  
 1 faith, 2 misery, 3 sorrow, 4 despair, 5 hate. . . . . ( )
37. If all the odd-numbered letters in the alphabet were crossed out, what would be the tenth letter not crossed out? Print it. *Do not mark the alphabet.*  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z. . . . . ( )
38. What letter in the word SUPERFLUOUS is the same number in the word (counting from the beginning) as it is in the alphabet? Print it. . . . . ( )
39. What people say about a person constitutes his (?)  
 1 character, 2 gossip, 3 reputation, 4 disposition, 5 personality. . . . . ( )
40. If  $2\frac{1}{2}$  yards of cloth cost 30 cents, how many cents will 10 yards cost? . . . . . ( )
41. If the words below were arranged to make a good sentence, with what letter would the second word of the sentence begin? Make it like a printed capital.  
 same means big large the as. . . . . ( )
42. If the first two statements following are true, the third is (?) George is older than Frank. James is older than George. Frank is younger than James.  
 1 true, 2 false, 3 not certain. . . . . ( )
43. Suppose the first and second letters in the word CONSTITUTIONAL were interchanged, also the third and fourth letters, the fifth and sixth, etc. Print the letter that would then be the twelfth letter counting to the right. . . . . ( )
44. One number is wrong in the following series. What should that number be?  
 0 1 3 6 10 15 21 28 34. . . . . ( )
45. If  $4\frac{1}{2}$  yards of cloth cost 90 cents, how many cents will  $2\frac{1}{2}$  yards cost? . . . . . ( )
46. A man's influence in a community should depend upon his (?)  
 1 wealth, 2 dignity, 3 wisdom, 4 ambition, 5 political power. . . . . ( )
47. What is related to few as ordinary is to exceptional?  
 1 none, 2 some, 3 many, 4 less, 5 more. . . . . ( )
48. The opposite of treacherous is (?)  
 1 friendly, 2 brave, 3 wise, 4 cowardly, 5 loyal. . . . . ( )
49. Which one of the five words below is most unlike the other four?  
 1 good, 2 large, 3 red, 4 walk, 5 thick. . . . . ( )
50. If the first two statements following are true, the third is (?) Some of Brown's friends are Baptists. Some of Brown's friends are dentists. Some of Brown's friends are Baptist dentists.  
 1 true, 2 false, 3 not certain. . . . . ( )
51. How many of the following words can be made from the letters in the word LARGEST, using any letter any number of times?  
 great, stagger, grasses, trestle, struggle, rattle, garage, strangle. . . . . ( )
52. The statement that the moon is made of green cheese is (?)  
 1 absurd, 2 misleading, 3 improbable, 4 unfair, 5 wicked. . . . . ( )

53. Of the five things following, four are alike in a certain way. Which is the one not like these four?  
1 tar, 2 snow, 3 soot, 4 ebony, 5 coal. .... ( )
54. What is related to a cube in the same way in which a circle is related to a square?  
1 circumference, 2 sphere, 3 corners, 4 solid, 5 thickness. .... ( )
55. If the following words were seen on a wall by looking in a mirror on an opposite wall, which word would appear exactly the same as if seen directly?  
1 OHIO, 2 SAW, 3 NOON, 4 MOTOR, 5 OTTO. .... ( )
56. If a strip of cloth 24 inches long will shrink to 22 inches when washed, how many inches long will a 36-inch strip be after shrinking? .... ( )
57. Which of the following is a trait of character?  
1 personality, 2 esteem, 3 love, 4 generosity, 5 health. .... ( )
58. Find the two letters in the word DOING which have just as many letters between them in the word as in the alphabet. Print the one of these letters that comes first in the alphabet.  
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z. .... ( )
59. Revolution is related to evolution as flying is to (?)  
1 birds, 2 whirling, 3 walking, 4 wings, 5 standing. .... ( )
60. One number is wrong in the following series. What should that number be?  
1 3 9 27 81 108. .... ( )
61. If Frank can ride a bicycle 30 feet while George runs 20 feet, how many feet can Frank ride while George runs 30 feet? .... ( )
62. Count each N in this series that is followed by an O next to it if the O is not followed by a T next to it. Tell how many N's you count.  
N O N T Q M N O T M O N O O N Q M N N O Q N O T O N A M O N O M. .... ( )
63. A man who is averse to change and progress is said to be (?)  
1 democratic, 2 radical, 3 conservative, 4 anarchistic, 5 liberal. .... ( )
64. Print the letter which is the fourth letter to the left of the letter which is midway between O and S in the alphabet. .... ( )
65. What number is in the space which is in the rectangle and in the triangle but not in the circle? .... ( )



66. What number is in the same geometrical figure or figures as the number 8? .... ( )
67. How many spaces are there that are in any two but only two geometrical figures? .... ( )
68. A surface is related to a line as a line is to (?)  
1 solid, 2 plane, 3 curve, 4 point, 5 string. .... ( )
69. If the first two statements following are true, the third is (?). One cannot become a good violinist without much practice. Charles practices much on the violin. Charles will become a good violinist.  
1 true, 2 false, 3 not certain. .... ( )
70. If the words below were arranged to make the best sentence, with what letter would the last word of the sentence end? Print the letter as a capital.  
sincerity traits courtesy character of desirable and are. .... ( )
71. A man who is influenced in making a decision by preconceived opinions is said to be (?)  
1 influential, 2 prejudiced, 3 hypocritical, 4 decisive, 5 impartial. .... ( )
72. A hotel serves a mixture of 2 parts cream and 3 parts milk. How many pints of cream will it take to make 15 pints of the mixture? .... ( )
73. What is related to blood as physics is to motion?  
1 temperature, 2 veins, 3 body, 4 physiology, 5 geography. .... ( )
74. A statement the meaning of which is not definite is said to be (?)  
1 erroneous, 2 doubtful, 3 ambiguous, 4 distorted, 5 hypothetical. .... ( )
75. If a wire 20 inches long is to be cut so that one piece is  $\frac{2}{3}$  as long as the other piece, how many inches long must the shorter piece be? .... ( )

# CHASSELL-UPTON CITIZENSHIP SCALES

## SHORT SCALE G

Score in Points..... Average Score in Per Cent  
 Score in Per Cent..... on Scales G and.....  
 Name..... Age.....yrs.....mos. Sex..... Grade...  
 School..... Pupil marked by..... Date.....

3	o 1 2 3	Keeps pencils sharpened, ready for use.
	o 1 2 3	Passes and collects materials promptly.
X	o 1 2 3	Opens door for others.
	o 1 2 3	Speaks without shyness and in a direct manner.
5	o 1 2 3	Does not indulge in sweets to a harmful extent.
	o 1 2 3	Puts away apparatus or materials when through with them.
5	o 1 2 3	Acknowledges favors graciously.
	o 1 2 3	Anticipates his needs and does not borrow.
5	o 1 2 3	Is pleasing in personality.
	o 1 2 3	Attains the best of "form."
5	o 1 2 3	Enjoys the beautiful in art and nature.
	o 1 2 3	Is thoughtful in making requests of others, including helpers.
5	o 1 2 3	Gives praise where praise is merited.
	o 1 2 3	Plans his daily program so that there may be a healthful balance between work and outdoor activities.
5	o 1 2 3	Takes care not to promise more than he can fulfill.
	o 1 2 3	Gives proper criticism in a courteous manner, and accepts suggestions from others and profits by them.
7	o 1 2 3	Sees details in their relation to the whole and selects essential points.
	o 1 2 3	Tries to do his best even when the task is disagreeable or praise is not forthcoming.
7	o 1 2 3	Seeks intelligently opportunities for serving others.
	o 1 2 3	Has faith in others.
7	o 1 2 3	Does not indulge in injurious or debasing practices.
	o 1 2 3	Faces facts squarely and does not allow himself to be misled by prejudices.
7	o 1 2 3	Considers candidates from the standpoint of the qualities essential for leadership, and elects a person for no other reason than his fitness for the position.
	o 1 2 3	Supports the right and opposes the wrong whenever occasion arises.

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These short scales provide a quantitative measure of the progress of pupils in forming habits and attitudes of good citizenship. For full directions for using and scoring them, see the *Teachers College Record* for January, 1922.

# CHASSELL-UPTON CITIZENSHIP SCALES

## SHORT SCALE H

Score in Points..... Average Score in Per Cent  
 Score in Per Cent..... on Scales H and... ..  
 Name..... Age... yrs..... mos. Sex... Grade....  
 School..... Pupil marked by..... Date.....

3	0	1	2	3	Takes seat in assembly quietly.
	0	1	2	3	Walks with a light step resulting from a feeling of "uplift" throughout the body.
	0	1	2	3	Offers book to visitors or to others who have none.
	0	1	2	3	Does not pose.
	0	1	2	3	Avoids getting wet, getting chilled, or cooling off too suddenly after play.
5	0	1	2	3	Volunteers in the recitation.
	0	1	2	3	Avoids abruptness of speech when addressing a person or replying to a question.
	0	1	2	3	Hands work in on time, including home assignments.
	0	1	2	3	Employs the most efficient methods of work, such as the use of short cuts in arithmetic.
	0	1	2	3	Does not worry.
	0	1	2	3	Makes or otherwise provides such apparatus and materials as are needed for carrying out his project.
	0	1	2	3	Remembers by letters or inquiries those who are sick.
	0	1	2	3	Enjoys working and playing with others.
	0	1	2	3	Returns promptly and in good condition articles loaned to him by another.
	0	1	2	3	Verifies tentative conclusions on the basis of further observation and experimentation.
7	0	1	2	3	Makes the best of his misfortunes and takes disappointments bravely.
	0	1	2	3	Follows the rules of the game scrupulously.
	0	1	2	3	Forgives wrongdoing in others, even when it has occasioned personal loss or annoyance.
	0	1	2	3	Craves real merit rather than external distinction.
	0	1	2	3	Takes pride in his group and in the school, and tries to foster the right kind of spirit.
	0	1	2	3	Studies civic problems and the needs of the community.
	0	1	2	3	Does not take the property of others without their consent.
	0	1	2	3	Holds to what he thinks is right, unmindful of ridicule or other unpleasant consequences to himself.
0	1	2	3	Appreciates other nations and races and their contributions.	

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APPENDIX

COMPUTATION A:--Standard Deviations for scores  
of Teachers X and Y, Initial  
Test, Group A.

TEACHERS X				TEACHERS Y				
f	x	fx	fx <sup>2</sup>	f	x	fx	fx <sup>2</sup>	
90-94.9	2	6	12	72	1	6	6	36
85-89.9	0	5	0	0	2	5	10	50
80-84.9	2	4	8	32	0	4	0	0
75-79.9	6	3	18	54	2	3	6	18
70-74.9	2	2	4	8	3	2	6	12
65-69.9	5	1	5	5	8	1	8	8
		<u>47</u>				<u>36</u>		
60-64.9	4	0	0	0	6	0	0	0
55-59.9	5	-1	-5	5	10	-1	-10	10
50-54.9	0	-2	0	0	4	-2	-8	16
45-49.9	7	-3	-21	63	0	-3	0	0
40-44.9	2	-4	-8	32	2	-4	-8	32
35-39.9	1	-5	-5	25	0	-5	0	0
30-34.9	1	-6	-6	36	0	-6	0	0
25-29.9	1	-7	-7	49	0	-7	0	0
20-24.9	0	-8	0	0	0	-8	0	0
15-19.9	1	-9	-9	81	1	-9	-9	81
		-61	462			-35	263	
		<u>47</u>				<u>36</u>		
N = 39		$\frac{-14}{39} = -.35$				$\frac{1}{39} = .025$		

$$\sigma = \left( \frac{\sqrt{462 - (-35)^2}}{39} \right) \times 5 =$$

$$\left( \frac{\sqrt{11.84 - .12}}{\sqrt{11.72}} \right) \times 5 =$$

$$3.4 \times 5 = 17.0$$

$$\sigma = 17.0$$

$$\sigma = \left( \frac{\sqrt{263 - (.02)^2}}{39} \right) \times 5 =$$

$$\left( \frac{\sqrt{6.74 - .004}}{\sqrt{6.73}} \right) \times 5 =$$

$$\left( \frac{\sqrt{6.73}}{\sqrt{6.73}} \right) \times 5 =$$

$$2.59 \times 5 = 12.95$$

$$\sigma = 12.95$$

$$\frac{\sigma_y}{\sigma_x} = \frac{12.95}{17.0} = .76 \text{ factor}$$

APPENDIX

COMPUTATION B: Standard Deviations for Scores of Teachers X and Y, Initial Test, Group D.

TEACHERS X					TEACHERS Y			
	f	x	fx	fx <sup>2</sup>	f	x	fx	fx <sup>2</sup>
90-94.9	1	7	7	49				
85-89.9	0	6	0	0				
80-84.9	0	5	0	0	1	5	5	25
75-79.9	0	4	0	0	1	4	4	16
70-74.9	2	3	6	18	4	3	12	36
65-69.9	6	2	12	24	8	2	16	32
60-64.9	8	1	8	8	6	1	6	6
			<u>33</u>				<u>43</u>	
55-59.9	5	0	0	0	3	0	0	0
50-54.9	3	-1	-3	3	2	-1	-2	2
45-49.9	3	-2	-6	12	6	-2	-12	24
40-44.9	3	-3	-9	27	2	-3	-6	18
35-39.9	3	-4	-12	48	1	-4	-4	16
30-34.9	2	-5	-10	50	1	-5	-5	25
25-29.9	0	-6	0	0	2	-6	-12	72
20-24.9	1	-7	-7	49	1	-7	-7	49
15-19.9	1	-8	-8	64	0	-8	0	0
10-14.9	0	-9	0	0	0	-9	0	0
5---9.9	1	-10	-10	100	1	-10	-10	100
			<u>-65</u>	<u>452</u>			<u>-58</u>	<u>421</u>
			<u>33</u>				<u>43</u>	
			<u>-32</u>	<u>-.82</u>			<u>-15</u>	<u>-.33</u>
			<u>39</u>				<u>39</u>	

$$\sigma = \left( \frac{\sqrt{452 - (-.82)^2}}{39} \right) \times 5 =$$

$$(\sqrt{11.59 - .67}) \times 5 =$$

$$(\sqrt{10.92}) \times 5 =$$

$$3.3 \times 5 = 16.5$$

$$= \left( \frac{\sqrt{421 - (-.33)^2}}{39} \right) \times 5 =$$

$$(\sqrt{10.79 - .14}) \times 5 =$$

$$(\sqrt{10.65}) \times 5 =$$

$$3.2 \times 5 = 16.0$$

$$\frac{\sigma_Y}{\sigma_X} = \frac{16.0}{16.5} = .96 = \text{factor}$$



APPENDIX

COMPUTATION D: Standard Deviations for Scores of Teachers X and Y, Final Test, Group B

TEACHERS X					TEACHERS Y			
	f	x	fx	fx <sup>2</sup>	f	x	fx	fx <sup>2</sup>
95-99.9	1	8	8	64				
90-94.9	1	7	7	49				
85-89.9	0	6	0	0	1	6	6	36
80-84.9	4	5	20	100	3	5	15	75
75-79.9	3	4	12	48	0	4	0	0
70-74.9	1	3	3	9	2	3	6	18
65-69.9	7	2	14	28	12	2	24	48
60-64.9	4	1	4	4	7	1	7	7
			<u>68</u>				<u>58</u>	
55-59.9	2	0	0	0	4	0	0	0
50-54.9	7	-1	-7	7	0	-1	0	0
45-49.9	2	-2	-4	8	2	-2	-4	8
40-44.9	2	-3	-6	18	2	-3	-6	18
35-39.9	2	-4	-8	32	2	-4	-8	32
30-34.9	0	-5	0	0	2	-5	-10	50
25-29.9	0	-6	0	0	0	-6	0	0
20-24.5	0	-7	0	0	1	-7	-7	49
15-19.9	0	-8	0	0	1	-8	-8	64
10-14.9	2	-9	-18	162				
5---9.9	1	-10	-10	100				
			<u>-53</u>	<u>629</u>			<u>-43</u>	<u>405</u>
			<u>68</u>				<u>58</u>	
N = 39			$\frac{15}{39} = .38$				$\frac{15}{39} = .38$	

$$\sigma = \left( \frac{\sqrt{629}}{39} - (-.38)^2 \right) \times 5 =$$

$$(\sqrt{16.12} - .14) \times 5 =$$

$$(\sqrt{15.98}) \times 5 =$$

$$3.9 \times 5 = 19.5$$

$$\sigma = \left( \frac{\sqrt{405}}{39} - (.38)^2 \right) \times 5 =$$

$$(\sqrt{10.33} - .14) \times 5 =$$

$$(\sqrt{10.24}) \times 5 =$$

$$3.2 \times 5 = 16.0$$

$$\frac{\sigma_y}{\sigma_x} = \frac{16.0}{19.5} = .82 = \text{factor}$$

APPENDIX

COMPUTATION E: Standard Deviations, Means and Standard Deviation of the Means of the Changes found by taking F. T. - I. T. for each individual student, on the basis of the Derived Average Technique.

GROUP A					GROUP B			
	f	x	fx	fx <sup>2</sup>	f	x	fx	fx <sup>2</sup>
40-44.9	1	6	6	36				
35-39.9	1	5	5	25				
30-34.9	0	4	0	0				
25-29.9	2	3	6	18				
20-24.9	3	2	6	12				
15-19.9	9	1	9	9	2	3	6	18
10-14.9			<u>32</u>					
10-14.9	8	0	0	0	3	2	6	12
5---9.9	5	-1	-5	5	6	1	6	6
							<u>18</u>	
0---4.9	8	-2	-16	32	8	0	0	0
0to-4.9	1	-3	-3	9	9	-1	-9	9
-5to-9.9	0	-4	0	0	5	-2	-10	20
-10"-14.9	1	-5	-5	25	5	-3	-15	45
-15"-19.9					1	-4	-4	16
			<u>-29</u>	<u>171</u>			<u>-38</u>	<u>106</u>
			<u>32</u>				<u>18</u>	
N = 39			<u>3</u>				<u>-20</u>	
			<u>39</u>				<u>39</u>	

$$\sigma = \left\{ \frac{\sqrt{171}}{39} - (.07)^2 \right\} \times 5 =$$

$$(\sqrt{4.58} - .004) \times 5 =$$

$$(\sqrt{4.37}) \times 5 =$$

$$2.09 \times 5 = 10.45$$

$$\sigma M_1 = \frac{10.45}{\sqrt{39}} = \frac{10.45}{6.24} = 1.6$$

$$\begin{aligned} \text{A. M.} &= 12.5 \\ c &= .35 \\ M_1 &= 12.85 \end{aligned}$$

$$\sigma = \left\{ \frac{\sqrt{106}}{39} - (-.51)^2 \right\} \times 5 =$$

$$(\sqrt{2.71} - .26) \times 5 =$$

$$(\sqrt{2.45}) \times 5 =$$

$$1.6 \times 5 = 8.0$$

$$\begin{aligned} \text{A. M.} &= 2.5 \\ c &= -2.5 \\ M_2 &= 0 \end{aligned}$$

$$\sigma M_2 = \frac{8.0}{\sqrt{39}} = \frac{8.0}{6.24} = 1.2$$

APPENDIX

COMPUTATION F: Difference, Standard Deviation of Difference, and Experimental Coefficient.

## I. Difference:

$EF_1$	$EF_2$	D
$M_1$	$M_2$	$M_1 - M_2$
12.85	0	$12.85 - 0 = 12.85$

## II. Standard Deviation Difference:

$$D = \frac{\sqrt{(\sigma M_1)^2 - (\sigma M_2)^2}}{2} = \frac{\sqrt{(1.6)^2 - (1.2)^2}}{2} =$$

$$\frac{\sqrt{4.00}}{2} = 2.0$$

## III. Experimental Coefficient:

$$\frac{D}{2.78 \times \text{SDD}} = \frac{12.85}{2.78 \times 2.0} = 2.3$$