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A COMPARISON OF THE POINT SCALE AND THE GROUP METHOD
OF MEASURING MENTAL ABILITY

by

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A Comparison of the Point -Scale and the Group Method
of Measuring Mental Ability

The Problem

Within the past decade great interest has arisen in the measurement of mental ability. As a result a vast deal of literature has been written upon this subject. Psychologists have suggested and secured norms for many tests, most of which, or perhaps all of which, are based more or less upon the original Binet-Simon tests.

However, this study does not propose either to list or review the history of such mental tests. The one problem of interest, and the problem to which we shall adhere strictly, is to discover the correlation which exists between the Group Tests of Mental Ability as worked out and tested by W. H. Pyle of the University of Missouri, and the Individual Tests, otherwise known as The Point Scale Tests as worked out and tested by Robert M. Yerkes, James W. Bridges, and Rose S. Hardwick, each of the Psychopathic Hospital, Boston.

A thorough explanation of each of these two tests is given in Appendices I and II of this study.

The Method and the Subjects

The examination of the eighty cases for this experiment was made by the writer personally so as to eliminate any possible error that might arise from variation of method by different examiners. All of the examinations were conducted in the Canton, Missouri, Public School. The subjects are the students in grades four, five, six, and seven. Twenty-five subjects are in the fourth grade, twenty-six are in the fifth grade, twenty-seven are in the sixth grade, and two are in the seventh grade.

No special selection of subjects was made. All who were present in a room the day on which the Group Tests were given became subjects. An equal number of boys and girls were tested--forty of each sex. No attempt was made to get such a distribution but it so fell out that this division was made.

Altho no attempt has been made in this experiment to study sex differences, such a division is fortunate in that the weight of influence is equal so far as sex is concerned.

The Group tests were given first. Beginning with the fourth grade they were given as rapidly as possible to the succeeding grades. This was done in order that the material used in the tests might not be imparted by the pupils who had had the tests to those who had not had them. About one hour and forty-five minutes was consumed in each grade. These tests were given the second week in January 1918.

The results of the tests, and the method used in securing the mental age are explained in Appendix I.

The individual tests were given between February 1 and March 15, 1918. All tests were made under favorable conditions of environment. The room was pleasant, and secluded enough to exclude most of the distracting elements. In order to eliminate any possible means of distraction for the subject no third person was allowed in the room or permitted to witness the examination. Before the tests were given, the subject was engaged in conversation by the examiner until all traces of embarrassment or hesitancy in response were eliminated. The subject's age, date of birth, home address, and occupation of father or mother were noted. A subtle, indirect inquiry was made as to how much, if any, of the material in the tests had been imparted by school mates. Since the tests were given first to the lower grades and then to the higher grades, very little information was passed by those who had taken the tests to those who had not taken them. In only one point did we detect any telling and then in only a relatively few cases. In test Number 10, (d) (What is a baby?) there was some telling. This test impressed the subjects as odd or funny, and, as has been said, was passed on in a few cases.

The sex and language norms furnished by Professor Yerkes on page 73 of his book (8) were used in determining the mental age. These ages were figured to years and tenths of a year, as were the mental ages secured by the Group tests. The record of the scores made is given in Appendix II.

Results

Chart I gives the results obtained from eighty children examined by the Group tests and the Point Scale tests.

Each case is numbered so as not to disclose the name. The cases are arranged in the order of increasing chronological age from eight to fifteen years.

The first column in Chart I gives the case number, the second the sex (M stands for masculine and F for feminine), the third gives the chronological age of each individual at the time the Point Scale test was given. Column four gives the mental age in years calculated from the Point Scale norms. The fifth column gives the mental age in years according to the Group tests. Column six gives the chronological age of each individual at the time the Group tests were given. Column seven gives the Group test status, that is, the relationship existing between the chronological age and the mental age. For example, a plus 1.9 means that according to the Group tests the subject is 1.9 years above normal, a minus 1.9 means that according to the Group tests the subject is 1.9 years below normal--normal in this case meaning chronological age. A zero in this column means that the mental age according to the Group tests and the chronological age of the subject are the same. Column eight gives the Point Scale status, that is, the relationship existing between the mental age of the child according to the Point Scale tests and the chronological age. The same

CHART I.

Results of the Examination of Eighty Cases
by the
Group Tests and the Point Scale Tests.

Case No.	Sex	P. S. Chron. Age	P. S. Age	Group Age	Group Chron. Age	Group Stat.	P. S. Stat.	Stat. Diff.
24	M	8.9	11.5	11.4	8.8	+2.6	+2.6	0
13	F	9.0	11.5	11.2	8.9	+2.3	+2.5	.2
5	M	9.1	11.0	10.9	9.0	+1.9	+1.9	0
20	F	9.2	12.0	10.6	9.0	+1.6	+2.8	1.2
22	M	9.2	9.7	11.1	9.1	+2.0	+ .5	1.5
21	F	9.4	11.4	10.2	9.3	+ .9	+2.0	1.1
11	M	9.5	11.8	10.7	9.4	+1.3	+2.3	1.0
25	F	9.6	10.5	10.0	9.4	+ .6	+ .9	.3
8	M	9.6	12.7	10.7	9.5	+1.2	+3.1	1.9
10	M	9.6	12.4	10.4	9.5	+ .9	+2.8	1.9
14	M	9.7	9.9	8.6	9.5	- .9	+ .2	1.1
49	F	9.7	11.5	11.2	9.5	+1.7	+1.8	.1
12	F	9.7	11.5	10.0	9.6	+ .4	+1.8	1.4
17	M	9.7	9.6	10.0	9.6	+ .4	- .1	.5
16	F	9.8	11.1	10.5	9.7	+ .8	+1.3	.5
31	M	9.8	15.0	11.6	9.7	+1.9	+5.2	3.3
9	F	9.9	11.7	12.5	9.7	+2.8	+1.8	1.0
19	F	9.9	11.7	10.1	9.8	+ .3	+1.8	1.5
3	F	10.2	11.2	11.2	10.1	+1.1	+1.0	.1
4	F	10.2	8.5	9.9	10.1	- .2	-1.7	1.5
18	M	10.3	9.4	9.1	10.2	-1.1	- .9	.2

Case No.	Sex	P. S. Chron. Age	P. S. Age	Group Age	Group Chron. Age	Group Stat.	P. S. Stat.	Stat. Diff.
2	M	10.4	11.6	10.9	10.3	+ .6	+1.2	.6
34	M	10.4	11.9	10.7	10.2	+ .5	+1.5	1.0
33	M	10.5	12.6	11.4	10.3	+1.1	+2.1	1.0
37	F	10.6	15.0	10.6	10.4	+ .2	+4.4	4.2
39	F	10.6	15.0	11.9	10.4	+1.5	+4.4	2.9
48	F	10.7	11.3	10.4	10.5	- .1	+ .6	.7
26	F	10.7	15.0	12.5	10.6	+1.9	+4.3	2.4
32	F	10.7	11.5	10.4	10.6	- .2	+ .8	1.0
41	F	10.7	15.0	13.1	10.6	+2.5	+4.3	1.8
27	F	10.8	15.0	10.5	10.7	- .2	+4.2	4.4
50	M	10.8	14.7	12.4	10.7	+1.7	+3.9	2.2
28	M	10.9	11.2	10.4	10.7	- .3	+ .3	.6
66	M	10.9	14.7	13.6	10.7	+2.9	+3.8	.9
38	F	11.0	10.0	9.9	10.8	- .9	-1.0	.1
43	F	11.0	10.0	10.4	10.8	- .4	-1.0	.6
52	F	11.0	9.8	11.0	10.8	+ .2	-1.2	1.4
7	F	11.0	11.4	10.6	10.9	- .3	+ .4	.7
35	M	11.1	11.3	10.9	10.9	0	+ .2	.2
36	M	11.1	11.2	11.0	10.9	+ .1	+ .1	0
65	F	11.1	14.0	12.7	10.9	+1.8	+2.9	1.1
15	M	11.2	9.5	11.0	11.1	- .1	-1.7	1.6
42	M	11.2	11.0	11.4	11.1	+ .3	- .2	.5
54	F	11.3	9.6	10.6	11.2	- .6	-1.7	1.1
51	M	11.4	12.3	12.1	11.2	+ .9	+ .9	0

Case No.	Sex	P. S. Chron. Age	P. S. Age	Group Age	Group Chron. Age	Group Stat.	P. S. Stat.	Stat. Diff.
59	F	11.4	11.6	12.6	11.2	+1.4	+ .2	1.2
67	F	11.5	11.5	11.2	11.3	- .1	0	.1
46	F	11.6	11.0	10.4	11.4	-1.0	- .6	.4
77	F	11.6	12.0	12.9	11.4	+1.5	+ .4	1.1
23	F	11.7	11.6	12.7	11.6	+1.1	- .1	1.2
64	M	11.7	15.0	13.6	11.5	+2.1	+3.3	1.2
74	M	11.7	15.0	12.5	11.6	+ .9	+3.3	2.4
72	M	11.8	15.0	14.1	11.7	+2.4	+3.2	.8
70	M	11.9	11.8	12.4	11.7	+ .7	- .1	.8
40	M	12.1	9.9	9.4	11.9	-2.5	-2.2	.3
63	M	12.1	12.7	11.9	11.9	0	+ .6	.6
75	M	12.2	15.0	14.1	12.1	+2.0	+2.8	.8
29	M	12.3	8.7	9.4	12.2	-2.8	-3.6	.8
44	F	12.3	9.5	10.1	12.2	-2.1	-2.8	.7
55	M	12.4	10.0	10.2	12.2	-2.0	-2.4	.4
62	M	12.5	11.0	14.9	12.3	+2.6	-1.5	4.1
80	M	12.6	12.0	12.5	12.4	- .1	- .6	.5
68	F	12.7	11.6	12.9	12.6	+ .3	-1.1	1.4
78	F	12.7	13.0	12.2	12.6	- .4	+ .3	.7
58	M	12.8	12.1	13.4	12.7	+ .7	- .7	1.4
61	F	12.8	15.0	12.2	12.7	- .5	+2.2	2.7
57	F	12.9	11.2	10.4	12.7	-2.3	-1.7	.6
76	F	12.9	11.5	12.7	12.7	0	-1.4	1.4
45	M	13.0	8.1	10.9	12.8	-1.9	-4.9	3.0

Case No.	Sex	P. S. Chron. Age	P. S. Age	Group Age	Group Chron. Age	Group Stat.	P. S. Stat.	Stat. Diff.
60	F	13.0	14.0	12.5	12.8	- .3	+1.0	1.3
1	F	13.0	10.5	9.4	12.9	-3.5	-2.5	1.0
69	M	13.2	11.5	12.9	13.0	-.1	-1.7	1.6
53	F	13.3	12.0	11.9	13.2	-1.3	-1.3	0
6	M	13.5	10.0	8.7	13.4	-4.7	-3.5	1.2
56	M	13.6	11.8	12.9	13.4	- .5	-1.8	1.3
30	F	13.8	11.2	11.7	13.7	-2.0	-2.6	.6
71	M	14.2	14.7	14.5	14.0	+ .5	+ .5	0
47	M	14.7	12.6	12.1	14.5	-2.4	-2.1	.3
79	F	14.7	11.2	11.4	14.6	-3.2	-3.5	.3
73	M	15.2	11.0	13.2	15.0	-1.8	-4.2	2.4

method of marking obtained as in the Group status. Column nine gives the status difference, that is, the difference between the Group status and the Point Scale status. It is found by subtracting the Group status from the Point Scale status, or vice versa.

An examination of columns seven and eight shows that, taking the two tests as a whole, there is no difference in the status of six cases. Thirty-six cases are shown to be above age and twenty-three cases are shown to be below age, as measured by both tests. In seventeen cases the tests differ, that is, one test shows the subject to be above age and the other shows him to be below age. In four additional cases the tests differ in that one shows them to be normal and the other shows them to be either above or below normal.

An examination of these cases of difference as set forth in Chart II shows their status difference to range from one tenth of a year to four and four tenths years. In eleven of these cases they differ by less than one year; in seven additional cases they differ by less than two years; and in three cases they differ by more than two years.

In these twenty-one cases in which the tests may be said to differ it should be pointed out that the disagreement is not great. In fact they do not differ any more widely, on the whole, in these twenty-one cases than they do in the fifty-nine cases where they are said to agree because they both show the subject to be above age, or below age, as the case may be.

CHART II

Showing the Twenty-one Cases in Which the Two Scales Differ

Case No.	Group Stat.	P.S. Stat.	Stat. Diff.
14	-.9	+.2	1.1
17	+.4	-.1	.5
48	-.1	+.6	.7
32	-.2	+.8	1.0
27	-.2	+4.2	4.4
28	-.3	+.3	.6
52	+.2	-1.2	1.4
7	-.3	+.4	.7
35	0	+.2	.2
42	+.3	-.2	.5
67	-.1	0	.1
23	+1.1	-.1	1.2
70	+ .7	-.1	.8
63	0	+.6	.6
62	+2.6	-1.5	4.1
68	+ .3	-1.1	1.4
78	- .4	+ .3	.7
58	+ .7	- .7	1.4
61	- .5	+2.2	2.7
76	0	-1.4	1.4
60	- .3	+1.0	1.3

Taking the tests as a whole, we find by the Group tests that forty-four individuals are rated above age, thirty-three are rated below age, and three are rated as normal. By the Point Scale tests forty-seven are rated above age, thirty-two are rated below age, and one is rated as normal. However, this sort of comparison means more if we break the results up into age groups. Chart III summarizes the results as they appear under each year.

CHART III

Results of 80 Cases Examined by the Group tests and the Point Scale.

9 Years			10 Years			11 Years			12 Years		
Ad.	Nor.	Ret.	Ad.	Nor.	Ret.	Ad.	Nor.	Ret.	Ad.	Nor.	Ret.
Group 7	0	0	14	0	3	12	1	10	8	1	5
P. S. 7	0	0	14	0	3	16	1	6	6	0	8

13 Years			14 Years			15 Years			Av. Dev.	
Ad.	Nor.	Ret.	Ad.	Nor.	Ret.	Ad.	Nor.	Ret.	+	-
Group 2	1	10	1	0	2	0	0	3	1.3	1.23
P. S. 3	0	10	1	0	2	0	0	3	2.0	1.76

It should be noted that nine years includes the ages from 8.6 to 9.5, ten years includes the ages from 9.6 to 10.5 etc. Under each year there are three columns. The first column gives the number of individuals rated as Advanced, the second column gives the number of individuals rated as Normal, the third column gives the number of individuals rated as Retarded. At the end of the chart is given the average deviation from age according to both tests. Age for age, we find the tests agreeing in the results obtained for ages nine, ten, fourteen, and fifteen, with a negligible difference at the age of thirteen. The greatest differences are found at the ages of eleven and twelve. In each of these two ages the tests differ by almost the same proportion.

We find that the average deviation is greater in the Point Scale tests than in the Group tests in both the positive and the negative departure from chronological age. ~~This is further shown when we find the Standard Deviation (S. D.). For the Point Scale Tests the S.D. is 1.74; for the Group Tests the S.D. is 1.54.~~

CORRELATIONS

The most valuable comparison of the two tests is shown in the correlations worked out (1) between the Group age and the Point Scale age, (2) between the Group age and Chronological age, (3) between the Point Scale age and Chronological age, (4) between the Group ranking and the teachers' estimate, (5) between the Point Scale ranking and the teachers' estimate, (6) between the Group ranking and the Point Scale ranking.

In securing the correlations (r) between the Group age and the Point Scale age, between the Group age and the Chronological Group age, and between the Point Scale age and the Chronological Point Scale age the Pearson "Product-Moments" formula, as explained on pages 38 and 39 of Whipple's "Manual of Mental and Physical Tests, Simpler Process" (7), was used. In securing the correlations between the teachers' rankings and the Group rankings, between the teachers' rankings and the Point Scale rankings, and between the Group ranking and the Point Scale ranking we used the Spearman formula, as set forth on page 41 of Whipple's "Manual of Mental and Physical Tests, Simpler Processes" (7). The correlations (R) thus obtained were converted into correlations of the Pearson value for r by means of Table 6 page 44 of Whipple's "Manual".

The correlations thus obtained are tabulated in Chart IV. Some significant correlations are found, but those most significant for our study are the first one and the last one shown in the chart of correlations, namely Group Age and Point Scale Age as shown by the two tests, and the relative rankings of the tests.

We find a correlation of .619 between the mental ages of the two tests. This is 13.6 times the Probable Error (P. E.). The rankings of the eighty subjects by the two tests gives a still higher correlation of .84. This is 38.2^{times} the P. E. Two such high correlations cannot but have significance in this study.

CHART IV

CORRELATIONS

Array	S. D.	P. E. of r	r	$r \div P. E.$
Group Age and Point Scale Age	1.34 1.74	.045	.619	13.6
Group Age and Chron. Group Age	1.34 1.45	.063	.398	6.1
Point Scale Age and Chron. P.S. Age	1.75 1.45	.0753	.029	.38
Group Ranking and 4th Teacher's Rank.		.09	.565	6.2
Group Ranking and 5th Teacher's Rank.		.065	.71	10.9
Group Ranking and 6th Teacher's Rank.		.046	.80	17.3
P.S. Ranking and 4th Teacher's Rank.		.10	.42	4.2
P.S. Ranking and 5th Teacher's Rank.		.012	.95	79.1
P.S. Ranking and 6th Teacher's Rank.		.074	.655	8.8
Group Ranking and P.S. Ranking.		.022	.84	38.2

The lowest correlations are found to be between the mental age as shown by each test and its corresponding chronological age. The Group Mental age correlates .398 with the Group Chronological age which is 6.1 times its P. E. However, this is enough to have some significance. The correlation between the Point Scale Mental Age and its corresponding chronological age is almost zero, being .029. These correlations have very little, if any, significance for our study.

On page 111 of "The Psychological Methods of Testing Intelligence" by William Stern (Whipple's translation) (6) this question is asked: "Is it possible, on the basis of a short examination with a series of tests to arrive at a gradation of pupils that corresponds with their actual differences of intelligence and such that the rank that each gains is sufficiently characteristic of his grade of intelligence within the group?"

In answering this question, we have been interested to note not only how the rank-order of one intelligence test compares with another intelligence test, but also how each of these tests compares with the teachers' estimate of the pupils intelligence as shown by their rank-order. As is pointed out by Stern, the great difficulty lies in securing the judgment of teachers who have had sufficient psychological training to give weight to their estimation of intelligence when subjected to scientific comparisons.

It was at first the thought of the writer to compare the two tests of intelligence with the school standing of the subjects as shown by grade marks. However, the system used in the school in giving grade marks excluded this. The subjects are graded as Excellent, Superior, Medium, Inferior, or Failure. The numerical value back of each grade varies by five points. This made impossible any exactness in assigning numerical values to the recorded grades.

Altho the teachers did not have the necessary psychological training to give exactness to an intelligence rank-order, yet it was felt that a rank-order based upon the school accomplishment, plus a knowledge of the intelligence of the pupils, as gained by seven and one half months of personal contact with them in the class room, would be of value; at least, it would be the most valuable criterion for gauging the tests that we would be able to find outside of experiment, or outside of the tests themselves.

Each teacher was asked to rank her students from the best to the poorest. This ranking was based not only upon actual school accomplishment, but also upon the teacher's judgment of what she felt the student was able to do. Under such conditions, after all, most of the ranking was based, either consciously, or unconsciously, upon school accomplishment.

The relative rankings by teachers as compared with the mental tests is shown in Charts V, VI and VII.

Chart V shows the ranking of the fourth grade teacher and that of each of the two tests. These rank-orders are arranged in a scale from the poorest to the best. The poorest student as shown by each test or by the teacher's rank-order is put first and the best one is put last. Where two or more tie for a given rank the numbers are averaged and the resultant average given as the rank of each.

Column one gives the rank-order of the Point Scale tests. Column two gives the case numbers which correspond to the rank as established by the Point Scale age. In column three the teacher's rank-order is given. This rank-order extends from one to twenty-five inclusive. Column four gives the case number of the subjects, in the Group tests in order of their ranking as shown by column five. Charts VI and VII are constructed in like manner. Chart VI begins its rank-order with number 26 since the last number in Chart V is 25. Chart VII continues in like manner from the last number of Chart VI.

By reference to Chart IV it will be noted that the lowest correlation obtained between the rankings of teachers and mental tests is obtained from the rank-order as made by the fourth grade teacher. With the Group tests we get a correlation of .565, which is 6.2 times the P.E. With the Point Scale tests a correlation of .42 is given when correlated with the fourth grade teacher's rank-order. This is 4.2 times the P. E. This is large enough to have significance, yet it is not a very high correlation as compared with the others.

CHART V

COMPARATIVE RANK-ORDERS OF THE POINT SCALE, GROUP, AND
FOURTH GRADE TEACHER

Rank Order Point Scale	Point Scale Rank Case No.	Fourth Grade Teacher Rank Case No.	Group Rank Case No.	Rank Order Group
1	4	18	14	1
2	18	14	6	2
3	15	12	18	3
4	17	4	1	4
5	22	1	4	5
6	14	23	17	7
7	6	22	25	7
8.5	1	11	12	7
8.5	25	10	19	9
10	5	24	21	10
11	16	21	10	11
12	3	19	16	12
13.5	7	6	7	13.5
13.5	21	15	20	13.5
16	12	16	11	15.5
16	13	8	8	15.5
16	24	5	5	17.5
18.5	2	3	2	17.5
18.5	23	25	15	19
20.5	9	7	22	20
20.5	19	2	3	21.5

Rank Order Point Scale	Point Scale Rank Case No.	Fourth Grade Teacher Rank Case No.	Group Rank Case No.	Rank Order Group
22	11	13	13	21.5
23	20	9	24	23
24	10	20	9	24
25	8	17	23	25

Chart VI shows the rank-order of the fifth grade teacher when compared with the two mental tests. This gives a correlation of .71 with the Group rank-order, and one of .95 with the Point Scale ranking. This is 10.9 and 79.1, respectively, times the P. E. This gives the highest average correlation of the three.

Chart VII gives the rank-order of the sixth grade teacher and the two mental tests. This gives a correlation of .80 with the Group ranking. This is 17.3 times the P. E. With the Point Scale rank-order we get a correlation of .655 which is 8.8 times the P. E.

It should be recalled that there are twenty-five subjects in the fourth grade, twenty-six in the fifth grade, and twenty-seven in the sixth grade. Taking this fact into consideration the correlations are very high.

If we average the correlations of all three teachers' rank-orders with the Group ranking we get an average of .69, while the average correlation between the three teachers' rank-orders and the Point Scale ranking is .67. These averages show a remarkable closeness in correlations of the mental tests' rankings and the teachers' rankings.

However, when we correlate the rank-order of one mental test with the rank-order of the other mental test we get the high correlation of .84, which is 38.2 times the P. E.

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CHART VI

COMPARATIVE RANK-ORDERS OF THE POINT SCALE, GROUP, AND
FIFTH GRADE TEACHER

Rank Order Point Scale	Point Scale Rank Case No.	Fifth Grade Teacher Rank Case No.	Group Rank Case No.	Rank Order Group
26	45	40	40	26.5
27	29	47	29	26.5
28	44	45	38	28.
29	40	29	44	29.
30.5	38	36	28	32
30.5	43	35	32	32
32.5	42	42	43	32
32.5	46	43	46	32
35	28	28	48	32
35	30	46	27	35
35	36	44	37	36
37.5	35	38	34	37
37.5	48	34	35	38.5
39.5	32	30	45	38.5
39.5	49	48	36	40
41	34	49	49	41
42	51	32	42	42.5
43.5	33	51	33	42.5
43.5	47	31	31	44
45	50	27	30	45

Rank Order Point Scale	Point Scale Rank Case No.	Fifth Grade Teacher Rank Case No.	Group Rank Case No.	Rank Order Group
48.5	39	50	39	46
48.5	27	37	51	47.5
48.5	31	33	47	47.5
48.5	37	26	50	49
48.5	26	41	26	50
48.5	41	39	41	51

CHART VII
COMPARATIVE RANK-ORDERS OF THE POINT SCALE, GROUP, AND
SIXTH GRADE TEACHER

Rank Order Point Scale	Point Scale Rank Case No.	Sixth Grade Teacher Rank Case No.	Group Rank Case No.	Rank Order Group
52	54	55	55	52
53	52	53	57	53
54	55	57	54	54
55.5	62	73	52	55
55.5	73	78	67	56
57	57	70	53	57.5
59	67	56	63	57.5
59	69	54	61	59.5
59	76	61	78	59.5
61.5	59	63	70	61
61.5	68	76	60	62.5
63.5	56	71	74	62.5
63.5	70	60	59	64
65.5	53	58	65	65.5
65.5	77	52	76	65.5
67	58	69	56	68.5
68	63	77	68	68.5
69	78	65	69	68.5
70.5	60	67	77	68.5
70.5	65	59	73	71
72.5	66	68	58	72

Rank Order Point Scale	Point Scale Rank Case No.	Sixth Grade Teacher Rank Case No.	Group Rank Case No.	Rank Order Group
72.5	71	62	66	73.5
76	64	66	64	73.5
76	72	72	72	75.5
76	75	74	78	75.5
76	74	75	71	77
76	61	64	62	78

CONCLUSIONS

The problem of this study, as stated in the beginning, has been to find out what correlations exist between the Group tests and the Point Scale tests. Do these two scales test the same phases of intelligence? If so, to what extent do they agree? Should one test supplement the other as do the Porteus (3) and the Binet tests, or is either sufficient in itself? Is the Point Scale superior to the Binet tests as is claimed by Bell (1) Zimmerman (9) and others, or may it be said that the Binet tests are as much of a Point Scale as are the Point Scale tests themselves, as is claimed by Otis (2)?

From the experience gained in giving the two tests, and in grading and ranking the same, we feel that both tests are eminently valuable. There are certain advantages in each test which we do not find in the other.

The Group tests can be given in a much shorter time than the Point Scale tests. It takes about one hour and a half to give the Group tests in a room, while it takes as many hours as there are pupils in the room to give the Point Scale tests. The Group tests may be graded outside of school. This does not interfere with the regular school work; neither does it take as much of the examiner's time as does the Point Scale method.

The Point Scale tests have the advantage of bringing the examiner into closer contact with the subject than do the Group tests. This enables him to observe the effects of each test much more closely than does the Group method; he is also able to gain more information about each individual case.

It occurs to the writer that the most economical method is to give the Group tests first. The extreme cases, or the doubtful cases, should^{then}/be examined by the Point Scale tests. It may also be necessary to use other supplementary tests in some cases.

Since these tests give a high correlation in both the mental ages and the rank-orders obtained, it is obvious that, in the main, they both test the same phases of intelligence.

In no case, however, do the Group tests rank a subject to the maximum limit of the norms. By this we mean that no student is ranked as eighteen years old or even fifteen years old by the Group tests. On the other hand, in several instances we find that the subjects are rated as fifteen years old by the Point Scale. This is the maximum limit of the norms.

From this it is to be observed that the reliability and fairness of the Group tests continue beyond the limit of the Point Scale, and therefore the Group method demonstrates its superiority over the Point Scale a few years beyond the point where the reliability of the Point Scale ceases. Just as the Point Scale reaches beyond the Binet tests in this respect, so do the Group tests reach beyond the Point Scale tests.

We find that the Group tests rate the subjects a little lower in mental age than does the Point Scale. The average mental age as shown by the Point Scale is 11.8 years, while the average mental age of the Group tests is 11.4. This fact is shown more strikingly when we consider the norms for the

fifteen year olds. Since this is the limit of the Point Scale we find a goodly number of subjects lumped together as fifteen year olds altho their Point Scale score exceeds the maximum norm by eight or ten points. The Group tests do not cause the subjects to be clustered about the mental age of fifteen because, first, the norms give an average rating lower than fifteen to all subjects, and second, the Group norms are so graduated as to extend to the eighteen-year-olds.

The Point Scale norms for girls from twelve to fifteen years old are very irregular. Those making eighty points are rated as younger than those making seventy-seven, seventy-nine, or seventy-six. There is a need of more cases for these norms so that the curve may be smoothed.

The conclusions to be drawn, then, from a comparison of the two methods of testing are:

1. That the results are similar enough to warrant the statement that the two scales test the same phases of mental ability.
2. That the advantage of economy in time by the Group method overbalances the intimacy of contact in the Point Scale, when large numbers of subjects are involved. The Group tests are, therefore, more practical for ordinary school testing.
3. That the Point Scale should be used as a supplementary test for doubtful cases.
4. That the reliability and fairness of the Group method continues beyond the limit of the Point Scale norms, and therefore demonstrates its superiority over the Point Scale method in the more advanced ages.

APPENDIX I

EXPLANATION OF THE GROUP TESTS OF MENTAL ABILITY.

There are in all seven tests in the group method of testing for mental ability. The second test, however, is divided into two parts, namely, Rote Memory Concrete and Rote Memory Abstract. Counting this as two separate tests we have eight in all.

Every test was most carefully explained to the subjects, and great care was taken to see that all understood exactly what was expected of them. In those tests in which time was an element a stop watch was used and the time was carefully kept.

Before beginning each test, the subject was required to write his name, age, birthday, grade and sex on the back of his paper. When the test was completed, the teacher and the examiner collected the papers as quickly as possible. Both the teacher and the examiner watched carefully to see that there was no cheating.

An explanation of the nature and purpose of each test follows.

LOGICAL MEMORY

Object.--The purpose of this test is to determine the pupil's facility in remembering and reproducing ideas. A pupil's standing in the test may serve as an indication of his ability to remember the subject matter of the school studies.

Method.--The procedure in this test is for the examiner to read slowly and distinctly the story to be reproduced.

Immediately after the reading the pupils are to write all the story they can recall. They must not begin to write till after the reading. Ten minutes should be allowed for reproduction. Before reading the story, the following instructions are given:

I shall read to you a story entitled Willie Jones and His Dog (or A Farmer's Son, as the case may be.) After I have read the story you are to write down all you can remember of it. You are not to use the exact words that I read unless you wish. You are to use your own words. Try to recall as much as possible and write all you recall. Try to get all the details, not merely the main facts.

Material.--For grades three, four, and five, use "Willie Jones and His Dog"; for grades six, seven, and eight, use "A Farmer's Son".

WILLIE JONES AND HIS DOG

Willie/Jones/was a little/boy/only/five years old./ He had a dog/whose name was Buster./ Buster was a large/dog/with long,/black,/curly/hair./ His fore/feet/and the tip/of his tail/were white./ One day/Willie's mother/sent him/to the store/ which was only/a short/distance away./ Buster went with him,/ following behind./ As Buster was turning/at the corner,/a car/ struck him/and broke/one/hind/leg/and hurt/one/eye./ Willie was/ very/sorry/and cried/a long/time./ Willie's father/came/and carried/the poor/dog/home./ The broken leg/got well/in five/ weeks/but the eye/that was hurt/became blind./

A FARMER'S SON

Will/was a farmer's/son/who attended school/in town./ His clothes/were poor and his boots/often smelled/of the farmyard/ although he took great/care of them./ Since Will had not gone to school/as much/as his classmates,/he was often/at a dis-

Plate I. Logical Memory--Willie Jones

advantage,/although his mind/was as good/as theirs,--/in fact, he was brighter/than most/of them./ James,/the wit/of the class,/never lost an opportunity/to ridicule/Will's mistakes,/ his bright/red/hair,/and his patched/clothes./ Will/took the ridicule/in good part/and never/lost his temper./ One Saturday/as Will/was driving/his cows/to pasture,/he met James/teasing/a young/child,/a cripple./ Will's/ indignation/was aroused/by the sight./ He asked/the bully/to stop,/but when he would not,/Will pounced/upon him/and gave him/a good/beating,/and he would not/let James go/until he promised/not to tease/the crippled/child/again./

The Results.--The material for the test is divided into units as indicated by the diagonal lines. The pupil's written reproduction should be compared unit by unit with the story as printed, and given one credit for each unit adequately reproduced. The norms for the two tests are shown in plates I and II. In these and all the graphs which follow, the actual ages are shown in the first horizontal column. The norms for girls are shown in the second horizontal column, the norms for boys are shown in the column at the bottom. By the norm for an age is meant the average performance of all pupils of that age examined. By age ten is meant the pupils that have passed their tenth birthday and have not reached their eleventh birthday, and the other ages are to be similarly interpreted. The vertical lines in the graphs indicate birthdays and the scores written on these lines indicate ability at these exact ages. The column marked ten, for example, includes

Plate II. Logical Memory--A Farmer's Son

all the children that are over ten and not yet eleven. The graphs show the development from age to age. In these tests, however, one half year was added to the average age of each pupil as shown by the norms, in order that it might correspond to the Point Scale norms.

ROTE MEMORY

Object.--The object of the rote memory tests is to determine the pupil's memory span for unrelated impressions,--words that have no logical relations with one another. Much school work makes demands upon this ability. Therefore, the tests are of importance.

Method.--There are two lists of words, concrete and abstract, with six groups in each list. The list of concrete words should be given first, then the abstract. The procedure is to pronounce the first group, cat, tree, coat, and then pause for the pupils to write these three words. Then pronounce the next group, mule, bird, cart, glass, and pause for the reproduction, and so on through the list.

Give the following instructions:

We wish to see how well you can remember words. I shall pronounce first a group of three words. After I have pronounced them, you are to write them down. I shall then pronounce a group of four words, then one of five words, and so continue with a longer group each time. You must pay very close attention for I shall pronounce a group but once. You are not required to write the words in order, but just as you recall them.

Plate III. Concrete Rote Memory

Plate IV. Abstract Rote Memory

Material.--The words for the test are given in the following lists:

Concrete	Abstract
1. cat, tree, coat	1. good, black, fast
2. mule, bird, cart, glass	2. clean, tall, round, hot
3. star, horse, dress, fence, man	3. long, wet, fierce, white, cold
4. fish, sun, head, door, shoe, block	4. deep, soft, quick, dark, great, dead
5. train, mill, box, desk, oil, pun, bill	5. sad, strong, hard, bright, fine, glad, plain
6. floor, car, pipe, bridge, hand, dirt, cow, crank	6. sharp, late, sour, wide, rough, thick, red, tight

Results.--The papers are graded by determining the number of concrete words and the number of abstract words that are reproduced. No account is taken of whether the words are in the right position or not. A perfect score in each test would therefore be thirty-three. The norms are shown in plates III and IV.

THE SUBSTITUTION TEST

Object.--This test determines one's ability to build up new associations. It is a test of quickness of learning.

Method.--The substitution test-sheets are distributed to the pupils and turned face down on the desks. The examiner gives the following instructions:

We wish to see how fast you can learn. At the top of the sheet which has been distributed to you there is a

SUBSTITUTION TEST

Key No. 1

84,976						27,516					
79,821						33,821					
63,442						97,473					
21,629						62,978					
57,183						31,542					
32,761						17,143					
95,146						26,981					
28,349						35,724					
73,862						16,315					
91,563						14,923					
37,628						34,762					
42,916						28,543					
23,729						83,936					
85,652						75,314					
35,486						56,283					
29,635						19,175					
72,518						36,293					
24,631						85,746					
19,852						15,283					
76,431						24,976					

Plate V. Substitution Test

key. In nine circles are written the nine digits and for each digit there is written a letter which is to be used instead of the digit. Below the key are two columns of numbers; each number contains five digits. In the five squares which follow the number you are to write the letters which correspond to the digits. Work as fast as you can and fill as many of the squares as you can without making mistakes. When I say "stop," quit work instantly and turn the paper over.

Before beginning the test the examiner should explain on the blackboard the exact nature of the test. This can be done by using other letters instead of those used in the key. Make sure that the pupils understand what they are to do. Allow eight minutes in the grades three, four, and five, and five minutes above the fifth grade.

Material.--For material use the substitution test-sheets.

Results.--In grading the work, count each square correctly filled in as one point, and reduce the score to speed per minute by dividing by eight in grades three, four, and five, and by five in the grades above. The norms are shown in plate V.

FREE ASSOCIATION

Object.--This test determines the speed of the free flow of ideas. The result of the test is a criterion of the quickness of the flow of ideas when no restriction or limitation is put on this flow.

Method.--The procedure in this test is to give the subjects a word, and tell them to write this word down and all the other

Plate VI. Free Association Test

words that come into their minds. Make it clear to them that they are to write whatever word comes to mind, whether it has any relation to the word that is given them or not. Start them with the word cloud. Give the following instructions:

I wish to see how many words you can think of and write down in three minutes. I shall name a word, you may write it down and then all the other words that come into your mind. Do not write sentences, merely the words that come into your mind. Work as fast as you can.

Results.--Score the work by counting the number of words that have been written. The norms are shown in plate VI.

OPPOSITES

Object.--This is a test of controlled association. It tests one aspect of the association of ideas. All thinking is a matter of association of ideas. Reasoning is controlled association. The test may therefore be taken as a measure of speed in reasoning.

Method.--Distribute the opposites lists to the pupils and turn them face down on the desks. Use list one in grades three, four, and five, and list two in grades above. Allow two minutes in grades three, four, and five and one minute in grades above. Give the following instructions:

On the sheets that have been distributed to you are fifty words. After each word you are to write a word that has the opposite meaning. For example, if one word were far, you could write near. Work as fast as you can, and when I say "stop," quit work instantly and turn the paper over.

Results.--The score is the number of opposites correctly written. The norms are shown in plate VII.

OPPOSITES List No. 1.

1. good	26. strong
2. big	27. dark
3. rich	28. dead
4. out	29. wide
5. sick	30. empty
6. hot	31. above
7. long	32. north
8. wet	33. laugh
9. yes	34. man
10. high	35. before
11. hard	36. winter
12. sweet	37. ripe
13. clean	38. night
14. sharp	39. open
15. fast	40. first
16. black	41. over
17. old	42. love
18. up	43. come
19. thick	44. east
20. quick	45. top
21. pretty	46. wise
22. heavy	47. front
23. late	48. girl
24. wrong	49. sad
25. smooth	50. fat

OPPOSITES   List No. II.

1. strong	26. hot
2. deep	27. long
3. lazy	28. wet
4. seldom	29. fierce
5. thin	30. great
6. soft	31. dead
7. many	32. cloudy
8. valuable	33. hard
9. gloomy	34. bright
10. rude	35. fine
11. dark	36. plain
12. rough	37. sharp
13. pretty	38. late
14. high	39. sour
15. foolish	40. wide
16. present	41. drunk
17. glad	42. tight
18. strange	43. empty
19. wrong	44. sick
20. quickly	45. friend
21. black	46. above
22. good	47. loud
23. fast	48. war
24. clean	49. in
25. tall	50. yes

Plate VII. Opposites Test--Lists I. and II.

THE WORD BUILDING TEST

Object.--This is a test of a certain type of inventiveness, namely linguistic invention. Specifically it tests the pupil's ability to construct words using certain prescribed letters.

Method.--The pupils are given letters, a, e, o, m, n, r, and told to make as many words as possible using only these letters. Give the following instructions:

I wish to see how many words you can make in five minutes, using only the letters which I give you. The words must be real English words. You must use only the letters which I give you and must not use the same letter more than once in the same word. You do not, of course, have to use all the letters in the same word. A word may contain one or more letters up to six.

Material.--The pupils need only sheets of blank paper.

Results.--The score is the number of words that do not violate the rules of the test as given in the instructions. The norms are shown in plate VIII.

THE COMPLETION TEST

Object.--This test, to some extent, is a test of reasoning capacity. Of course, it is only one particular aspect of reasoning. The pupil is given a story that has certain words omitted. He must read the story, see what it is trying to say and determine what words, put into the blanks, will make the correct sense. The meaning of the word written in a particular blank must not only make the sentence read sensibly but must fit into the story as a whole. Filling in the blanks in this way demands considerable thought.

Plate VIII. Word Building Test

Method.--Distribute the test-sheets and turn them face down on the desks. Allow ten minutes in all the tests. Give the following instructions:

On the sheets which have been distributed is printed a story, which has certain words left out. You are to put in the blanks the words that are omitted. The words, which you write in, must give the proper meaning so that the story reads correctly. The word, which you fill in, must not only give the proper meaning to the sentence but to the story as a whole.

Material.--Use the completion test-sheets, Joe and the Fourth of July, for grades three, four and five; and The Trout, for grades, six, seven and eight.

Results.--In scoring the papers, allow one credit for each blank correctly filled. The norms are shown in plates IX and X. It will be noticed that the boys excel in the Trout story. This is doubtless because the story is better suited to them on the ground of their experience and interest.

JOE AND THE FOURTH OF JULY

Joe ran errands for his mother and took care of the baby until by the Fourth of July his penny grew to be a dime. The day before the Fourth, he went down town all by himself to get his fire works. There were so many kinds he hardly knew which to buy. The clerk knew that it takes a long time to decide, for he had been a boy himself not very

Plate IX. Completion Test--Joe and the fourth of July

Plate X. Completion Test--The Trout

long ago. So he helped Joe to select the very best kinds. "When are you going to fire them off?", asked the clerk. "I will fire them very early tomorrow," said the boy. So that night Joe set the alarm clock, and the next morning got up early to fire his firecrackers.

THE TROUT

The trout is a fine fish. Once a big trout lived in a pool close by a spring. He used to stay under the bank with only his head showing. His wide-open eyes shone like jewels. I tried to catch him. I would creep up to the edge of the pool where I could see his bright eyes looking up.

I caught a grasshopper and threw it over to him. Then there was a splash in the water and the grasshopper was gone. I did this two or three times. Each time I saw the rush and splash and saw the bait had been taken.

So I put the same bait on my hook and threw it over into the water. But all was silent. The fish was an old one and had grown very wise. I did this day after day with the same luck. The trout knew there was a hook hidden in the bait.

RESULTS

The Group mental age is obtained by averaging the eight mental ages as secured from the norms for each test. For example, Case number one has a grade of 9 in the Completion test. By reference to Plate IX we read her age for this test as 8 years. Since 12.1 is the lowest norm, and the norm for

8 year old girls, we read as her age the nearest age to which she approaches. In the Word Building test her score is 13. By reference to Plate VIII we find her mental age in this test to be 12 years, since her score falls between 12.1 and 13.5 which are the upper and lower limits, respectively, of the twelve year norm for girls. The scores for the remaining tests are in like manner converted into mental ages. To secure the final mental age, as indicated by a combination of the eight tests, the eight mental ages are averaged. The average age thus secured is the mental age of the subject. The scores made by each individual in each test are given in the following table.

Case No.	Compl.	Word Bldg.	Free Ass'n.	Opp.	Subs.	R. Mem. Conc.	R. Mem. Abst.	Log. Mem.
1	9	13	31	12	12.5	17	14	23
2	20	4	36	27	14	22	21	38
3	15	11	32	20	14.7	26	21	37
4	15	4	25	18	14	23	17	32
5	19	8	36	22	14.8	17	15	32
6	4	6	22	2	13.7	15	10	27
7	18	10	33	19	14.3	22	17	40
8	16	8	32	18	7.5	23	18	36
9	19	16	45	24	19.1	24	21	38
10	19	9	22	20	8.3	22	19	34
11	20	8	32	24	8.1	26	21	27
12	18	8	33	14	11.7	21	16	38
13	20	13	43	24	16.8	22	22	31
14	7	4	22	9	9.7	14	17	24
15	17	9	36	15	12.3	20	14	37
16	17	11	39	15	10.7	19	18	35
17	19	8	15	20	8.7	21	20	28
18	11	2	26	6	10.5	18	13	32
19	19	8	41	23	11.1	21	16	25
20	20	8	30	23	14.1	24	20	39
21	17	11	23	18	9.6	23	21	32
22	18	5	29	15	8.3	29	14	23
23	19	16	41	23	11.8	41	21	30
24	20	14	23	15	6.1	23	18	36
25	16	4	27	12	16.5	27	14	27

Case No.	Compl.	Word Bldg.	Free Ass'n.	Opp.	Subs.	R. Mem. Conc.	R. Mem. Abst.	Log. Mem.
26	18	6	49	30.3	20.1	27	23	42
27	18	9	40	23	14.1	22	21	40
28	12	3	38	24	13.3	22	24	27
29	19	3	3	6	7.7	19	22	19
30	19	5	37	27	12.1	26	28	32
31	19	7	31	24	12.3	20	26	41
32	19	9	37	18	12.1	23	17	34
33	18	8	44	25	13.1	17	22	41
34	16	6	38	18	13.5	19	18	35
35	13	3	36	21	13.6	24	20	40
36	17	2	40	18	8.7	21	20	40
37	20	9	28	20	17.1	23	20	42
38	15	7	38	17	14.8	23	20	31
39	20	11	48	29	12.3	24	24	39
40	16	1	22	14	9.1	19	11	20
41	19	9	53	30	10.1	30	24	48
42	19	11	34	25	14.3	23	20	44
43	20	5	26	20	15.1	22	21	42
44	18	2	28	4	14.2	21	19	44
45	19	7	41	22	13.0	22	15	30
46	17	3	6	25	12.6	25	24	30
47	18	3	61	26	18.3	21	22	40
48	18	7	46	35	11.3	22	14	31
49	19	3	33	21	10.7	28	21	41
50	20	8	41	24	12.6	27	21	39

Case No.	Compl.	Word Bldg.	Free Ass'n.	Opp.	Subs.	R. Mem. Conc.	R. Mem. Abst.	Log. Mem.
51	20	2	41	22	11.7	26	25	37
52	15	7	45	9	17.4	22	26	28
53	23	8	41	9	13.4	22	26	52
54	18	10	27	6	12.8	20	22	30
55	9	7	33	7	8	23	21	33
56	26	8	49	10	16	25	24	33
57	12	9	39	8	6.1	22	22	33
58	23	8	53	7	18	26	25	31
59	18	11	50	7	15	26	21	41
60	29	7	49	11	18.8	26	22	29
61	27	14	42	8	19	27	20	29
62	25	12	59	11	15.2	27	25	42
63	27	7	36	9	14	25	21	38
64	27	7	47	12	25	25	23	37
65	20	12	51	8	21.6	24	23	26
66	18	8	64	14	17.8	26	22	49
67	18	6	48	8	16.2	26	18	28
68	20	11	53	6	17.4	26	20	36
69	23	7	43	10	12.2	26	25	51
70	28	12	44	8	15.6	18	20	41
71	31	12	50	9	16.2	26	28	52
72	31	15	47	11	12	27	23	31
73	23	9	51	7	13.4	24	27	27
74	26	7	38	8	20	26	21	49
75	26	15	48	9	14	21	25	43
76	18	6	59	12	25.4	25	21	26

Case No.	Compl.	Word Bldg.	Free Ass'n.	Opp.	Subs.	R. Mem. Conc.	R. Mem. Abst.	Log. Mem.
77	23	11	51	7	15.8	25	23	35
78	27	5	41	9	17.2	28	20	36
79	19	10	45	9	9.2	22	24	19
80	24	7	59	10	17.8	25	21	31

APPENDIX II

Explanation of, and Directions for using the
Revised Point Scale.

Below are given the directions for using the Point Scale tests for mental ability. The directions are fairly explicit, and should be followed as closely as the situation permits. Of course it is absolutely essential that the examiner use discretion, and if one form of expression or explanation is not intelligible to the child, care should be taken that a clear understanding is established by some other form of statement.

The material for giving these tests may be secured from the C. H. Stoelting Company, Chicago, Illinois. We present below the form of record blank used in connection with the Point Scale.

The examiner should find out by devious methods whether the subject has any knowledge of the tests to be given. This usually requires but a few minutes. He should then explain briefly what he is going to do and what is expected of the subject. It must be made clear that the subject is to try to answer all questions asked him--even those he is uncertain about. The examiner must neither help the subject nor inform him of his mistakes, but he should always encourage him and show satisfaction with his answers, whether they be correct or incorrect.

The tests are arranged in order of increasing difficulty.

DATE.....

EXAMINED BY.....

NAME.....

DATE OF BIRTH.....

Test

Credits

1. Chooses, twice, prettier in each of three pairs of pictures, (1 each)
2. Sees picture lacks: (a) arms; (b) nose; (c) mouth (d) eyes. (1 each)
3. Compares, twice: (a) Lines, 5 and 6 cm. (1)
(b) Weights, 3 and 12 grams (1)
(c) Weights, 6 and 15 grams (1)
4. Memory span for digits.
(a) 374. 581. (1)
(b) 2947. 6135. (1)
(c) 35871. 92736. (1)
(d) 491572. 516283. (1)
(e) 2749385. 6195847. (1)
5. Counts backward: 20-1 (4); 15-1 (3); 10-1 (2); 5-1 (1)
6. Repeats: (a) It rains. I am hungry. (1)
(b) His name is John. It is a very fine day. (1)
(c) The sun is very large and red. Our train was more than two hours late. (2)
(d) It is not necessary to hurt the poor little birds. It is night and all the world rests in sleep. (2)
7. Reaction to three Binet pictures: enumeration, (1 each); description, (2 each); interpretation, (3 each).
(a) Man and boy
(b) Man and woman
(c) Man
8. Arranges weights: two trials. All correct but one (1); correct (2). Trial 1. Trial 2.
9. Compares: (1 or 2 each)
(a) Apple and banana
(b) Wood and glass
(c) Paper and cloth
10. Defines in terms of use, (1 each); superior to use, (2 each).
(a) Spoon (c) Horse
(b) Chair (d) Baby

RECORD BLANK FOR YERKES-BRIDGES POINT SCALE EXAMINATION

AGE.....MENTAL AGE.....COEFFICIENT 1.A...

NATIONALITY.....SCHOOL GRADE.....TOTAL CREDITS.....

Test	Credits
11. Resists suggestions: (1 for each of three resistances)	
12. Copies (on back of this sheet) (a) square (1 or 2); (b) diamond (1 or 2).	
13. Gives words for three minutes; 30-44 (1); 45-59 (2); 60-74 (3); 75- (4) 1st half minute 2nd 3rd 4th 5th 6th	
14. writes (on back of this sheet) sentence containing Boston, money, river. Three words in two (2); three words in one (4).	
15. Comprehends questions: (2 each) (a) Missed train (b) Someone unkind (c) Action versus words (d) Forgive easier	
16. Draws(on back of this sheet) designs from memory, after 15 sec. exposure. (a) (1 or 2); (b) (1 or 2)	
17. Sees absurdity: (1 each) (a) Swinging cane (b) Unfortunate cyclist (c) Three brothers (d) Guide-post directions (e) Last car	
18. Puts dissected sentences together: (2 each) (a) My teacher (b) A good dog (c) We started	
19. Defines: (a) Charity (2) (b) Obedience (2) (c) Justice (2)	
20. Analogies: (1 each) (a) Oyster is to shell as banana is to (b) Arm is to elbow as leg is to (c) Head is to hat as hand is to (d) Truth is to falsehood as straight line is to (e) Known is to unknown as present is to (f) Storm is to calm as war is to	

YERKES-BRIDGES POINT SCALE REPORT

NAME.....SEX.....
 AGE.....GRADE.....BIRTH.....
 NATIONALITY.....POINTS.....P.S. AGE.....COEF. I.A.....

1.	a	b	c		11.	a	b	c	
2.	a	b	c	d	12.	a	b		
3.	a	b	c		13.				
4.					14.	a	b		
5.					15.	a	b	c	d
6.	a	b	c	d	16.	a	b		
7.	a	b	c		17.	a	b	c	d e
8.	a	b			18.	a	b	c	
9.	a	b	c		19.	a	b	c	
10.	a	b	c	d	20.	a	b	c	d e f

TEST I. AESTHETIC COMPARISON AND JUDGMENT

The Three pairs of Binet pictures constitute the materials for this test. In the first figure the pairs (a), (b) and (c) are arranged as they are ordinarily used in the Binet Scale; in the second figure the positions of the members of the pairs are reversed. With a sheet of paper or cardboard over pairs (b) and (c), present pair (a) of the first figure to the subject, asking "Which is the prettier of these two faces?" (If prettier is unintelligible, ask "Which do you like the better?") Record the subject's judgment and immediately expose pair (b), repeating the question. The same procedure is followed for pair (c). If all of the judgments have been incorrect, the test may be considered complete, but if some or all have been correct, the examiner should turn to the second figure and repeat the procedure. Two correct judgments are required for a success, whereas one incorrect judgment constitutes a failure. The two correct judgments are demanded for each part of this test in order to avoid the influence of guessing. Credit of 1 point is given for success in each of the three parts of the test (for each pair of correct judgments).

TEST II. PERCEPTION AND COMPARISON OF PICTURES

(MISSING PARTS)

Four Binet pictures are used. Present the figure of a woman, asking simply "What is missing in this picture of a woman?" If the subject responds "hands" or "arms," pass on to the next part of the test; but if, instead, he says, "hat,"

ask "what else?" If , again, he replies incorrectly, consider the attempt a failure and pass on to the next comparison, (b). With the faces (c) and (d) of the next figure covered, present to the subject face (b), asking "What is missing in this face?" If the subject replies "an ear," ask "what else?" If to this he replies incorrectly, pass on to the next part of the test. Present the next face (c), keeping face (d) covered, repeating the question, "What is missing in this face?" As in the previous parts of the test, give two chances, and no more. Present next, in like manner, face (d). The correct responses for these four missing part questions are "arms" or "hands," "eye" or "eyes," "mouth" and "nose." Credit of 1 point should be given for each correct response.

TEST III. COMPARISON OF LINES AND WEIGHTS

The materials are two lines, 5 and 6 centimeters long, respectively, by 1 millimeter wide, and 3 centimeters apart, and four weighted blocks 22 millimeters in their several dimensions and weighing, respectively, 3, 6, 12 and 15 grams.

(a) Present the lines as they appear on the card with the longer one above, saying to the subject "Which is the longer of these two lines?" If the answer is incorrect, proceed no farther; but if correct, remove the page from view, turn it upside down, and present it to the child with the longer line below. If the response is again correct, record success; if incorrect, failure. This procedure is to obviate the possibility of a chance correct response. As in the case of test 1, the subject must here make two correct judgments in order to receive full

credit, whereas one incorrect judgment, whether it occurs in the first or the second trial, constitutes a failure.

(b) The examiner next places before the subject the two blocks weighing 3 and 12 grams, respectively, leaving a space of about 5 centimeters between them, and saying "I wish you to tell me which is the heavier of these two blocks." If the subject merely points to a block and says "this one," ask "How do you know?" and if he still hesitates to touch them, say "You may touch them if you wish to." Beyond this, by way of encouragement or suggestion, the examiner must not go. He must carefully avoid suggesting by word or act the lifting of the weights as a method of comparing them, but he may say "You may touch them if you wish to," since otherwise certain young children may think that it is not allowable for them to touch the cubes.

If the subject responds correctly, by lifting the weights and selecting the heavier one, the blocks should be reversed in position and a second trial should be given. If again a correct judgment is made, success should be recorded.

(c) In precisely the same manner, the blocks weighing, respectively, 6 and 18 grams should be presented for either one or two judgments according to the nature of the first response.

In this test, 1 point credit is given for each successful comparison (each pair of correct judgments) for parts a, b, and c. A single incorrect judgment constitutes a failure in any part of the test.

TEST IV. MEMORY SPAN FOR DIGITS

The materials used for the test are presented in full on the record blank, and they are also reproduced below.

	1st trial	2nd trial	Credit
(a)	374	581	(1)
(b)	2947	6135	(1)
(c)	35871	92736	(1)
(d)	491572	516283	(1)
(e)	2749385	6195847	(1)

The examiner should say, "Listen, and repeat exactly what I say." He should then distinctly and at the rate of two digits per second, in a perfectly monotonous tone, repeat the digits under trial 1 (a),--"3, 7, 4." He then pauses for the subject's response. If the subject fails to grasp the idea and makes no response, he should be told again to listen carefully and say just what the experimenter says. Then the same group should be re-presented. If the subject repeats them correctly, the experimenter immediately passes on to the group of four digits, trial 1 (b),--"2, 9, 4, 7." But if, instead, the subject fails correctly to repeat group (a) under trial 1, he is given a second chance under trial 2, with the digits,--"5, 8, 1." If he fails in this second trial, the test is discontinued, but if he succeeds, the experimenter credits him with 1 point and proceeds to the next larger group of digits. This needs to be especially emphasized, since we have noted that examiners are prone to overlook this rule, and if a subject fails in both trials, to credit him with a zero for that particular part of the test, and to proceed with the next part. The rule is, as is distinctly stated above, to discontinue the test if a subject fails in both trials for a given number of digits.

Credit of 1 point is given for each of the five parts of the test.

TEST V. COUNTING BACKWARD

No printed material is necessary. Say to the subject, "I wish you to count backward from 20 to 1 like this, 25, 24, 23, 22, 21"--at this point pause and wait for the subject to continue the counting. If he is unable to make a start, the experimenter should himself continue "20, 19, 18, 17, 16"--and pause again to give the subject an opportunity to take up the counting. If once more the subject fails to make a start, the experimenter should continue "15, 14, 13, 12, 11"--when he again pauses for a few seconds. If the subject is incapable of response, the examiner should count "10, 9, 8, 7, 6"--and once more pause to give the subject a chance.

If the subject takes up the counting at 20 and continues without a mistake to 1, 4 points credit should be given. If he makes a single mistake (reversal or omission), he should be asked to repeat, and if the mistake is corrected, full credit should be given. Otherwise, he should be credited with correct response for counting from the next multiple of 5 below his mistake. For example, if the count is "20, 18, 19, 17, 16," and so on correctly to 1, and this mistake is made likewise in the second trial, the subject is credited with 3 instead of 4 points. If the subject counts correctly from 15 to 1, 3 points credit are given; from 10 to 1, 2 points credit; from 5 to 1, 1 point. The rule concerning a single mistake applies, no matter where the counting is begun. If more than one mistake is made, a second

trial should not be allowed.

In this test not more than 30 seconds should be allowed the subject for counting backward.

TEST VI. REPETITION OF SENTENCES

For this test the materials appear both in the record blank and below. They consist of four sentences, as follows:

- (a) It rains. I am hungry.
- (b) His name is John. It is a very fine day.
- (c) The sun is very large and red. Our train was more than two hours late.
- (d) It is not necessary to hurt the poor little birds. It is night and all the world rests in sleep.

In giving this test the examiner should say to the subject, "Listen carefully and repeat just what I say." He should be sure that the subject is attending, and should then read slowly and distinctly the sentences under (a). If for any reason the subject fails to make any response, (a) should be read to him again and a second chance thus given him to get started. In case of failure to repeat correctly "It rains. I am hungry," the examiner should present the sentences under (b), and if failure occurs in this part also, the test should be discontinued.

Great care should be taken to gain the subject's attention and to repeat the sentences distinctly and fairly slowly.

For perfect repetition of (a), 1 point credit is given; for perfect repetition of (b), likewise 1 point credit; for perfect repetition of (c) and of (d), each, 2 points credit. In no case is credit given for imperfect repetition, unless the examiner is convinced that the subject misunderstood a word.

TEST VII. DESCRIPTION OF THREE BINET PICTURES

The experimenter should present picture (a), saying, "Please look at this picture and tell me about it." The form of statement is important. If the examiner says "Look at this picture and tell me what you see," enumeration rather than description or interpretation is likely to be obtained from the young child. In response to the examiner's request, "Please look at this picture and tell me about it," the subject may enumerate the parts of the picture, may describe it in terms of composition and action, or may interpret it in terms of meaning or purpose.

He enumerates if he names, separately, the objects which he recognizes in the picture, without indicating any of their relations--for example, in the case of picture (a): man, boy, wagon, bucket; or picture (b): woman, man, bench, light; or picture (c): man, sofa, tables, chair.

He describes if he mentions the characteristics of the objects, their relations, actions, the nature or condition of the situation. Thus, for picture (a) : a man and a boy pulling a cart; picture (b): a man and a woman sitting on a bench in the park; picture (c): a man looking out of the window.

He interprets if he goes beyond the visual impression, or its immediate perceptual value, and attempts to give the meaning or emotional value of the picture. Thus, for picture (a): a man moving, or the load is heavy, or they are Jews, or they couldn't pay their rent; picture (b): they are poor and miserable, or they have no home, or the man is praying; picture (c): a prisoner, or a man who is sad and lonesome, or he wants to get out.

Obviously, interpretation is usually accompanied by description, and description usually involves enumeration. For example, under picture (a): "a man moving" is classed as interpretation because of the use of moving. Had the subject said "a man pulling," it would clearly be description, whereas the characterization of the act as "moving," although descriptive, is in addition interpretative.

The subject having responded as best he can to picture (a), and the experimenter having made a record of the response, picture (b), is presented with a repetition of the request, "Please look at this picture and tell me about it." This, in due course, is followed by picture (c).

In no case should the experimenter content himself with recording merely the credits for the test. Instead, he should do his best to record precisely what the subject says, since he can then at his leisure decide any difficult questions concerning credits.

The rules for credit in this test are: 1 point for enumeration in the case of each of the three pictures; 2 points for description, whether or not accompanied by enumeration, and 3 points for interpretation, whether or not accompanied by description. This rule may be briefly summarized by saying that in the case of mixed response, credit should be given for the highest type which appears.

TEST VIII. ARRANGING CUBES ACCORDING TO THEIR WEIGHT

For this test the materials are five wooden cubes, of which

four are used in test 3. These cubes measure 22 millimeters in each direction, and weigh, respectively, 3, 6, 9, 12, 15 grams. They should be inconspicuously marked by the experimenter so that he can recognize them without having the subject's attention attracted to the markings.

The examiner should place the five cubes on the table before the subject within easy reach, and should say, "These little blocks are all the same size, but they weigh different amounts. Some are heavier and some are lighter. I wish you to place the heaviest one here; and next to it, here, the one which is a little less heavy than that; and then the one still a little less heavy; and finally, here, the lightest one of all." While saying these words the examiner should point to the position on the table where each block belongs. It is essential to give this explicit form of direction to young children, whereas for older children or adults, it is necessary only to say, "I wish you to arrange these blocks in order by weight, beginning with the heaviest one, here, and placing the lightest one here, at the opposite end of the series." By experience the examiner learns to what extent it is necessary to follow the detailed directions. It is obviously a waste of time to say so much to the intelligent adult, or even to the normal child of ten.

If the arrangement first made is not correct, a second trial should be given, and the subject should be cautioned to be careful and not to hurry too much.

Credit of 2 points is given for one correct arrangement, and 1 point, if in either the first or second trial the arrangement

is correct, except two consecutive blocks are interchanged.

TEST IX. COMPARISON OF THREE PAIRS OF OBJECTS

The three pairs of objects are:

- (a) apple and banana
- (b) wood and glass
- (c) paper and cloth

The examiner should proceed in this manner: "You know what an apple is; you know what a banana is? Tell me how they are different from one another." In the same way, questions are asked for wood and glass, and paper and cloth.

Many children are satisfied when they have given one point of difference, such as, for example, "An apple is round and a banana is long" or "An apple is red and a banana is yellow." In such instances the examiner should say, in order to make certain that the child is unable to go farther, "What other differences are there?" He should not, in any case, give other aid or encouragement than this.

Credit of 1 point is given for one correct point of difference, in the case of each pair of objects, and 2 points for two or more correct points of difference, in the case of each pair.

TEST X. DEFINITIONS OF CONCRETE TERMS

The terms, appearing both in the record blank and below, are: (a) spoon; (b) chair; (c) horse; (d) baby.

The examiner asks "What is a spoon?" pauses for the subject's reply, records the same, and then proceeds to ask, similarly, "What is a chair?" and so on. Since there are some

difficulties in awarding credits in this test, we shall give numerous examples. The general rule is to give a credit of 1 point for any definition in terms of use, and 2 points for any definition which is superior to use.

Examples of responses for which no credit should be given are the repetition of the word or pointing to the object and saying "that."

Examples of satisfactory definition in terms of use are: "a spoon is to eat with" or "something to eat with"; "a chair is to sit on" or "something to sit on"; "a horse is to drive" or "something to drive"; "a baby is to cry" or "to play with" or "to take care of."

The following are examples of definitions barely superior to use; "a spoon is an instrument or article to eat with"; "a chair is an instrument or article to sit on" or "a piece of wood" or "furniture to sit on"; "a horse is an animal" or "a beast of burden"; "a baby is a small child." Any definition in which use is preceded by the word "object", "article," "instrument," should be rated as superior to use; whereas, if the word "thing" or "something" is used instead of "object," "article" or "instrument," the definition should be classified as in terms of use.

Definitions descriptive of the objects are obviously superior to use, and it is needless to give examples. But the most perplexing of all to the inexperienced examiner are certain single-word definitions. These may be classed as, first,

synonyms. For these 1 point credit should be given. Examples are: baby=infant or child; chair=stool or rocking=chair. Second, are the single-word descriptions which are not synonyms, but name some particular part or quality of the object, as, for example: spoon=silver; chair=wood; horse=meat; baby=skin. For all of these, and the like, only 1 point credit should be allowed. Third, single-word definitions which involve classification, as, for example: horse=animal; baby=person or human being; chair=furniture. For all such definitions 2 points of credit should be allowed.

TEST XI. RESISTANCE OF VISUAL SUGGESTION

The materials for this consist of the six pairs of lines. In each case the members of a pair are separated by 1 centimeter. The lines are approximately 1 millimeter in width. The measurements for the several pairs are as follows: pair (a), lefthand member 4 centimeters, righthand member 5 centimeters; pair (b), 5 centimeters and 6 centimeters, respectively; pair (c), 6 centimeters and 7 centimeters, respectively; pairs (d), (e), (f), 7 centimeters and 7 centimeters.

As the experimenter presents the lines of pair (a) he asks, "Which is the longer of these two lines?" He notes the response, preferably remembering rather than stopping to record it, turns immediately to pair (b), and repeats his question. He next presents pair (c), again repeating the question in precisely the same way. Without needless delay, he next presents the lines of pair (d), changing the form of question to "and of these?" and repeating the same question for each of the remaining pairs,

The subject's judgment in the case of each of the six pairs should be recorded.

If any one of the judgments for the first three pairs of lines, (a), (b), (c), is incorrect, no credit should be given for the test. If, in case of the pairs of lines (d), (e), (f) the subject replies that the lefthand member of the pair instead of the righthand member is the longer, or if he says that they are equal, 1 point credit is given for each of the three pairs. That is, 1 point credit is given for each resistance of the suggestion, from the first three pairs of lines, that the righthand member of the pair is the longer.

TEST XII. COPYING OF SIMPLE GEOMETRICAL FIGURES

For this test the materials are a square, 4 centimeters on the side (inside measurements) with lines 1 millimeter wide; and a diamond 5 centimeters on the side (inside measurements) with lines 1 millimeter wide.

The experimenter proceeds with part (a) of the test by placing the square before the child and saying "Please draw on the back of the record sheet with this pencil a figure just like the one before you." It is, of course, absolutely necessary, if comparable results are to be obtained, that the square be placed directly in front of the subject, so that he does not get a distorted image of it.

As soon as the square has been completed, the experimenter should proceed with part (b) of the test by presenting the diamond with the repetition of his former request in precisely the same words. It is essential that the figure of the diamond

be placed before the subject with the orientation which it has in the figure.

The verbal directions are for (a), the square: give 2 points for any figure which shows approximate equality of both lines and angles; 1 point credit for a figure which shows approximate equality of angles but not of lines, and 1 point for a figure which shows approximate equality of lines but not of angles; for anything poorer, no credit should be given.

In the case of (b), the diamond, give 2 points credit for any figure which shows approximate equality of both pairs of opposite angles; and 1 point credit for any figure which shows approximate equality of only one pair of opposite angles; no credit should be given for anything which is indistinguishable from a square or unidentifiable readily as a diamond.

TEST XIII. FREE ASSOCIATION

The only materials used in this test are the examples. These the examiner should thoroughly commit to memory, so that he can give them quickly, surely, and without reference to the printed page. The procedure should be as follows: To the subject the examiner should say, "I wish you to say all the words that you can think of in three minutes. When I say 'ready,' you begin and say as many words as you can before I tell you to stop. Say such words as pin, table, grass, trees, clouds, horse, dog, brook. All ready! Begin."

With either a stop-watch or the second-hand of an ordinary watch to guide him, the experimenter keeps track of the passage of time, while recording, in the space for the

appropriate half-minute on the record sheet, a stroke for each word uttered. If the child stops, as though assuming that enough words had been given, at the end of a half-minute period, the experimenter should say, "Go on, please," and he should repeat this, if necessary, at the end of each half-minute of the three-minute period. Repeated words, if recorded the second time, should be indicated by a dot above the stroke. But it is even more convenient to omit them entirely, and it is an advantage in counting the words if the strokes are grouped in fives by crossing each successive group of four.

Especially important in this test is the giving of the same words as examples and the stimulation or attraction of attention to the task, if necessary, at the end of each half-minute.

Credit is given for words or phrases (except in the case of repetitions) as follows: 1 point credit for from 30 to 44 words, inclusive; 2 points for from 45 to 59 words, inclusive; 3 points credit for from 60 to 74 words, inclusive; 4 points credit for 75 and upward.

TEST XIV. THE USE OF THREE GIVEN WORDS IN ONE SENTENCE

On the back of the record sheet the examiner should write plainly the words--Boston, money, river. He next shows them to the subject and reads them over twice. Having thus prepared the way, he should say "I wish you to make one sentence in which the three words Boston, money, and river are used."

The examiner must make perfectly certain that the subject understands the three words, knows what is meant by a sentence,

and grasps the fact that one, not two or more sentences, is required. It is especially necessary to emphasize that the three words are to be used along with other words in making one good sentence. The sentence need not be written by the subject unless he prefers to do so, but should be recorded by the examiner.

Disjointed ideas connected by "and" are to be rated as two or more sentences--for example, "There are many rivers in Boston, and one can spend his money." This should count as two sentences. Whereas, "I crossed the river to Boston to spend my money" is obviously one sentence. Satisfactory, also, are complex sentences, such as, "The rivers in Boston don't bring much money to the city because they are not navigable."

Credit of 4 points is given if the three words are used in one sentence; 2 points, if they are used in two separate sentences, or in sentences very loosely connected, and no credit for more than two sentences.

TEST IV. COMPREHENSION OF QUESTIONS

The materials for this test are the following four questions, each of which is indicated by two or three words on the record blank:

- (a) If you were going away and missed your train, what would you do?
- (b) If someone has been unkind to you and says he is sorry, what should you do?
- (c) Why should you judge a person by what he does rather than by what he says?
- (d) Why do we more readily forgive an unkind act done in anger than one done without anger?

The examiner should repeat question (a) slowly and distinctly

twice, and then encourage the subject, if necessary, to make some reply. The answer should be recorded on the record blank either in full or in substance. The examiner should in like manner present questions (b), (c), and (d).

Satisfactory replies are as follows: (a) "wait for the next" or "take an electric car"; (b) "forgive him" or "pardon him"; (c) "because one is more sure of acts than of words" or "because one may lie in what he says, but you're sure of what he does"; (d) "an angry person is not responsible or does not realize what he does" or "an act done in anger is not intentional." For these, or answers expressing like ideas, full credit of 2 points for each question is allowed.

For less comprehensive and intelligent answers, such as (a) "go home", (b) "be kind to him" or "do nothing", (c) "actions speak louder than words", partial credit of 1 point for each question is allowed.

TEST XVI. DRAWING DESIGN FROM MEMORY

The Two Binet designs are used for this test.

The examiner should say to the subject, "I am going to show you two drawings. After you have looked at them, I shall take them away and ask you to draw both of them from memory. You must look at them carefully because you will see them for only fifteen seconds, and that is a very short time."

The examiner then presents the designs in the orientation indicated by the figure, and with either a stop-watch or the second-hand of an ordinary watch, determines properly the interval of exposure. The subject should then be given opportunity,

immediately, to reproduce the designs in pencil on the back of the record sheet.

Credit of 2 points is given for each correct reproduction, even although the lines of the drawings are irregular. For imperfect reproductions, such as those in which the rectangle is placed in the center of the prism section, or the small squares of design (b) turned outward instead of inward, 1 point credit is given. No credit is given for anything poorer than the above.

TEST XVII. CRITICISMS OF ABSURD STATEMENTS

The following five absurd statements constitute the material for this test:

- (a) We met a finely-dressed gentleman. He was walking along the street with his hands in his pockets and swinging a cane.
- (b) An unlucky bicycle rider fell on his head and was instantly killed; they took him to the hospital and fear that he cannot get well.
- (c) A little boy said: "I have three brothers, Paul, Ernest, and myself."
- (d) At the crossroads was a guide-post with the following directions: "Boston, three miles and a half; if you can't read, inquire at the blacksmith shop."
- (e) It has been found that the last car of the train is damaged most in case of accident. It, therefore, would be better to leave off the last car.

The examiner should proceed by saying, "I am going to read some sentences to you. In each one of them there is something foolish or absurd. (He should make sure that the child understands what is meant by 'foolish' or 'absurd.')

Listen carefully and tell me each time what it is that is foolish."

He should then repeat (a) slowly and distinctly twice and ask, "Now, what is foolish about that?" So, in turn, each of the five

parts of the test should be presented, with sufficient interval between the parts to permit the examiner accurately to record the subject's response.

After a reply has been made, it is safest to question a subject, especially if a young child, to make sure that he really appreciates the absurdity. For example, the child may reply to question (c) "myself," and in answer to further questioning he may say that the speaker should have used his own name. This, of course, indicates that he does not appreciate the absurdity.

Credit of 1 point is given for each absurdity discovered; no partial credits are allowed.

TEST XVIII. CONSTRUCTION OF SENTENCES

For this test the three groups of words should be used. The arrangement and spacing is important--hence the words are not reproduced at this point, since were they, the examiner might make use of them in other than the regular form. These three groups are indicated as parts (a), (b), and (c) of the test.

The order is important, since (a) is much easier than either (b) or (c), and (c) is distinctly more difficult than (b).

The examiner should say to the subject, "You see these words. Read them to me, please." And having assured himself that the subject recognizes the words, he should continue, "Now please arrange them so that they make sense. Make one good sentence out of them, using every word that you read, but no other words."

The subject should be allowed only three minutes for actual

work on this test. The sentences are to be spoken, not written.

The most natural form for the sentences follows: (a) "I asked the teacher to correct my paper"; (b) "A good dog defends his master bravely"; (c) "We started for the park at an early hour." For each of these sentences, credit of 2 points is allowed; but credit should be allowed also for other sentences, which, although not as natural to the adult as the above, still make perfect sense and are unquestionably, from the childish standpoint, perfectly satisfactory. Such, for example, are: under (a), "I asked my teacher to correct the paper"; under (b), "A master defends his good dog bravely" or "A good master defends his dog bravely"; under (c), "We started for the park at an early hour" or "We started for the park at an hour early." For such sentences full credit should be allowed, and for any others including all of the words so arranged as to make good sense and to convince the examiner that the child both understands his task and is able to meet all except the requirements of conventional form and elegance of expression.

TEST XIX. DEFINITIONS OF ABSTRACT TERMS

The three abstract terms (a) charity, (b) obedience and (c) justice are used.

The examiner should say simply, "What does charity mean?" and after recording the response, "What does obedience mean?" and so on.

The definition of charity should express two ideas, that of unfortunates and of kindness shown to them. If the subject

replies "love," ask him "what sort of love?" or "to whom is the love shown?" The definition of obedience should be "to do what you are told," or something similar. If the subject says "to obey," ask him what obey means. The definition of justice should express the idea of persons being treated according to their merits, of fairness, or of protection accorded to people and their interests. If the subject replies "justice of the peace" or names an individual, he should be told that that is not the kind of justice meant and should be given another trial.

For an acceptable response, as above defined, credit of 2 points is given in the case of each of the three terms; no partial credits are allowed.

TEST XX. ANALOGIES

The six analogies presented below are employed:

- (a) Oyster is to shell as banana is to--(skin or peel).
- (b) Arm is to elbow as leg is to--(knee).
- (c) Head is to hat as hand is to--(glove or mitten).
- (d) Truth is to falsehood as a straight line is to--(a crooked or curved line).
- (e) The known is to the unknown as present is to--(future or absent).
- (f) Storm is to calm as war is to--(peace).

The examiner should proceed as follows: "If I say 'man is to boy as woman is to _____,' what should you say?" He should then pause for a second, and if the subject does not respond "girl," he should himself supply the word and continue, "for girl has the same relation to woman as boy has to man." He should then proceed to give two additional examples, allowing the subject to supply the missing term in each case, or, if he cannot do so, telling him what it is. The examples are: "Boat is to

water as train is to _____" (track); "Chew is to teeth as smell is to _____" (nose). Having made such preparation for the actual test, the examiner should caution the subject, "Now, think well before you speak. Don't hurry." He should then present (a), record the result, and pass on to (b), and so on.

Credit of 1 point is allowed for each correct analogy. What is expected in each case has been indicated above in parentheses.

RESULTS

The Point Scale score as made by each subject, and the corresponding mental age of the subject are given in the following table.

Case No.	Sex	P. S. Score	P. S. Age
24	M	71	11.5
13	F	71	11.5
5	M	66	11.0
20	F	80	12.0
22	M	62	9.7
21	F	70	11.4
11	M	73	11.8
25	F	62	10.5
8	M	80	12.7
10	M	78	12.4
14	M	63	9.9
49	F	72	11.5
12	F	71	11.5
17	M	61	9.6
16	F	65	11.1
31	M	88	15.0
9	F	75	11.7
19	F	75	11.7
3	F	66	11.2
4	F	47	8.5
18	M	59	9.4
2	M	72	11.6
34	M	74	11.9
33	M	79	12.6
37	F	83	15.0

Case No.	Sex	P. S. Score	P. S. Age
39	F	90	15.0
48	F	68	11.3
26	F	87	15.0
32	F	72	11.5
41	F	93	15.0
27	F	82	15.0
50	M	85	14.7
28	M	68	11.2
66	M	85	14.7
38	F	61	10.0
43	F	61	10.0
52	F	60	9.8
7	F	70	11.4
35	M	69	11.3
36	M	68	11.2
65	F	79	14.0
15	M	60	9.5
42	M	66	11.0
54	F	59	9.6
51	M	77	12.3
59	F	73	11.6
67	F	72	11.5
46	F	63	11.0
77	F	80	12.0
23	F	73	11.6
64	M	92	15.0

Case No.	Sex	P. S. Score	P. S. Age
74	M	91	13.0
72	M	92	15.0
70	M	73	11.8
40	M	63	9.9
63	M	80	12.7
75	M	89	15.0
29	M	53	8.7
44	F	58	9.5
55	M	64	10.0
62	M	66	11.0
80	M	75	12.0
68	F	74	11.6
78	F	77	13.0
58	M	76	12.1
61	F	86	13.0
57	F	66	11.2
76	F	71	11.5
45	M	57	8.1
60	F	79	14.0
1	F	62	10.5
69	M	71	11.5
53	F	80	12.0
6	M	64	10.0
56	M	73	11.8
30	F	67	11.2
71	M	85	14.7

85.

Case No.	Sex	P. S. Score	P. S. Age
47	M	79	12.6
79	F	66	11.2
73	M	66	11.0

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of measuring mental ability

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