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OF THE
Moorhead State Teachers College
MOORHEAD, MINNESOTA

**A Mental Survey in the Training
Department of the Moorhead State
Teachers College, Moorhead, Minn.**

By
T. H. SCHUTTE,
Director Training Department

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A MENTAL SURVEY IN THE TRAINING DEPARTMENT OF
THE MOORHEAD STATE TEACHERS COLLEGE,
MOORHEAD, MINNESOTA

BY

T. H. Schutte, Director Training Department

PREFACE

This article is written not for specialists in Educational Psychology, but for persons in the teaching profession whose educational status is that of normal school graduates, and for persons who have little or no training in the use of educational measurements.

The article should be of value to teachers who are interested in overcoming some of the weaknesses existing in their schools, due to improper classification or lack of understanding the children. It should serve as a very elementary guide to one mode of relief.

T. H. Schutte.

In the latter part of December, 1920, a mental survey was made in the Training Department of the Moorhead State Teachers College of practically all pupils from grades one to eight inclusive. For this purpose three tests were used, the Otis Group Intelligence Scale (Form A, Primary Examination, for grades one to four; and Form A, Advanced Examination, for grades five to eight); the Chicago Group Tests, arranged by Freeman and Rugg, for grades five to eight; and the Army Alpha Group Test, Form 8, for grades five to eight. In addition, the pupils in the various departments of the Training School were ranked as to intelligence on the basis of the judgments of the principals and their associates.

Various reasons prompted the study: (1) the superintendent's desire to become thoroughly familiar with the mental status of the school so that he might proceed more efficiently in his administrative duties; (2) the principals and their associates and the superintendent coincided in the judgment that there was too marked a difference in the abilities of pupils in the various grades; (3) practice teaching requires that the pupils in the various grades in the different subjects be divided into groups, and it was believed that the procedure outlined below would show the student-teacher a scientific mode of procedure in the classification of children for the purpose of instruction and enable the child to progress in harmony with his mental ability; (4) standardized subject-matter tests in the different subjects in the various grades indicated such a wide difference in the accomplishments of pupils that it was clear that a reclassification was desirable; (5) the faculty of the Training School desired to enter on a plan of semi-annual promotion rather than to continue on the plan of annual promotion then in vogue.

In order to make it feasible to enter on a mid-year promotion plan at that time the faculty had to find pupils who would pass from say grade 6B to 7B instead of to grade 6A, as the normal step would be. In other words, the group which would be able to pass from grade 6B to 7B must be a group of pupils who had the mental and physical ability and also the required accomplishment in the various subjects to indicate that they could do the work of both the 7B and the remaining work of the 6A grade in the rest of the year. Those who were accelerated as a result of these tests were those who for the most part had already been singled out

earlier in the year by standardized subject-matter tests. To these pupils special attention had already been given. Thus, most of those accelerants had been progressing at a more rapid pace than the others for some time before the mental survey was made.

The policy of this school is not to permit pupils to skip grades or parts of grades except in the very rare cases where special investigation would warrant such procedure. It is deemed more advisable that a pupil be permitted to work through subject matter as rapidly as possible, but not more rapidly than is consistent with his mental and physical strength.

Before the mental tests were given the principals and their associates ranked the pupils in the different grades as to intelligence. It is necessary that such ranking be made before the tests are given if the best judgment of the teacher is desired, and especially so when it is desired to find how the teachers' judgments of the pupils' intelligence correlates with the results of the tests.

The following specific instructions were given the teachers before they ranked their pupils: "Rank your pupils by grades in the order of their innate intelligence or mental ability as your judgment tells you they should be ranked. Give the brightest pupil, that is, the most intelligent pupil, rank one; the next brightest, rank two; and so on. Remember that performance in subject matter in a certain grade may not be indicative of the pupil's mental ability; a pupil may be too old for his grade or be a repeater, and hence do good work for that grade; or again, a pupil may be too young for his grade, may have skipped a grade, and do poorer work in subject matter than is demanded by the grade standard and yet be very bright. The age of the child, the skipping and repeating of subjects, must not be lost sight of in forming your judgment as to the innate intelligence of a child. It is the child's fundamental or innate mental ability rather than his ability resulting from learning that we desire to find."

The Conditions Revealed

The Otis tests were the first to be used. These were given in all grades from one to eight inclusive, as stated above.

GRADE I

The status of the first grade group can probably be seen best from Table I, which shows for each pupil the chronological age and the mental age in months, the retardation or acceleration in months, and the Intelligence Quotient. (I.Q.)¹

¹The Intelligence Quotient (I. Q.) is the result obtained by dividing the mental age of the child in months by the chronological age in months. Throughout this article the decimal points in the I. Q. are omitted, hence a child just at age has an I. Q. of 100 rather than 1.00.

Table I

Status of 26 first grade children, showing their chronological and mental ages, the acceleration and retardation in months, and the Intelligence Quotient (I.Q.) based on results of Otis Primary Examination Form A.²

Pupil No.	Chronological Age (Months)	Mental Age (Months)	Acceleration (Months)	Retardation (Months)	Intelligence Quotient (I. Q.)
1	73	74	1		101
2	76	79	3		104
3	80	83	3		104
4	77	82	5		106
5	97	102	5		105
6	81	88	7		109
7	78	88	10		113
8	82	94	12		115
9	78	92	14		118
10	89	106	17		119
11	77	95	18		123
12	74	100	26		135
13	79	109	30		138
14	77	116	39		150
15	84	128	44		152
16	82	151	69		184
17	81	81	0	0	100
18	75	75	0	0	100
19	89	78		11	87
20	85	81		4	95
21	96		(Made a score of 14)		? ^{prob.}
			A score of 15 represents a mental age of 72 months.		
22	76	75		1	99
23	77	74		3	96
24	77		(Made a score of 8)		?
25	83		(Made a score of 10)		?
26	73		(Made a score of 4)		?

The group tested consisted of only 26 children. The median score made by this group was 24. This means that the median pupil in our first grade has a mental age of 6 years and 10 months or 82 months.³ But the median chronological age for the group is 6 years and 4 months or 76 months. Hence the median mental age for this group is 6 months greater than the median chronological age.

The range of scores for this group is from 4 to 81. The lowest score given in the Otis norms is 15, which indicates a mental age of 6 years. Thus, we can not tell from this test how far down in mental age our lowest pupil is. The highest score made in the group (81), which indicates a mental age of 12 years and 7 months, or

²For mode of procedure, giving and scoring the tests, the reader is referred to the Otis Group Intelligence Scale, Manual of Directions for Primary and Advanced Examinations, Edition 1920, The World Book Company, Chicago, Illinois.

³The Otis Primary Examination norms (grades 1 to 4) are not given as norms for the various grades but rather for the different ages from 72 months to 155 months.

151 months, was made by a child having a chronological age of 82 months. In this case the child's mental age surpasses his chronological age by 69 months. This child (pupil 16) ranks first in the group as to intelligence but was ranked as tenth by the teacher. The low ranking by the teacher is probably chiefly due to the fact that the child is somewhat reticent and in addition is interested in things other than his school work. It is especially desirable that such children be singled out for special study and be given an individual rather than a group test.

The child (No. 26) making a score of 4 is 73 months old chronologically. This child was ranked 25th in the group by the teacher and as 23.5 by the test. For all practical purposes this difference in ranking may be ignored. This same child was tested by the superintendent about two weeks earlier, when the Stanford Revision of the Binet Tests was used. In this test the child was given an intelligence quotient of 61, which indicates a mental age of 44 months. According to Terman this child is feeble-minded and should doubtless be taught in a special group.⁴

The child mentioned earlier, making the highest score (81) has, according to results from the Otis tests, an intelligence quotient of 184, which places him in the genius group according to Terman's classification.

Of the 26 pupils, two are just at age mentally and are respectively 75 months and 81 months old chronologically. Eight of the 26 children have a mental age lower than their chronological age. The differences are in months 1+, 1, 3, 4, 6+, 11+, 13, 24+. In cases where the plus sign appears we can not tell how much more these children are retarded mentally because the table of norms records no scores lower than 15, which indicates a chronological age of 72 months. All of these children should be given the Stanford Revision of the Binet Tests. Those not more than six months retarded may well be regarded as at age.

Sixteen of the 26 children have apparently a mental age above their chronological age. When, according to Terman, we regard the people whose I.Q. falls between 90 and 110 as normal or of average intelligence, we see that we do not have over 5 pupils below average mentally. Just where four of these five belong must be determined by an individual test.

Three pupils of the group have an I.Q. above 140, which puts them in the genius group; three fall into the very superior intelligence group, having an I.Q. between 120 and 140; and four fall between 110 and 120, or into the superior group; while 11 have an I.Q. between 90 and 110, which places them in the average or normal group.

⁴Terman, *The Measurement of Intelligence*, p. 79.

GRADE II

The median score in the second grade (27 pupils) is 54, the range is from 22 to 72. The chronological ages range from 6 years 2 months to 10 years 9 months. The median chronological age of the group is 88 months (7 years and 4 months) while the median score mentioned above (54) indicates a mental age of 118 months (9 years 10 months). That is, the median mental age of this group is at least 30 months ahead of the median chronological age.

The following table shows the status of this group:

TABLE II
Status of the second grade children; from the results of the Otis Primary Examination, Form A.

No. Pupil	Chronological age in months	Mental age in months	Months Accelerated	Months Retarded	I. Q.
1	84	124	40		148
2	94	133	39		141
3	90	117	27		130
4	88	109	21		124
5	87	123	36		141
6	94	119	25		127
7	91	110	19		121
8	87	115	28		132
9	108	121	13		112
10	111	109		2	98
11	116	111		5	96
12	129	121		8	94
13	91	118	27		130
14	87	87	0	0	100
15	87	95	8		109
16	87	83		4	95
17	90	95	5		105
18	88	152	64		173
19	97	93		4	96
20	91	121	30		133
21	93	110	17		118
22	74	123	49		168
23	88	121	33		138
24	87	126	39		145
25	117	111		6	95
26	88	80		8	91
27	87	118	31		136

The table shows that the chronological ages of the pupils range from 74 months to 129 months, while the mental ages range from 80 months to 126 months. That is, the lowest mental age of the group lacks six months of being as low as the lowest chronological age, and the highest mental age lacks three months of being as high as the highest chronological age.

Nineteen of the 27 pupils have a mental age in advance of their chronological ages. The range of this acceleration is from 5 months to 64 months, with a mean of 28.9 months. The median pupil of

the accelerated group is mentally 28 months ahead of his chronological age.

One pupil in the group is exactly at age, having both a mental and chronological age of 87 months. Seven of the 27 pupils are apparently retarded in their mental ages; such retardation being by the following number of months respectively: 2, 4, 4, 5, 6, 8, 8, months. The average retardation for this group of retardates is 5.28 months. The two pupils retarded 8 months are respectively 88 months and 129 months old chronologically. Note that 129 months is the highest chronological age in the group and that this pupil has the greatest retardation.

The child with the greatest acceleration (64 months) has a chronological age of 88 months, being one of the younger members of the group.

In considering the I.Q.'s we find that the range is from 91 to 173, with a median of 124. Considering all children as normal whose I.Q.'s fall between 90 and 110, as recommended by Terman, there are none in this group who are mentally subnormal. There are six whose I.Q.'s are above 140, which ranks them in the genius group; there are 9 whose I.Q.'s fall between 120 and 140, belonging therefore to the very superior intelligence group. Two have an I.Q. between 110 and 120, which ranks them as of superior intelligence. Ten have an I.Q. between 90 and 110; these, then, are the group of average or normal intelligence.

GRADE III

The median score made by the 21 pupils in the third grade is 57, and the range is from 31 to 71. The chronological ages range from 8 years 2 months to 11 years 2 months. The median chronological age is 112 months (9 years 4 months), while the median mental age is 122 months. That is, the median mental age of the group is 10 months higher than the median chronological age. In the group there are, however, 10 pupils whose mental ages fall below their chronological ages by the following number of months, respectively, 1, 2, 4, 5, 5, 7, 9, 14, 32, 38. The child retarded 38 months has a chronological age of 146 months, the oldest in the group. The child retarded 32 months has a chronological age of 125 months. There are only five in the group who surpass this child in chronological age. Again we see that the most seriously retarded pupils tend to be the older children, which is shown most definitely by their I.Q.'s which are for these children 74 in each case, the lowest in the group.

The average acceleration for the accelerated group of 11 pupils is 18.7 months, while the average retardation for the retardates is 11.7 months.

The acceleration for those who have a mental age in advance of their chronological age ranges from 2 months to 39 months. The

numbers of months these pupils are accelerated are respectively 2, 4, 7, 15, 17, 17, 18, 19, 32, 36, 39. Again, it is the younger pupils of the group who are most accelerated (see table III). The pupils who are accelerated by 32, 36, and 39 months have chronological ages respectively of 100, 98, and 100 months.

The range of I.Q.'s for this group is from 74 to 139 with a median at 103. We note that 10 pupils have an I.Q. below 100 and that two of these fall below 90. The two below 90 should, according to Terman, be regarded as below average or normal. None reach or surpass an I.Q. of 140, hence none rank in the genius group. There are three whose I.Q.'s fall between 120 and 140, which thus rank them as of very superior intelligence; five have an I.Q. between 110 and 120, superior intelligence. Ten have an I.Q. between 90 and 110, these form the average or normal group. Two have an I.Q. below 74, border line deficiency.

TABLE III

Status of the third grade children; from the results of the Otis Primary Examination Form A.

Pupil No.	Chronological Age	Mental Age	Accelerated in months	Retarded in months	I. Q.
1	98	134	36		137
2	100	132	32		132
3	112	127	15		113
4	110	128	18		116
5	129	122		7	95
6	100	139	39		139
7	116	123	7		106
8	112	129	17		115
9	126	121		5	96
10	131	130		1	99
11	111	113	2		102
12	146	108		38	74
13	118	122	4		103
14	141	127		14	90
15	109	128	19		117
16	127	122		5	96
17	100	91		9	91
18	107	103		4	96
19	125	93		32	74
20	98	115	17		117
21	110	108		2	98

GRADE IV

In this group of 25 fourth grade children the median score falls at 68, which represents a mental age of 135 months. The median chronological age is 117 months. That is, the median mental age exceeds the median chronological age by 18 months. The range of score is from 33 to 78, which represents a range in mental age of 93 months to 147 months. The range in chronological age is from 107 months to 143 months. Thus, the mental age of the

group goes both lower and higher than the extremes in chronological age.

The lowest score (33) was made by a pupil of 115 months chronological age; this score indicates a mental age of 93 months. The highest score (78) was made by a child 118 months old chronologically; this score as stated above indicates a mental age of 147 months. Thus, we see that there is a difference of 3 months in chronological age between the highest and lowest in the group, but a difference of 54 months in mental age.

The range of I.B.* for the group is from 62 to 166. The lowest I.B., 62, was made by a child 143 months old chronologically, and 121 months mentally. The highest I.B., 166, was made by a child 118 months old chronologically and 147 months mentally. These two are, then, the dullest and brightest children of the group.

From table IV we see that five pupils have a mental age lower than their chronological age by the following numbers of months, respectively, 1, 6, 7, 22, 22. The ones retarded 22 months have a chronological age of 115 and 143 months.

This again points to the fact that retardation tends to occur with the oldest pupils in the grade.

Twenty of this group of pupils have a mental age in advance of their chronological age. Such acceleration ranges from 4 months in the case of a pupil 124 months old chronologically to 39 months in the case of a pupil 101 months old chronologically. The average acceleration for this group of accelerants is 21.15 months. There are, then, 80% in this group who are accelerated while 20% are retarded mentally.

The range of I.Q.'s is from 81 to 139. The classification of this group is as follows: I.Q. above 140, or genius, none; I.Q. 120-140, very superior intelligence, 10 pupils; I. Q. 110-120, superior intelligence, 5 pupils; I.Q. 90-110, average intelligence or normal, 8 pupils; I.Q. 80-90, dullness, 2 pupils; only two are below average; these are the two mentioned earlier as being 115 and 143 months old chronologically.

Table IV

Status of fourth grade children; from results of the Otis Primary Examination Form A.

Number of Pupil	Chronological age in months	Mental age (months)	Accelerated (Months)	Retarded (Months)	I. Q.
1	119	144	25		121
2	121	130	9		107
3	129	144	15		112
4	112	111		1	99
5	117	134	17		115

(Continued on next page)

*Index of Brightness. I. B. of 100 means "just at age". See Otis Manual.

TABLE No. IV—(Continued)

6	124	117		7	94
7	114	146	32		128
8	107	139	32		130
9	109	142	33		130
10	128	136	8		106
11	108	128	20		119
12	117	144	27		123
13	101	140	39		139
14	117	145	28		124
15	112	135	23		120
16	116	122	6		105
17	118	147	29		124
18	117	135	18		115
19	112	132	20		118
20	108	135	27		125
21	143	121		22	85
22	115	93		22	81
23	124	128	4		103
24	139	128	11		92
25	109	103		6	94

GRADE V

The fifth grade is shown, as the teachers had suspected, to be the lowest ranking grade in the school. This is largely a group of pupils who did not come up through the training school but came in from various districts. Most of the pupils come from districts from without the city.

The standard norm or median for the grade is a score of 67. The median of this group falls below this standard by 6 points, being 61. The range of scores for the group is 14 to 89 representing a range of mental ages from below 96 months to 145 months.

The lowest score given in the table of norms is 40, which represents a mental age of 96 months. Six children in this group failed to make a score of 40. These, of course, must be tested further by an individual test to determine their mental ages.

The chronological ages range from 116 months to 174 months, with the median at 130 months. The median mental age as indicated by the median score is 117 months. Thus, the median mental age is 13 months below the median chronological age. This means that the group is not up to standard mentally.

Table V gives us some additional information. From it we see that 6 pupils of the group have a mental age below 8 years; that one is just at age; that only seven are accelerated in mental age, and that 13 are retarded mentally. The range of acceleration for the accelerated group is from 8 months to 28 months, with an average of 17.3 months. The range of retardation for the retarded group is from 1 month to 73 months, with an average of 22.5 months.

Looking at the percentile rank column (P.R.) we see that the range is from .76 to 82.8 with the median at 26. This presents

a rather doleful picture, since the group is a group that ranks largely in the lower fourth of American school children of their ages. Indeed, we find only 8 of the group who rank in the upper 50% and only two who get into the upper fourth.

Arranging the pupils in ascending order of percentile rank we have:

?	26.00	
.76	39.00	These six pupils belong to the second fourth.
.90	39.00	
7.80	46.00	
8.90	49.00	
10.00	49.00	These 13 pupils belong to the lower fourth of American school children of their age.
11.90		
13.30	50.00	
14.00	61.00	
14.00	62.00	
18.00	68.00	
21.00	69.00	These six pupils belong to the third fourth.
24.00	74.00	
	82.00	These 2 pupils reach the upper fourth.
	82.00	

Table V.

Status of fifth grade children; from results of the Otis Advanced Examination Form A.

Pupil No.	Chronological Age in Months	Mental Age (Months)	Acceleration in Months	Retardation in Months	P. R.	I. Q.
1	130	139	9		62	107
2	128	Below 8 yrs. (40 lowest given)			10	?
3	119	111		8	39	93
4	116	144	28		82.8	124
5	138	117		21	24	85
6	147	114		33	13.3	78
7	156	Below 40, lowest given				
8	138	111		27	18	80
9	135	131		4	46	97
10	125	Below 40			14	?
11	174	101		73	76	57
12	123	138	15		69	112
13	124	Below 40			11.9	?
14	136	135		1	49	99
15	143	124		19	26	87
16	145	145	0	0	50	100
17	126	134	8		61	106
18	131	99		32	14	76
19	128	127		1	49	99
20	121	135	14		68	111
21	130	Below 40			7.8	?
22	124	143	19		74	115
23	117	145	28		82.8	124
24	141	117		24	21	84
25	127	119		8	39	94
26	150	109		41	8.9	73
27	147	Below 40			9	?

From the I.Q.'s column we get an equally discouraging impression. The range of I.Q.'s is from ? to 124. None of these pupils reach 140 or the genius group; two reach the rank of very superior intelligence; three rank in the superior intelligence group; none have an I.Q. between 90 and 110, or are of normal or average intelligence; while 13 are below normal. Terman's placement on the basis of I.Q.'s is somewhat more liberal than the condition shown by the acceleration and retardation columns. From these columns it appears that only 7 have a mental age in excess of their chronological age, one is just at age, while 19 are retarded.

GRADE VI

The sixth grade standard (median) score as given by Otis is 84, that of our 6th grade is 85. On this basis we may regard our 6th grade group as just at age. The range of scores for this group is from 42 to 147, which represents a range of mental age from 98 months to adult age, 130 being the score given for adults, while the chronological ages range from 113 months to 199 months. The median chronological age is 142 months, while the median mental age, as indicated by the median score, is 141 months. Thus we see that the median mental age falls one month below the median chronological age.

A child 121 months old chronologically made the lowest score, 42, which indicates a mental age of 98 months, while a child 146 months old made the highest score, 147, which is the adult median. Thus the chronological age difference for these two children is 25 months, while the difference in mental age is at least 118 months. The child making the highest record is surpassed in brightness by a child 113 months old, the former having an I.B. of 157, the latter an I.B. of 181.

The I.B.'s range from 32 to 181, the lowest being made by a child 15 years 5 months old, the highest by a child 9 years 5 months of age. The one making the lowest I.B. made a score of 55, while the one making the highest I.B. has a score of 138.

Table VI

Status of sixth grade children; from results of Otis Advanced Examination, Form A.

No. of Pupil	Chronological Age in Months	Mental Age (Months)	Acceleration (Months)	Retardation (Months)	P. R.	I. Q.
1	127	141	14		68	111
2	150	119		31	14.8	79
3	146	131		15	31	90
4	151	160	9		62	106
5	138	171	33		86.7	124
6	126	163	37		89.4	129
7	126	130	4		55	103

(Continued on next page)

TABLE No. VI—(Continued)

8	172	139		33	12.6	81
9	127	161	34		87.4	127
10	146	above 18 yrs.	above 82		97.3	156
		above 228				
11	153	120		33	13.3	79
12	145	132		13	33	91
13	137	128		9	38	93
14	121	98		23	22	81
15	199	118		81	1.4	59
16	185	111		74	1.1	60
17	129	176	47		94	136
18	149	168	19		74	113
19	169	142		27	18	84
20	177	141		36	12.6	80
21	151	107		44	6.9	71
22	153	140		13	33	91
23	141	163	22		77	116
24	132	131		1	49	99
25	143	129		14	32	90
26	135	215	80		95.7	159
27	136	154	18		73	113
28	113	above 19 above 228	above 115		99.7	200
29	142	153	13		64	108
30	133	153	20		75	115

Of this group of 30 children 50% are retarded and 50% are accelerated on the basis of mental age, as indicated by the test, the average retardation being 29.3 months for the retardates and the average acceleration being 36.5 months for the accelerants.

On the basis of the I.Q.'s given in table VI there are three children who reach or surpass an I.Q. of 140 or belong to the genius group; four have an I.Q. between 120 and 140, ranking as of very superior intelligence; five have an I.Q. between 110 and 120, superior intelligence; nine have an I.Q. between 90 and 110, average or normal intelligence; four have an I.Q. between 80 and 90, dullness; and five fall below an I.Q. of 80.

In other words 12 of these children are above average or normal intelligence; 9 are average or normal; while 9 are below normal intelligence.

From the P.R. column we get an excellent view of the group. The range is from 1.1 to 99.7. Nine of these children fail to reach a percentile rank of 25, that is, they belong to the lower quartile of American school children of their ages while 15 fall in the lower 50%; three fall in the third quartile; and nine belong to the upper quartile.

Though this group of 30 children does not distribute along the normal probability curve, it is interesting to note the distribution when we arrange the P.R. column in ascending order.

1.1	} This group falls in the lower fourth of American school children of their ages.
1.4	
6.9	
12.6	
12.6	
13.3	
14.8	
18.0	
22.0	
31.0	} This group falls in the second fourth.
32.0	
33.0	
33.0	
38.0	
49.0	
55.0	} This group falls in the third fourth.
62.0	
64.0	
68.0	
73.0	
74.0	
75.0	
77.0	
86.7	} This group belongs to the upper fourth.
87.4	
89.4	
94.0	
97.3	
97.7	
99.7	

Note that 75% of the 6th grade pupils should exceed a score of 51; in our group approximately 97% reached this mark, in fact all but one pupil reached a score of 51; 25% should exceed a score of 117; in our group 13% or 4 pupils exceed this score.

GRADE VII

The standard seventh grade median is 100; the median for our group is 97. That is, this group is practically a standard group, its median falling only 3 points below the standard. The range is from 19 to 141, indicating a range in mental age from below 8 years to adult. (The low score of 19 was made by a decidedly feeble minded boy 18 years and 1 month chronological age.) Barring this one case the range would be from 52 to 141. The score 52, indicating a chronological age of 9 years, was made by a boy 15 years of age.

The chronological ages range from 120 months to 192 months (217 if the above low-scoring boy be included). The median chronological age is 153 months, which is also the median mental age as shown by the median score.

TABLE No. VI—(Continued)

8	172	139		33	12.6	81
9	127	161	34		87.4	127
10	146	above 18 yrs.	above 82		97.3	156
		above 228				
11	153	120		33	13.3	79
12	145	132		13	33	91
13	137	128		9	38	93
14	121	98		23	22	81
15	199	118		81	1.4	59
16	185	111		74	1.1	60
17	129	176	47		94	136
18	149	168	19		74	113
19	169	142		27	18	84
20	177	141		36	12.6	80
21	151	107		44	6.9	71
22	153	140		13	33	91
23	141	163	22		77	116
24	132	131		1	49	99
25	143	129		14	32	90
26	135	215	80		95.7	159
27	136	154	18		73	113
28	113	above 19 above 228	above 115		99.7	200
29	142	153	13		64	108
30	133	153	20		75	115

Of this group of 30 children 50% are retarded and 50% are accelerated on the basis of mental age, as indicated by the test, the average retardation being 29.3 months for the retardates and the average acceleration being 36.5 months for the accelerants.

On the basis of the I.Q.'s given in table VI there are three children who reach or surpass an I.Q. of 140 or belong to the genius group; four have an I.Q. between 120 and 140, ranking as of very superior intelligence; five have an I.Q. between 110 and 120, superior intelligence; nine have an I.Q. between 90 and 110, average or normal intelligence; four have an I.Q. between 80 and 90, dullness; and five fall below an I.Q. of 80.

In other words 12 of these children are above average or normal intelligence; 9 are average or normal; while 9 are below normal intelligence.

From the P.R. column we get an excellent view of the group. The range is from 1.1 to 99.7. Nine of these children fail to reach a percentile rank of 25, that is, they belong to the lower quartile of American school children of their ages while 15 fall in the lower 50%; three fall in the third quartile; and nine belong to the upper quartile.

Though this group of 30 children does not distribute along the normal probability curve, it is interesting to note the distribution when we arrange the P.R. column in ascending order.

1.1	} This group falls in the lower fourth of American schoolchildren of their ages.
1.4	
6.9	
12.6	
12.6	
13.3	
14.8	
18.0	
22.0	
31.0	} This group falls in the second fourth.
32.0	
33.0	
33.0	
38.0	
49.0	
55.0	} This group falls in the third fourth.
62.0	
64.0	
68.0	
73.0	
74.0	
75.0	
77.0	
86.7	} This group belongs to the upper fourth.
87.4	
89.4	
94.0	
97.3	
97.7	
99.7	

Note that 75% of the 6th grade pupils should exceed a score of 51; in our group approximately 97% reached this mark, in fact all but one pupil reached a score of 51; 25% should exceed a score of 117; in our group 13% or 4 pupils exceed this score.

GRADE VII

The standard seventh grade median is 100; the median for our group is 97. That is, this group is practically a standard group, its median falling only 3 points below the standard. The range is from 19 to 141, indicating a range in mental age from below 8 years to adult. (The low score of 19 was made by a decidedly feeble minded boy 18 years and 1 month chronological age.) Barring this one case the range would be from 52 to 141. The score 52, indicating a chronological age of 9 years, was made by a boy 15 years of age.

The chronological ages range from 120 months to 192 months (217 if the above low-scoring boy be included). The median chronological age is 153 months, which is also the median mental age as shown by the median score.

months; thus the mental age extends 31 months lower than does the chronological age, while on the other hand adult mentality is reached in some cases.

The median chronological age is 163 months, and the median mental age, as indicated by the median score, is 148 months; that is, the mental age median is 15 months lower than the chronological median.

The pupil making the lowest score, 59, is 15 years 11 months old chronologically. His score indicates for him a mental age of 115 months (9 years 7 months)—a mental retardation of 76 months. This pupil is a decidedly troublesome and undesirable pupil in school. The child making the highest score, 133, is 164 months (13 years 9 months) old chronologically. This score indicates for him a mental age of 18 years and a mental acceleration of at least 52 months.

The brightest child in the group has a chronological age of 146 months (12 years 2 months), and a score of 131, which indicates for her a mental age of 216 months (18 years) plus. She has an I. Q. of 91.7.

Of the 22 pupils six have a mental age higher than their chronological age, the average acceleration being 31.6 months; 16 pupils are retarded, the average retardation being 32.9 months. The range of acceleration is from 10 to 70 months; the range of retardation is from 9 to 76 months. We see, then, that 27% are accelerated, while 73% are retarded.

While 50% of the children in the 8th grade should reach or exceed a score of 114, only 5 of this group, approximately 23%, do so; 75% should exceed a score of 81, but in our group 16 children or 73% do so; and 25% should reach a score of 147, but in this group this score is not reached by any one.

Note the P.R. column in table VIII. When the percentile ranks are arranged in ascending order we have:

1.3	} These 11 pupils rank in the lower quartile of American school children of their ages.	28.0	} These five pupils rank in the second quartile.
4.0		31.0	
6.9		37.0	
6.9		38.0	
10.6		39.0	
10.6		63.0	} These two pupils rank in the third quartile.
11.2		68.0	
15.6		75.0	} These four pupils rank in the upper quartile.
16.4		76.0	
19.0		81.0	
22.0		91.7	

Table VIII

Status of eighth grade children; from results of Otis Advanced Examination. Form A.

Pupil No.	Chronological Age in Months	Mental Age in Months	Acceleration in Months	Retardation in Months	P. R.	I. Q.
1	155	178	23		76	115
2	181	147		34	15.6	81
3	164	216	52		81	132
4	154	164	10		63	106
5	158	172	14		68	109
6	153	174	21		75	114
7	167	151		16	31	90
8	191	115		76	1.3	60
9	182	140		42	10.6	77
10	161	124		37	10.6	77
11	157	148		9	39	94
12	146	216	70		91.7	148
13	160	143		17	28	90
14	163	139		24	22	85
15	162	152		10	37	94
16	175	129		46	6.9	74
17	179	150		29	19	84
18	169	160		9	38	95
19	158	119		39	16.4	75
20	184	143		41	11.2	78
21	177	131		46	6.9	74
22	173	121		52	4.0	70

Viewing this group on the basis of Terman's I.Q. classification we have:

- 140
- 1 pupil with an I.Q. of ~~140~~ or above, the genius group;
 - 1 pupil with an I.Q. between 120 and 140, very superior intelligence;
 - 2 pupils with an I.Q. between 110 and 120, superior intelligence;
 - 7 pupils with an I.Q. between 90 and 110, average or normal intelligence;
 - 11 pupils with an I.Q. below 90, or below average or normal.

This table shows the correlation of the ranking given the pupils in the various grades by the teachers' judgment and by the results from the various tests. The coefficients of correlation were calculated by the rank differences method, and by a conversion table were converted into the Pearson coefficients. The table should be read as follows: The correlation between the ranking in Grade I of the teachers' judgment and the ranking of pupils obtained from the Otis total score is .82 with a P. E. of .04, etc.

Table IX

Grade	Teacher Rating and Army Total Score	Teacher Rating and Chicago Total Score	Teacher Rating and Otis Total Score	Teacher Rating and Otis I. B.	Otis I. B. and Army Total	Otis I. B. and Chicago Total Score	Otis I. B. and Otis Total	Otis Total Score and Army Total Score	Otis Total Score and Chicago Total Score	Chicago Total Score and Army Total Score	Number of Pupils in Grade
1			.82	.77			.95				26
2			.24	.24			.73				26
3			.74	.63			.79				21
4	.70	.62	.64	.65	.86	.69	.95	.84	.66	.73	25
5	.07	.08	.07	.07	.03	.07	.01	.04	.08	.06	27
6	.65	.39	.66	.81	.79	.72	.81	.83	.72	.80	30
7	.75	.67	.61	.69	.81	.74	.92	.78	.77	.81	33
8	.56	.74	.71	.75	.81	.93	.93	.87	.89	.81	22
	.09	.06	.07	.06	.05	.01	.02	.03	.02	.04	

*The figures in the column headed No. of Pupils in Grade are only approximately correct. They are correct for the Otis tests. In a few cases pupils were absent or a greater number present in other tests. They are so nearly correct that for the purpose of this table they may be taken as correct in all cases.

The coefficients of correlation shown in table IX are unusually high and have small probable errors in nearly all cases. The marked exception to this is in grade II where two coefficients are exceedingly low and with large probable errors. We are not certain as to just what the correct interpretation of these low coefficients is. It is probably one of several things: (1) the teacher found it exceedingly difficult in her first attempt to rank pupils on the basis of innate intelligence, or (2) the pupils got lost in the test. It is not likely, however, that it was the latter since the pupils ranked uniformly high in the test. It may be possible (3) that the test is too easy for the pupils and hence the entire group ranked high, in which case the test did not rank the pupils properly. This last condition does not, however, seem to exist in any other grade.

The only other coefficient we should call special attention to is that in the 6th grade between the teachers' judgment and the total score on the Chicago test. Here the coefficient is comparatively low and the probable error high. This is probably due to some fault in giving the test. In this particular case the test was not given by the person who gave the tests elsewhere throughout the school.

It appears from the results in table IX that the three tests used are very reliable in ranking the pupils in their proper order and that, in general, the teachers did well in ranking their pupils.

CONCLUSIONS.

1. In grade I there are certainly 6 and possibly 10 pupils who are able to progress at more than normal rate.
2. In grade II there are certainly 15 and possibly 17 pupils who are able to progress at more than normal rate.
3. In grade III there are certainly 3 and possibly 8 pupils who can progress at more than normal rate.
4. In grade IV there are certainly 10 and possibly 15 pupils who can progress at more than normal rate.
5. In grade V there are certainly 3 and possibly 5 pupils who can progress at more than normal rate.
6. In grade VI there are certainly 7 and possibly 12 pupils who can progress at more than normal rate.
7. In grade VII there are certainly 9 and possibly 13 pupils who can progress at more than normal rate.
8. In grade VIII there are certainly 2 and possibly 4 pupils who can progress at more than normal rate.
9. It seems from the results in table 9 that the different tests used are very reliable in ranking pupils in the proper order of

intelligence, and hence are excellent means for dividing pupils into different groups for purposes of instruction.

10. The teachers (apparently) did very excellent work in ranking the pupils on the basis of judgment after 4 months acquaintance with the children.

It should be noted that in practically all of the above cases the pupils gave evidence of a high degree of ability in class work and in standardized subject-matter tests. They were immediately singled out and at the close of the year we were convinced that a decided benefit came to both the pupils who were put into the rapid progress groups and also to the ones who remained to progress at the regular rate. We were not disappointed in a single person put into the rapid progress group.

WHAT WAS DONE IN THE MATTER.

GRADE I

In this grade there are six pupils (Nos. 11, 12, 13, 14, 15 and 16) whose intelligence quotients exceed 120. These six pupils, and also pupils Nos. 9 and 10 whose intelligence quotients are 118 and 119 respectively, showed marked competency in their school performance; and an examination indicated that they were physically strong. This group of eight pupils was put into a rapid progress group, and by the close of the year had completed the work for grades 1 and 2B. Pupils Nos. 13, 14, 15 and 16, who had the highest intelligence quotients, returned for the six-week summer session and showed such proficiency that they were promoted to grade 3B. Thus these pupils did two years of work in one year and a six-week summer session. Pupils Nos. 7 and 8, with intelligence quotients of 113 and 115, could possibly have made more than normal progress but they did not appear to be physically stronger than the average child of their ages, hence it was not deemed wise to have them do more than make normal progress.

To avoid repetition, it might be stated here that no pupil was put into a rapid progress group unless his mental ability, his physical strength, and his scholarship attainments appeared to warrant such procedure.

GRADE II

The twelve pupils having the highest intelligence quotients (I. Q.'s of 130 or above) appeared from the standpoint of mental, physical, and subject-matter ability to merit being placed into a special progress group. This was done, and by the close of the year they had finished the work for grades 2 and 3B so that they were promoted to grade 3A.

Pupils Nos. 4, 6, 7, and 21 appeared to have the requisite mental ability to make more than normal progress. However, their per-

formance in subject matter, while slightly above average, hardly seemed to warrant putting them into the above rapid progress group.

Pupil No. 9, having an intelligence quotient of 112, slightly above normal, did excellent work, but it seemed best to leave him in the normal progress group as it was deemed better that he do exceptionally strong work in the normal group rather than moderate work in the rapid progress group.

None of these pupils were encouraged to return for the six-week summer session. There are several in the group who could probably have gained another half year by doing so.

GRADE III

Four of these pupils (Nos. 1, 6, 15 and 20), by the above mentioned standards, appeared to merit being put into a rapid progress group. They completed the work through grade 4B by the close of the year.

Pupil No. 2, having an I. Q. of 132, could doubtless have done so, too, from the standpoint of mental ability. He was, however, irregular in attendance, hence somewhat weak in subject matter. He was retained in the normal progress group where he was doing a good average grade of work by the close of the year.

Pupils Nos. 3, 4, and 8, could possibly have made somewhat more than normal progress but their physical ability did not appear to warrant putting extra pressure on them.

GRADE IV

Ten pupils of this group (Nos. 1, 7, 8, 9, 12, 13, 14, 15, 17, and 20) have intelligence quotients of 120 or above and met the physical and subject matter standards already mentioned. These were put into a rapid progress group and by the close of the year they had completed the work for grades 4 and 5B, thus gaining a half year of work.

From a mental standpoint pupils Nos. 3, 5, 11, 18, and 19, could probably have made more than normal progress. Their physical condition and performance in subject matter hardly seemed to warrant placing them into a rapid progress group. Pupils Nos. 11 and 19 did excellent work when present, but certain conditions caused a somewhat irregular attendance.

GRADE V

Three of the fifth grade pupils (Nos. 4, 22, and 23) have intelligence quotients of 124, 115, and 124, respectively. They did exceptionally strong work in the various subjects and gave evi-

dence of possessing robust health. They were put into a rapid progress group and by the close of the year had completed the work for grades 5 and 6B.

Pupils Nos. 12 and 20 have intelligence quotients but slightly above the normal or average. They did specially strong work in some subjects but did not do so well in others. It was deemed better to put more emphasis on the work in which they were weaker to bring this to a higher level than to put them into a rapid progress group. By the close of the year they showed a marked improvement in the subjects in which they had been doing a lower standard of work. They returned for the six-week summer session and were given an opportunity to do 6A grade work at the beginning of the next year.

GRADE VI

Nine of the sixth grade pupils gave evidence of a marked degree of mental ability. These pupils (Nos. 5, 6, 9, 10, 17, 23, 26, 28, 30) were put into a rapid progress group. They all returned for the six-week summer session and by the close of that time had completed the work required in both grades 6 and 7, hence were promoted to grade 8. Note that these pupils completed two years of work in a year and a six-week term.

Pupils Nos. 1, 18, and 27 also have intelligence quotients slightly above normal and did work above an average standard for their grade. When the regularity of good work and physical conditions were taken into consideration, it appeared best to leave them in the regular progress group until later evidence should show more conclusively that they merited being placed in a rapid progress group.

GRADE VII

Pupils Nos. 2, 5, 19, 22, 26, 31, 32, and 33 have intelligence quotients of 118 or above. Their performance in subject matter and their physical conditions, too, seemed to warrant giving them an opportunity to make more than normal progress. Hence, they were placed in a group for rapid progress and by the close of the year had finished the work for grades 7 and 8B, thus permitting us to promote them to grade 8A. Pupils Nos. 5, 19, 22, and 26 returned for the summer term of six weeks, and finished a part of the 8A work. These will be ready to undertake ninth grade work by the close of the first twelve-week term of the year 1921-22. The rest of the rapid progress group will remain in grade 8A until the middle of the year.

Pupils Nos. 7, 9, 12, and 29 have intelligence quotients slightly above average but they were not put into the rapid progress group because of not showing marked ability in subject matter.

Pupil No. 1 has an intelligence quotient of 118, but to put him into a rapid progress group would probably have overtaxed his physical ability.

GRADE VIII

In grade 8 there were four pupils whose mental, physical, and subject matter ability seemed to warrant their being placed into a rapid progress group. This was done, and by March they had completed the work for the eighth grade, when they were promoted to the ninth grade work.

Note that in no case was a pupil put into a rapid progress group unless his mental ability, his physical ability, and his performance in subject matter warranted such procedure. Standardized subject matter tests as well as the teacher's judgment were made use of in determining the pupils' performance in subject matter.

In no case were we disappointed in putting pupils into the rapid progress group—they "made good" in all cases.

The reader may well ask what became of the pupils who showed ability of less than normal standard. The answer is that these were largely left in the normal progress groups where they surely did not suffer so much as they did when left in the heterogeneous groups they were in before. Further, we meant to attempt but one thing at a time, which was to give most definite attention to the pupils of superior ability. Incidentally the pupils of less marked ability and the pupils of below normal ability were better provided for than when in groups with the superior element.

To solve the problem of the slower pupils is a task for the present school year.

A VERY BRIEF LIST OF VALUABLE MATERIAL TO CONSULT.

1. Terman, L. M., *The Measurement of Intelligence*, Houghton Mifflin Co., Chicago, 1916.
2. Terman, L. M., *The Intelligence of School Children*, Houghton Mifflin Co., Chicago, 1919.
3. Terman, L. M., *The Hygiene of the School Child*, Houghton Mifflin Co., Chicago, 1914.
4. Woodrow, Herbert, *Brightness and Dullness of Children*, J. B. Lippincott Co., Chicago, 1919.
5. Anderson, M. L., *Education of Defectives in Public Schools*, World Book Co., Chicago, 1917.
6. Goddard, Henry H., *School Training of Defective Children*, World Book Co., Chicago, 1915.

7. Holmes, Arthur, **Backward Children**, The Bobbs-Merrill Co., Indianapolis, 1915.
8. Hoke and Wilson, **How to Measure**, MacMillan Co., New York, 1920.
9. Monroe, W. S., **Measuring the Results of Teaching**, Houghton Mifflin Co., Chicago, 1918.
10. Rugg, H. O., **Statistical Methods Applied to Education**, Houghton Mifflin Co., Chicago, 1917.

It is suggested that all persons interested in this type of work write to the following and ask for price lists and samples of testing material.

1. World Book Company, Chicago, Ill.
2. Public School Publishing Co., Bloomington, Ill.
3. Bureau of Publications, Teachers College, Columbia University, New York City.