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Moorhead State Teachers College

A SURVEY OF THE RUSTAD CONSOLIDATED SCHOOL

A Report of the Study of a Typical School Situation in the Red River Valley

by

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INTRODUCTION

The measurements movement is the most promising development in modern scientific education. The Moorhead State Teachers College has endeavored to give practical suggestions from time to time along the line of assisting superintendents, principals, and teachers in western Minnesota to apply the best features of this movement to their own local school systems.

Two studies in this field have already been published, one prepared by Doctor Ward G. Reeder and the other by Mr. T. H. Schutte, both members of the faculty of this institution. This is the third number of this series. It is a survey of a typical consolidated district in rural western Minnesota. The study was made by Superintendent E. E. Wright of Rustad in cooperation with Doctor Frederick L. Whitney, Director of our Training School. It illustrates in detail how superintendents and teachers can use the best features of the standard intelligence and achievement tests to measure the relative quality of the raw material with which they have to work and the relative efficiency of their own work and that of their teachers. Studies of this kind will enable patrons and school boards to know just how good their schools are. Such studies will also point the way to definite improvement in the details of teaching specific subjects, thus leading to definite growth on the part of the teachers. Such studies are a good investment on the part of the state, because the information thus secured should lead to improvement in the preparation of teachers. Practically all of the teachers in the Rustad system are our own graduates, consequently it indirectly measures the efficiency of this institution in doing the work the state has entrusted to it.

Approved for publication June 26, 1923.

O. M. DICKERSON, President.

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NOTE: The organization of the material of this brief study was suggested by an address given by Doctor J. B. Sears at the Conference on Educational Research and Guidance San Jose, California, State Teachers College, May 19, 1922. This is published under the title, "Technique of the public school survey," in the Journal of Educational Research, November, 1922.

Section I

EDUCATIONAL NEEDS

E. E. WRIGHT

The Rustad consolidated district, known as School District Number Forty-eight, is located in the towns of Kurtz and Holy Cross on the Red River of the North in Clay county, Minnesota. This is in northwestern Minnesota very close to Fargo, North Dakota. It covers about twenty sections of the best farming land in the valley, which is famous for the fertility of its soil. The map of the district, Figure 1, shows it located on the Red River, which forms its western boundary.

The Red River valley is an agricultural section unique in itself. It is perfectly flat, the bed of an ancient glacial lake, Lake Agassiz. Drainage is effected by means of ditching on the section lines. The black, rich soil is from one to four or five feet deep. Wheat has been the principal crop here, grown entirely without regard to conservation of land fertility. But, during the past few years diversification has started by the introduction of cultivated crops, and the raising of potatoes has now assumed an important place in the industry of Clay county. Potato warehouses are found in all of the towns of this region. A few of the farmers have silos, although dairying has not as yet reached a place of importance. Prosperity in farming in this region is assured, if modern methods of cropping should be generally introduced and efficient facilities for marketing secured.

The school building is the only public structure of importance in the district, located in its geographical center. However, a checking of the number of children found in the homes of the district shows two thirds of them located to the north of Rustad. The school building was erected in 1912 at a cost of about twenty thousand dollars. It scores 700 (cir.) on the Strayer-Englehardt card, [1] [2] [3] and is large enough very probably to serve the needs of the community for the next fifty years, unless the present economic status of the section is radically changed. The only other buildings in the district larger than a dwelling, outside of the potato warehouse in Rustad, are a small "Town Hall" and a small one story brick bank building in Rustad. The hall is equipped with a pool table, card tables, and chairs. It is used for recreation and for town meetings. The expense and upkeep are provided for by means of annual membership fees. The map shows a church just outside of the district to the south.

Figure 1 shows that the district represents a truly "rural" situation, as practically all of the homes are outside of the village

[1] Published by the Bureau of Publication, Teachers College, Columbia University, New York City.
[2] Neale, M. G. A school building program for the city of Duluth, Minnesota, 1922.
[3] Neale, M. G. A school building program for the city of Winona, Minnesota, 1922.

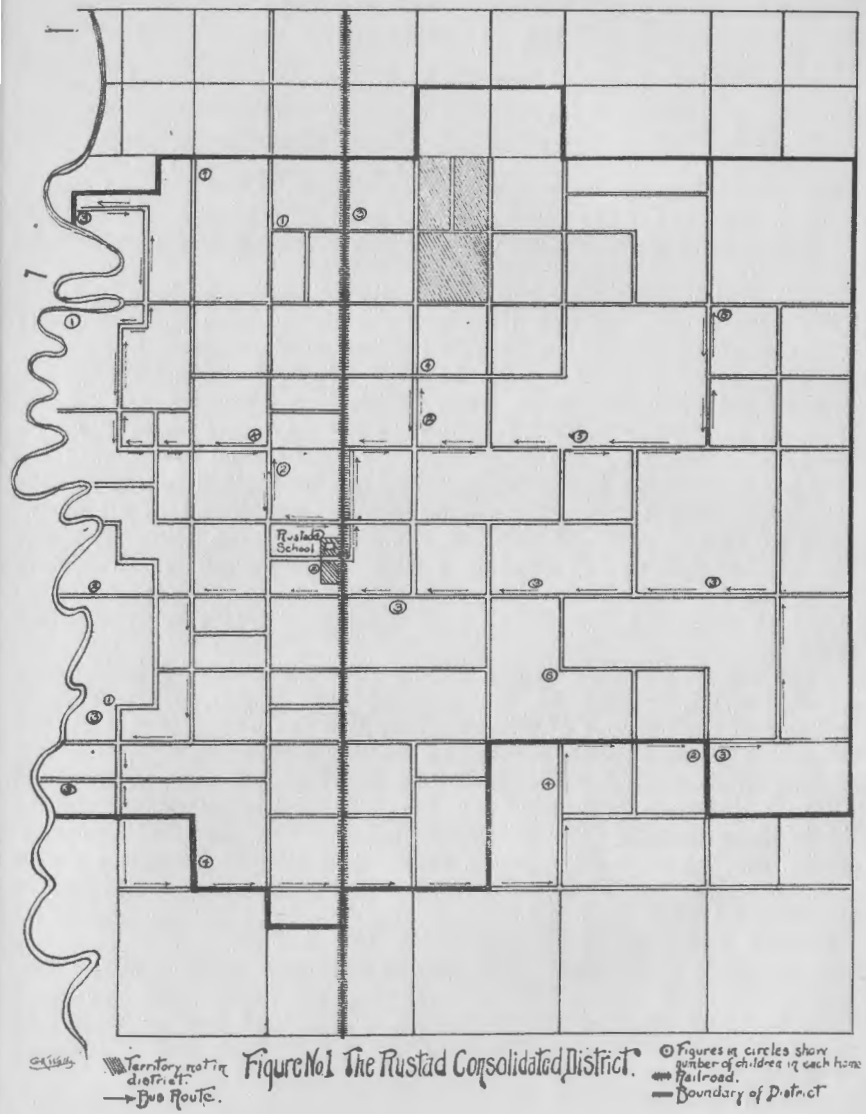

Figure No. 1 The Rustad Consolidated District.

of Rustad and only a half dozen children live in the village. The circled figures on the map represent the number of children sixteen years of age and younger in each home.

The town of Kurtz comprises the major portion of school district number forty-eight. Table 1 gives its population through a period of twenty years. It shows rather a stable condition, although there has been some increase. However, diversification and modern agriculture have not yet affected a breaking up of the original farm units, which are still the typical large wheat farm areas. The majority of the people of the district are of Scandinavian ancestry, although a very few are German, Bohemian, and English.

Table 1. United States census figures for the town of Kurtz, Clay county, Minnesota

Year	Population	Increase	Percent of Increase
1900	268	----	----
1910	279	11	4.1
1920	322	43	13.0
Increase since 1900		54	20.0

There is no adult nor school child in the district who can neither read nor write in some language. In a majority of the Scandinavian homes either the Norwegian or the Swedish language is spoken almost entirely. This is a serious handicap to a mastery of the vernacular in the lower grades, but the children become thoroughly Americanized as to reading and speaking ability in the upper grades.

The general intelligence of the people of the district is quite high, typical of Scandinavian farming communities. The financial success of most of the farmers bears testimony to this fact. Beautiful, modern homes with well kept yards and buildings are in evidence throughout the district.

Farming is the sole basic industry of this region. In the village of Rustad there is a store keeper, a banker and general business man, a station agent, and the proprietor of an elevator for grain and of a potato warehouse. The owners of the store and of the warehouse are neighboring farmers.

The community is governed by a town board. It is a pure democracy, as all of the people meet in the town hall on election day, pass resolutions to regulate the work on ditches, roads, and bridges, and vote to determine the general tax of the town. The school business of the district is managed by a group of six men, three school directors, a school board president, a clerk, and a treasurer. The government of the school district is distinct and separate from that of the town. This separation of function gives an ideal situation from the standpoint of school management and administration.

In general, the district shows a woeful lack of all social, intellectual, and aesthetic interests such as would provide for the natural needs of children and adults. The church, located just outside the community, is served by a pastor from the village of Comstock to the south, and this fact precludes the possibility of its becoming a potential factor in the life of the district. The school is the natural community center and has facilities which should be used to their capacity. The leadership of a "brown mouse"[4] is needed here. Much might be done to raise the tone of social culture and to make life more worth living for all members of the community.

Table 2. Census, enrolment, and attendance of school children in the Rustad Consolidated School District

Year	School census	Enrolment	Average attendance
1914	71	84	....
1915	76	85	61
1917	71	82	57
1918	79	96	65
1919	80	82	47
1920	70	81	55
1921	52	81	55

Table 3. Increase and decrease of the assessed valuation of the Town of Kurtz through a period of five successive years

Year	Amount	Increase	Percent of increase	Decrease	Percent of decrease
1917	$212,063	....	....	....	....
1918	219,582	$7,519	3.1	....	....
1919	226,016	6,534	3.9	....	....
1920	293,887	67,871	31.0	....	....
1921	289,804	....	....	$4,083	1.4
Total since 1917		77,741	36.0	....	....

Section II

CAPACITY TO MEET EDUCATIONAL NEEDS

E. E. WRIGHT

It has been shown that the general population of the Rustad school district has been in practically a static condition for a number of years. Table 2 gives the facts about the school children. Here, it is seen that there has been very little change in the school census figures for eight years, and that the enrolment and actual school attendance are very stable, although there is some decrease in later years. The fact is that this district has no problem of fluctuation in pupil population to meet such as is found in urban manufacturing centers and in agricultural regions where large numbers of workers are needed for short seasonal periods. The table reflects also the fact that new families of young people are not moving in. The children of the original settlers are growing up and moving out. This will continue until different ideas about more intensive farming result in a breaking up of present large farm holdings.

[4] Quick, H., The brown mouse, 1915.

The farmers of the Rustad district complain bitterly of hard times, and it is true that market conditions have been very unfavorable for some years. But Table 3 shows a steady increase in the assessed valuation of taxable and real wealth through a period of five years. Good business methods should eventually take account of this increase of capital invested, which amounts to over one third of the basal amount since 1917. The earning power of the community must be subject to market and transportation uncertainties until the general establishment of dairy herds and feed yards assure a steady income. In many Minnesota communities, the monthly cream check, amounting quite frequently to three or four hundred dollars, and the returns from car load shipments of cattle and hogs establishes a feeling of financial security and prosperity which is reflected at once throughout all phases of community social life. The schools are sure to benefit first of all.

Table 4. Cost of public education in the Rustad Consolidated School, for five successive school years, in terms of seven items and the total

School year	Teachers' salaries	Janitor and fuel	General repairs	Transportation	Interest	Text Books and supplies	Other items	Total
1915-16	$1,638.88	$ 944.95	$240.42	$ 477.60	$252.56	.....	$398.80	$3.953.41
1918-19	3,237.61	1,461.10	.....	1.484.70	470.58	$159.67	.....	6,813.65
1919-20	3,591.50	1,513.42	.....	2,135.58	301.92	528.17	910.24	8,982.83
1920-21	5,278.05	1,229.76	106.82	3,056.24	413.85	594.05	803.06	11,471.83
1921-22	5,705.00	1,287.20	368.15	2,751.00	239.23	502.71	96.54	10,949.83

This fact is illustrated for Rustad by the distribution of tax levies there. Over one half of the total (54.7 percent) is for public school purposes. The state tax constitutes one third (30.7 percent), and that for the township is 14.6 percent.

An analysis of the expenditure of the school money for the last five years is made in Table 4. A steady increase occurs in the total until the last year, and this is maintained in the two items, teachers' salaries and janitor and fuel, there. The level of teaching skill available is the most significant single factor in any school situation, and the amount of money used in buying this is some indication of its value. How this is related to the total cost of the schools is indicated by a comparison of the two items. For the school year 1921-22, teachers salaries covered 52 percent of the total. For the preceding year, they were 46 percent; the year before that 39 percent; then 47 percent and 24 percent. Relatively, more has been

expended each successive year for teaching skill. But an examination of many school surveys shows that the usual practice is to use as high as 75 percent of all school monies for teachers' salaries. In the small town of Arlington, near Minneapolis, the proportion has been about 70 percent.[1]

Table 5. Pupil unit costs for the Rustad Consolidated School for total enrolment and for average number of pupils belonging

School year	Total enrolment	Average number belonging	Cost per pupil enroled	Cost per average number belonging
1915-16	87	61	$45.45	$65.02
1918-19	79	65	86.25	104.82
1919-20	76	47	118.33	190.94
1920-21	80	55	143.40	208.56
1921-22	66	53	165.90	206.40

Table 6. Analysis of the cost of transportation of the Rustad school children for the school year 1921-22

Route number	Total cost	Average number of days driven	Actual number of days driven	Average cost per pupil per day	Average cost per pupil	Number of pupils carried
1	$700.00	123.0	180	$5.28	$3.90	14
2	743.75	149.2	180	4.98	3.58	14
3	787.50	156.1	180	5.04	4.37	19
4	520.00	128.5	180	4.05	2.90	5

Table 7. Total and pupil unit costs for the Rustad Consolidated District for the school year 1921-22 compared with figures from four neighboring districts

District	Total	Total enrolment	Unit
Glyndon	$26,283.29	236	$111.37
Felton	17,765.82	156	113.88
Hitterdahl	29,572.82	254	116.42
Oak Mound	8,131.71	42	140.20
Rustad	10,949.83	66	165.90

The cost of education per pupil is a significant fact to be derived from these figures also. This is set forth in Table 5, the computation being on the basis of both total enrolment and of average number belonging. The increase has been over three hundred percent in five years and is now much above the usual figures for similar pupil groups elsewhere. This is caused by the small pupil groups handled (13.7 pupils per teacher, Section IV) and because good salaries have been paid to four teachers. Very likely one teacher less would constitute a faculty large enough to care for Rustad's present en-

[1] Sears, J. B., The Arlington survey, Bulletin, vol. 24, no. 28, University of Minnesota, 1921.

rolment, but it will be very desirable not to permit a tendency toward economy to lower calaries or shorten the school year.

Table 6 gives an analysis of the item of school cost second in size to that of salaries, that of transportation of pupils; and Table 7 compares total and pupil unit costs in Rustad with those in four other consolidated schools in Clay county. It is seen that Rustad is second in rank as to the total but fifth and last as to unit costs. Public school education is costing too much for each pupil in the Rustad Consolidated School.

Section III

PROVISIONS FOR MEETING EDUCATIONAL NEEDS

F. L. WHITNEY

1. ADMINISTRATION AND SUPERVISION

The Rustad Consolidated School has state rating as a Class A consolidated grade school. It is under the immediate control of a board of six men, three of whom are designated as president, clerk, and treasurer. Their legal representative is the county attorney.

The school policy has been one of conservative advancement, resulting in the establishment of an excellent brick building and the organization of two years of high school work. The economic pressure now affecting the Red River valley has created a desire to cut school expenses, but the wish is to do this without reducing the amount of secondary work offered and without lowering the efficiency of teaching.

The actual management of the business of the school is left very largely to the superintendent. He is executive officer for the board and acts upon discretion most often, reporting to the board later.

The detailed data on the teaching staff will be given in Table 9, Section IV. The 55 pupils enroled are organized into three groups, grades seven to ten inclusive being departmentalized and handled by the superintendent and his assistant. The number of pupils per teacher is 13.7. When compared with the usual school room condition, this is very small. The work of the school progresses without much effective professional supervision. That from the state department takes the form of an infrequent visit from an inspector and the requirement of an annual report from the superintendent. The state eighth grade completion examinations are given, but promotion and classification of Rustad pupils are not dependent upon the grading of these examinations made by the commissioner's office. They serve the purpose of motivation toward a more or less vague, but somewhat dreaded, objective. Supervisory contacts of the county superintendent are infrequent and without effect.

2. INTERNAL MANAGEMENT

The school census for the district is taken each year so as to be reported before October first. This includes all children between

the ages of six and sixteen. This census is the basis for state apportionment, which is forthcoming for each child attending school forty days or more. The total census for the school year 1922-23 is 52 children. The number of children enrolled is 58, including six of over school age and non-resident. The average daily attendance is 53.1 for the year. It is difficult to effect perfect attendance during the fall when farm work is pressing. In particular, the handling of the potato crop tempts parents to permit absence. This situation and the "hard times" have resulted in an eight months school year for 1923-24. No children of school age are non-attendant. This excellent fact results from the energy of the present superintendent, who has not hesitated to invoke the law when necessary. All children remain in school until they are sixteen or until they have completed the eighth grade.

3. CURRICULUM

On the back of the form supplied for the superintendent's annual report to the state commissioner of education is found the statement, "The grading of pupils for the purposes of this report should be based on the standards outlined by the Minnesota Course of Study. For the first five grades use reading, arithmetic, spelling, and writing as the basis; for grades six, seven, and eight add history, geography, and composition and grammar."

This course was printed some years ago. The testimony at Rustad is that it has lost its prestige as a guide for selection and organization of subject matter because it is thought to be over theoretical and hard to understand. The new elementary course, when it becomes available, will very probably be received with more favor. Legislative enactment has determined the minimum core of the elementary curriculum. Outside of these sources, no doubt the recent work in the nearby state teachers' college has had its effect upon both the selection and the organization of subject matter for Rustad. The new state course of study in English is in constant use in grades nine and ten. Evidence appeared that the past content of the state completion examinations determined to some extent what knowledges and skills would appear in conscious objectives held in view in grades seven and eight.

Table 8. Percent of time distribution of elementary school subjects in Rustad and in fifty typical cities

Subjects	Grade groups 1	2	3	4	5	6	7	8	Rustad	50 cities[4]
1. Opening exercises	4.8	4.8	4.8	....	....	....	3.8	3.8	4.4	....
2. Reading	14.6	19.6	21.2	13.1	9.8	9.8	5.1	5.1	19.2	17.0
3. Language, Grammar	8.1	8.1	9.8	9.8	11.5	14.6	7.7	7.7	9.6	11.4
4. Spelling	....	4.5	4.8	....	....	....	2.0	2.0	3.3	6.4
5. Handwriting	4.8	4.8	4.8	4.8	4.8	4.8	3.1	3.1	4.3	5.1
6. Arithmetic	9.8	9.8	11.4	16.4	13.1	13.1	7.7	7.7	11.1	13.3
7. History, Civics	....	....	....	11.7	11.1	13.7	....	7.7	11.0	6.5
8. Geography	....	....	....	12.4	11.4	11.4	5.1	....	10.0	7.1
9. Drawing	22.7	13.1	7.8	4.8	4.8	4.8	....	....	9.6	6.1
10. Music	4.8	4.8	4.8	4.8	4.8	4.8	....	....	4.8	4.8
11. Manual Training	....	....	....	....	....	....	20.7	20.7	20.7	7.3
12. Home Economics	....	....	....	....	....	....	20.7	20.7	20.7	7.3
13. Agriculture	....	....	....	....	....	....	....	3.1	3.1	....
14. Physiology, Hygiene	....	....	...	6.5	6.5	6.5	....	2.0	5.3	4.4
15. Physical education	14.6	14.6	14.6	....	....	....	....	....	14.6	4.8
16. Recess	9.8	9.8	9.8	9.8	9.8	9.8	....	....	9.8	....
17. Home and environment	2.6	2.6	2.6	....	....	....	....	....	2.6	....
18. Health talks	2.6	2.6	2.6	....	....	....	....	....	2.6	....
19. General lessons	....	....	....	5.2	5.2	5.2	....	....	5.2	....
20. Study periods	....	....	....	....	....	....	23.4	15.5	19.4	....

The total number of minutes per week in grades one to six inclusive is 1525, in grades seven and eight 1925.

Table 8 sets forth degrees of emphasis put upon all school activities in Rustad. Reading, manual training, and home economics occupy the most time, each about one fifth of all. Physical education comes next, then arithmetic, history, geography, language, and drawing. Spelling is an incidental subject in four grades and receives but a small amount of time in the other four. Agriculture, the basic home industry, is given but 60 minutes per week. When these percents are compared with those in fifty representative cities, such subjects as reading, language, handwriting, arithmetic, music, and hygiene appear with very similar emphasis. But, Rustad gives more time to geography, drawing, manual training, home economics, and physical education.

On the whole, Rustad is planning well in a general way to meet the educational needs of the community. But it appears that objectives set up are vague and unanalyzed, as elsewhere, and are not the result of a careful consideration either of pupil capacity or of social conditions. More study is needed of the curriculum and more definite provision for adequate professional supervision.

Section IV
EXTENT TO WHICH EDUCATIONAL NEEDS ARE MET
F. L. WHITNEY

1. QUALITY OF INSTRUCTION

A measure of the efficiency with which Rustad's educational needs are taken care of may be approximated by determining the level

[4] Bobbitt, F., What the schools teach and might teach, Cleveland Education Survey, 1915.

upon which her public school faculty is teaching and by checking pupil performance in terms of capacity and of achievement.

Table 9 makes partial comparison of the teaching faculty of Rustad with 1,200 other teachers. Rustad's four teachers are graduates of the State Teachers College at Moorhead, Minnesota, in the same county, and the large group of 1,200 graduates come from 12 similar institutions, three of which are located in Minnesota. The 1,200 teachers had all taught since graduation less than one half year. One of Rustad's teachers has taught three years and the other three teachers one year since graduation. Rustad's teachers are from two to five years older than the median state normal school graduate. Their estimated intelligence is a median of about 125 (army alpha) as compared with 136 for the larger group. As the army alphas probably do not take account adequately of social intelligence, a prime requisite in teaching success, one could expect Rustad's four teachers, who are older and have had more actual teaching experience, to teach on a higher level than the 1,200 new graduates. Item number 9 in the table gives the prediction for this level as computed statistically when the influence of items 2, 4, 5, 6, 7, and 8 is equated by the method of partial correlation and the regression equation. Item 10 seems to say that they are not teaching up to their promise, but that two of them are as successful as the typical state normal school graduate.

Table 9. Facts about four Rustad teachers as compared with 1,200 graduates of 12 state normal schools, classes of 1920, in their first term of teaching

Item	Teacher Number 1	Teacher Number 2	Teacher Number 3	Teacher Number 4	1200 Teachers [1]
1. Chronological age	27.0	27.0	26.0	23.0	21
2. Intelligence score .... (estimated army alpha)	140.0	140.0	105.0	110.0	135.9
3. Years of experience (total)	3.0	6.0	6.0	4.0	0.5
4. Academic marks ..... (maximum 10)	8.6	8.5	8.8	8.2	....
5. Professional marks .. (maximum 10)	8.7	9.0	9.2	8.2	....
6. Secondary record .... (maximum 100)	79.0	83.0	92.0	85.0	....
7. Student teaching .... rating (maximum 10)	8.0	9.3	9.6	8.3	....
8. Physique rating ..... (maximum 30)	28.0	26.0	25.0	27.0	....
9. Prediction of teaching success (maximum 38)	36.6	37.8	38.9	35.4	....
10. Actual teaching success (maximum 38)	30.0	30.0	26.0	25.0	29.8

[1] Whitney, F. L. The intelligence, preparation, and teaching skill of state normal school graduates in the United States: A study in the personnel of young teachers with implications for state normal school administration, University of Minnesota, 1922.

Table 10. Grade location of the 55 children in Rustad's public school

Grade	Chronological Age 6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total
1	2	1													3
2	1	3		1											5
3	1		2	2											5
4				3											3
5					1	2	1	1							5
6					2	5	1								8
7						2	1	3							6
8								1	4		1				6
9								1	1		4	4		1	11
10										2			1		3
Total	4	4	2	6	3	9	3	6	5	2	5	4	1	1	55

Table 11. Percent of normal, overage, and underage grade location of Rustad's school children compared with that in other typical systems

	Overage	Normal	Underage
1. Rustad	25.4	61.9	12.7
2. Average in 29 city elementary schools (1916)	37.3	34.0	28.7
3. 2484 elementary pupils in Nassau county, New York	27.5	57.6	14.9
4. Quincy, Mass.	19.0	31.0	50.0

Table 12. Median chronological age for each school grade compared with norms and with like age levels found among pupils in four teacher schools in New York rural systems

Grade	Norm	Rustad	New York
3	8	8.5	9.2
4	9	9.0	10.5
5	10	11.0	11.6
6	11	11.0	12.5
7	12	12.5	13.5
8	13	14.0	14.4
9	14	16.0	.....
10	15	15.0	.....

2. PERFORMANCE—Capacity.

This section will measure two important determiners of the performance of the pupils in Rustad, (1) their ability to achieve, and (2) their actual school achievement. The ratio of these two variables constitutes a scientific statement for efficiency.

Capacity is discovered in Tables 10 to 16 inclusive in terms of the relation between chronological and mental age and grade location, as compared with similar typical school situations elsewhere. Tables 10 and 11 give the details of grade location in terms of chronological age. It is seen that one fourth of Rustad's pupils are too old for the grade in which they are found, and while this is about the condition in the country schools of Nassau county, New York, yet a more desirable ideal is found in the figure for Quincy (20 percent). Further, Table 10 shows that more than three fourths of Rustad's retarded pupils (78.6 percent) are found above the seventh grade. The older pupils are educational laggards. [2]

Table 12 reveals the same fact in other terms, and the comparison with New York four teacher rural schools is significant as Rustad is a four teacher rural school also. Here, it is noted that Rustad's pupils are on the average two thirds of a year older than the normal age for each grade, while the school children in New York state are one and one third year older. The condition in Rustad is better than in New York state, but there is a tendency for the "laggards" to collect in the upper grades as noted above. Are the educational activities which Rustad offers to these older school children fitted to their liking, aptitude, and capacity?

Table 13. Median scores in Intelligence Examination Delta 2 compared with author's standards and with the intelligence of pupils in four teacher schools in New York state rural systems

Grade	Standard	Rustad	New York
3	40	40	39
4	60	48	57
5	78	61	75
6	96	81	91
7	110	89	104
8	120	94	115
9	130	118	.....
10	.....	122	.....

Table 11 gives also the proportion of pupils who are accelerated, younger than other pupils in grades where they are found. Rustad has but 13 percent of her pupils underage. While this is comparable with the distribution in the elementary schools of Nassau county, New York, it is far from the modal condition (29 percent) and from

[2] Ayres, L. P., Laggards in our schools, 1909.

the ideal as illustrated in Quincy (50 percent). Where are Rustad's brightest pupils? Have they sought activities more congenial to their type of mentality than the educational activities found in their home school?

Table 14. Median scores by chronological age groups for Intelligence Examination Delta 2 compared with author's standards based on 40,000 cases

Age	Standard	Rustad
6	....	43
7	7	....
8	20	39
9	42	43
10	58	53
11	70	84
12	82	91
13	94	78
14	105	93
15	116	113
16	125	112
17	132	100
18	137	143
19	141	111
20	144	.....

Tables 13 to 16 inclusive throw some light on this question, and it may be that Rustad is not doing her full duty in the preparation of leaders. Tables 13 and 14 check the intelligence of the school children in terms of a widely used tool. It is noticed that grade by grade and age group by age group, the younger children of Rustad score on about the same level of intelligence as the standards given and that scores are not very dissimilar to those found in New York state rural schools. But, in the upper grades, the older children are not, on the whole, so intelligent as measured by this test. Tables 15 and 16 confirm this finding in the case of the youngest pupils found in grades one and two. They score slightly higher than children of similar grades in the Model School. The children from the homes of Rustad are as intelligent as the average, but the brighter tend to drop out of school early.

Table 15. Grade medians for the Detroit First Grade Intelligence Test, Form A, compared with tentative standards and with medians for the Model School at the Moorhead State Teachers College

Grade	Standard	Rustad	Model School
1	32	37	27
2	42	44	39

Table 16. Medians for chronological age groups in the Detroit First Grade Intelligence Test, Form A, compared with those for pupils in the Model School at the Moorhead State Teachers College

Age	Rustad	Model School	Mean
5	....	36	36
6	42	38	40
7	44	40	42
8	....	....	44
9	37	....	46

Table 17. Grade medians in Silent Reading Examination Sigma 1 compared with author's standards, with achievement in New York state rural four teacher schools, with Virginia rural schools, and with North Carolina four teacher schools in four counties

Grade	Standard	Rustad	New York	Virginia	North Carolina
1	6	2	2.4	3.5	....
2	20	6	12.7	14.5	14.0
3	30	24	26.7	26.7	26.1
4	38	32	34.3	....	27.0

As to the intellectual capacity of Rustad's children, then, it may be said that those in lower grades represent typically normal conditions, but that in the middle and upper grades intelligence levels tend to become lower.

2. PERFORMANCE—Achievement

(1) Minimum skills essential in a democracy

Every citizen must be possessed of certain simple tools in order to live happily with his fellows. School achievement may, in preparation for citizenship, be measured in terms of (a) levels of learning reached at different ages and of (b) effective use of information and skills thus obtained in preparation for social thinking.

Silent reading—The most fundamental skill taught in our public schools leads to an understanding of the vernacular as found on the printed page. The most usual social reading situation is silent reading. Our American public schools are first of all "reading schools." The typical school activity found in any school room in any system is still that of getting information from books.

Tables 17 to 20 inclusive give the levels of silent reading skill found in Rustad, as compared with other similar group findings. On the whole, it appears that the younger children in the lower grades read about as well silently as do the pupils of other systems, but that at about the fifth grade and age ten or eleven their achievement begins to drop below the standards tabulated for comparison. Tables 18 and 20 are particularly significant. Here, it is seen that Rustad's younger children are quite typical as to silent reading achievement, but from ages ten to fourteen inclusive there is not

the same increase in scores as is found in New York state. Further, between the ages of ten and sixteen New York children increase their median 33 points while Rustad children increase theirs but 18 points. In Table 19, it is noticed that the eighth grade pupils in New York state have a score nearly twice as large as that of Rustad pupils.

Above the primary grades Rustad pupils (a) do not increase in silent reading ability at typical rates nor (b) does the elementary school give them the same level of silent reading skill as do other systems their pupils.

Table 18. Medians for chronological age groups in Silent Reading Examination Sigma 1 compared with achievement in New York state rural four teacher schools

Age	New York	Rustad
5	2	....
6	3	3.5
7	9	10.5
8	17	27.0
9	28	30.0
10	28	....
11	28	....
12	27	....
13	26	....
14	24	....
15	24	....

Table 19. Grade medians in Silent Reading Examination Sigma 3 compared with author's standards and with achievement in New York state rural four teacher schools

Grade	Standard	Rustad	New York
5	31	24	42
6	50	44	55
7	68	50	71
8	76	46	81
9	84	68	....
10	90	83	....
11	96	....	....
12	102	....	....

Table 20. Medians for chronological age groups in Silent Reading Examination Sigma 3 compared with achievement in New York state rural systems, four teacher schools and all high schools

Age	Rustad	New York
10	49.5	50
11	44.0	56
12	30.0	63
13	38.0	71
14	46.0	79
15	69.0	82
16	67.0	93
17	72.5	110
18	105.0	105
19	78.0	111

Table 21. Median achievement in Woody Arithmetic Tests, Addition, compared with author's standards and with results in Huron, South Dakota, and in Indiana and Kentucky four teacher rural schools

Grade	Standard	Rustad	Huron	Indiana	Kentucky
2	4.5	....	4.0	....	....
3	9.0	8.0	10.0	....	....
4	11.0	10.0	12.0	....	....
5	14.0	11.0	13.0	12.6	11.0
6	16.0	14.5	14.0	....	....
7	18.0	15.5	14.5	14.9	13.4
8	18.5	15.0	16.0	15.6	14.1
9	....	17.0	....	....	....
10	....	14.0	....	....	....

Number—Any efficient system of public schools must carry learning in number skills to a point which will help its future citizens to understand the usual number situations which they will meet.

Tables 21 to 24 inclusive compare the achievement of Rustad children with similar representative pupil groups when they are caused to work with the simple number examples of the Woody

Table 22. Median achievement in Woody Arithmetic Tests, Subtraction, compared with the author's standards and with Huron, South Dakota, results

Grade	Standard	Rustad	Huron
2	3.0	....	....
3	6.0	0.0	7.0
4	8.0	9.0	8.0
5	10.0	10.0	10.0
6	12.0	12.5	12.0
7	13.0	11.0	12.5
8	14.5	11.0	14.0
9	....	13.0	....
10	....	14.0	....

Table 23. Median achievement in Woody Arithmetic Tests, Multiplication, compared with the author's standards and results in Huron, South Dakota, and in Indiana and Kentucky four teacher rural schools

Grade	Standard	Rustad	Huron	Indiana	Kentucky
3	3.5	5.0	7	....	....
4	7.0	8.0	7	....	....
5	11.0	9.0	11	10.3	9.2
6	15.0	14.0	13	....	....
7	17.0	14.5	12	14.3	12.3
8	18.0	16.0	15	15.2	14.4
9	....	14.0	....	....	....
10	....	14.0	....	....	....

Table 24. Median achievement in Woody Arithmetic Tests, Division, compared with the author's standards, and with Huron, South Dakota, results

Grade	Standard	Rustad	Huron
3	3	2	4
4	5	5	7
5	7	4	8
6	10	10	10
7	13	12	9
8	14	12	12
9	....	13	....
10	....	14	....

Arithmetic Tests, Series B. It is clear, upon examination of Tables 21 and 23, that in addition and multiplication Rustad's achievement is distinctly below desirable standards, although it equals the levels reached in Indiana and Kentucky four teacher rural schools. Further drill in grades beyond the eighth seems to be a waste of time, money, and energy, as scores are not raised in grades nine and ten.

In Tables 22 and 24, about the same comment may be made as to achievement in subtraction and division, and it is even more apparent that Rustad is using eight years of school time to reach a level of number skill in these fundamental operations that may be attained in six years beyond the second grade. In fact, as to subtraction, there is not much increase in skill above the sixth grade.

Rustad's instruction in the fundamental number skills does not reach a possible desirable standard of attainment at the close of grade eight and an addition of two years more of drill fails to raise the general level of achievement.

Table 25. Grade medians in speed of handwriting, number of letters written per minute, compared with the Starch standards, the Ayres and Freeman norms, and Boise achievement

Grade	Starch	Ayres	Freeman	Boise	Rustad
2	31	....	30.6	....	15.0
3	38	....	43.8	....	57.5
4	47	55	51.2	66	38.5
5	57	64	59.1	68	42.5
6	65	71	62.8	82	53.5
7	75	76	67.9	83	73.8
8	83	79	73.0	82	66.5
9	....	....	....	....	68.8
10	....	....	....	....	76.5

Table 26. Grade medians for quality of handwriting checked on the Ayres Handwriting Scale, Gettysburg edition, compared with Freeman and Ayres norms and with Boise achievement

Grade	Freeman	Rustad	Ayres Starch	Boise	Ayres Boise
2	39.7	25	27	....	....
3	42.0	45	33	....	....
4	45.8	30	37	41	46
5	50.5	33	43	48	50
6	54.5	40	53	52	54
7	58.9	45	57	57	58
8	62.8	40	....	58	62
9	....	45	....	....	....
10	....	45	....	....	....

Handwriting—Communication with others is necessary in order that one may live a normal, happy life. Oral speech is not considered in this survey, but measurement is made of facility in written communication. In order that this may be effective, in the usual social situation, handwriting must be at a reasonable speed and easily read, spelling must be in accordance with the best usage, and sentence and paragraph construction must be such as to convey definitely the exact thought of the writer.

Achievement in handwriting is set forth in Tables 25 and 26. It is seen that Rustad's children write slowly, attaining in no grade standards set up or levels reached in other systems. And, if the average end skill of the three standard columns be considered (77.3), it is seen that Rustad requires two additional years to reach it (76.5).

If Rustad children write slowly, one would expect that they would write carefully with due regard to form. Table 26 gives the facts as to quality as measured on the Ayres scale. There is no improvement beyond grade three, and the final level of excellence reached is much below both standards and achievement in other systems. Quality 60 on the Ayres scale has been selected as a desirable objective for elementary instruction in handwriting in our public schools.[3] While other group medians found in the table reach this level, two years additional drill in the Rustad schools leave pupils still writing only about as well as fourth or fifth grade pupils elsewhere.

[3] Koos, L. V., The determination of ultimate standards of quality in handwriting for the public schools, Elementary School Journal, February, 1918.

Table 27. Grade medians in spelling, Ayres Short List, compared with achievement in one hundred eastern cities, Huron, Springfield, Butte, and Salt Lake City

Grade	Standard	Rustad	Huron	Springfield	Butte	Salt Lake City
2	70	40	32.5	70	86.2	.....
3	70	60	39.8	65	81.8	89.9
4	70	70	64.2	70	78.7	78.8
5	70	40	64.5	72	84.5	87.6
6	70	70	70.3	68	75.0	86.8
7	70	50	73.7	73	76.2	87.1
8	70	30	59.3	75	89.4	82.2
9	....	50	67.0	....	.....	.....
10	....	80	70.1	....	.....	.....
11	....	....	78.5	....	.....	.....
12	....	....	79.1	....	.....	.....
Mean	70	54	63.5	70	80.3	86.0

Spelling—Table 27 gives the percent of words spelled correctly in the Ayres Short List. This is a brief list of ten very common words. Pupils in one hundred eastern city systems spell 70 percent of these words correctly in every grade tested. Rustad's achievement ranges from 30 percent to 80 percent with an average for all grades of 54 percent. This is a lower mean achievement than that set forth in any other column of Table 27. In one grade, the children of Rustad spell too well. In six grades they do not spell well enough. Only in grades four and six are they found on a desirable and possible level of ability in this necessary social skill.

Table 28. Hudelson English composition grade medians compared with author's standards, composite standards for January, and Saint Paul February achievement

Grade	Author's standard	Rustad	Composite standard	Saint Paul
4	3.5	2.0	3.0	2.02
5	4.0	3.0	3.6	3.38
6	4.5	3.5	4.2	3.54
7	5.0	3.2	4.7	4.12
8	5.5	4.0	5.3	4.96
9	6.0	5.0	5.5	5.83
10	6.5	5.7	5.9	5.66

Composition—Finally, the ability of Rustad pupils to convey familiar thought in the form of simple written compositions is measured in Table 28. While their achievement is not up to the author's standards, the most valuable comparison is with column four where the mid-year achievement in many schools is averaged. Rustad's achievement is quite comparable to these scores, although the eighth grade level is distinctly lower. It will be noted, also, that Rustad's scores are very similar to those of Saint Paul children.

It may be said, then, that if the children in the Rustad system were not handicapped by lack of skill in handwriting and spelling,

they would probably reach a desirable level of efficiency in written social communication.

Table 29. Median achievement in the Van Wagenen History Information Test A compared with author's standards and with medians in Indiana and Kentucky four teacher schools

Grade	Standard	Rustad	Indiana	Kentucky
4	4.895	4.0	....	....
5	8.859	4.0	....	....
6	11.800	6.5	....	....
7	12.464	5.2	9.6	9.3
8	15.679	10.3	10.9	10.9
9	.....	12.0	....	....
10	.....	10.6	....	....

(2) Social information and thinking

The skills discussed above (1) are but means to an end. They are tools which every citizen of a democracy must have at command in order to live happily and to make his individual contribution to the wellfare of the group. Their proper use will be found in getting valuable items of information and in experiencing vicariously useful social situations. And the ultimate objective, of course, will be that each public school pupil may be practiced in problem solving and in selective thinking so that efficient habits of reflection may carry over into that segment of life in which he finds himself after school attendance.

Achievement levels in school thinking are roughly determined in Rustad through the use of tests in American history, in geography, and in number reasoning.

American history—The raw material for history thinking must consist of important items of information about the past. Table 29 compares the equipment of Rustad school children in this realm with that of pupils in schools of the same size in Indiana and in Kentucky. The author's standards, it will be noted, are much higher than achievement in these smaller schools; and Rustad attains the same level in grade eight as do country schools in two states. However, no further information is gained apparently in grades nine and ten, and possibly effort expended there in history teaching is wasted.

Table 30. Median achievement in the Van Wagenen History Thought Test B compared with the author's standards and with medians in Indiana and Kentucky four teacher schools

Grade	Standard	Rustad	Indiana	Kentucky
4	1.902	3.0	....	....
5	5.163	4.6	....	....
6	10.680	8.0	....	....
7	14.103	5.8	10.7	6.3
8	18.580	12.8	15.3	10.4
9	.....	17.6	....	....
10	.....	18.3	....	....

Table 31. Median achievement in the Van Wagenen Geography Test, Information R, compared with the achievement of Minnesota and Kansas City children

Grade	Minnesota	Rustad	Kansas City
5	....	.....	66
6	67	.....	75
7	71	65.7	74
8	72	71.0	....
9	....	71.5	....
10	....	73.0	....

Table 32. Median achievement in the Van Wagenen Geography Test, Thought R, compared with the achievement of Minnesota children

Grade	Minnesota	Rustad
6	67	.....
7	73	71.1
8	74	67.3
9	....	77.0
10	....	75.5

Table 30 is a statement of how this information about American history is used in teaching Rustad school children how to think. Here, Rustad attains a level comparable to southern efficiency in grade eight, but not to that of Indiana children. Further, seven years of instruction are required to do what the author's standards show to be possible in five.

Rustad needs more information about the important facts of American history and more practice in reading about and explaining historical movements and events.

Geography—Tables 31 and 32 give the results of a checking of similar mental content and power in the field of geography. Completion levels are most significant here, and while Rustad does as well finally as do large groups of school children elsewhere yet two years more are required for this than in the case of Minnesota pupils and three years more than in Kansas City, which has a seven year elementary school curriculum. The deficiency is more pronounced in geography thinking, and one might guess that more project and problem work and less place and fact geography are needed in the administration of this segment of the elementary curriculum.

Table 33. Grade medians for arithmetical reasoning according to Intelligence Examination Delta 2, Exercise 2, compared with author's standards, wih Virginia white four teacher schools, and with New York state rural four teacher schools

Grade	Standard	Rustad	Virginia	New York
3	5.0	4.0	4.0	4.9
4	7.0	5.0	6.6	5.6
5	9.0	5.0	7.5	7.7
6	10.5	9.0	8.8	9.8
7	11.5	10.5	10.4	12.1
8	13.0	10.0	....	12.3
9	....	12.0	....	....
10	....	10.0	....	....

Table 34. Medians for chronological age groups in arithmetic reasoning according to Intelligence Examination Delta 2, Exercise 2, compared with achievement in New York state rural four teacher schools

Age	Rustad	New York
7	....	5.8
8	4.0	5.1
9	5.0	6.6
10	4.0	7.6
11	8.0	8.4
12	11.5	9.8
13	9.0	10.7
14	8.0	11.6
15	12.0	10.0
16	14.5	10.4
17	11.0	10.7
18	9.0	....
19	12.0	....

Reasoning—The number situations and experiences of social life are many and complex, and social happiness and efficiency depend to some degree upon ability to understand and interpret them.

Power in number reasoning is set forth in Tables 33 and 34. The functions tested here do not constitute a very adequate sampling of all number activities in a typical society. They are those which pupils meet in the usual school arithmetic exercises. Traditional arithmetic reasoning is tested.

Rustad is not far below grade standards as shown in Table 33, but the progress up the grades is not uniform, although this may be accounted for because of the small groups tested. Rustad does as well at the close of the elementary curriculum (grade eight) as does Virginia at the same point (grade seven). The achievement of New York in schools of the same type is more consistent and on a higher level. However, the showing by age groups (Table 34) in New York is not so good. Rustad's scores in Table 34 reveal a serious lack of development in thinking power as pupils become older.

Inadequate sampling may account for a part of this, but not all. No doubt the selection and organization of mathematical work needs a thorough revision.

These paragraphs on achievement give the general impression that the school children of Rustad are not gaining a control of social skills such as seems to be possible in other communities with similar social standards. Nor is the type of reflection in which they are practiced, in preparation for efficient, happy living as adults, such as would insure the perpetuity of our democracy, if all public schools did no better. However, judgment must be suspended until a balance is struck between "gifts" and performance. This will be undertaken next.

3. ACHIEVEMENT RATIO

Every parent, when inquiring about the school status of his children, asks, "Are they doing as well as they can?" And this must be the inquiry of the classroom teacher for each of her pupils and the conscious objective of any school management for its school system. Ability at any point in child development is compounded of native intelligence plus educative experience to that point. If a measure of ability be available, this may be compared with the level of achievement reached by the child. The relation of these two measures will be his achievement ratio. If he is working up to capacity, this ratio will be 100. For example, if mentally the pupil has the ability of ten-year-olds and if his school achievement is only on a level with five-year-olds, his achievement ratio will be 50.

Table 35. Mental and achievement age and achievement ratios of 58 Rustad children.

Individual	Grade	Mental Age	Sigma 1 Achievement	Sigma 2 Achievement	Reasoning Achievement	Average Achievement	Achievement Ratio	Grade Median
1	1	6.00	5.00	.....	....	5.00	83.3	.....
2	1	4.50	6.33	.....	....	6.33	140.6	.....
3	1	5.25	4.50	.....	....	4.50	85.6	85.6
4	2	8.00	8.00	.....	....	8.00	100.0	.....
5	2	10.00	7.75	.....	....	7.75	77.5	.....
6	2	8.00	6.50	.....	....	6.50	81.2	.....
7	2	5.25	6.00	.....	....	6.00	114.2	.....
8	2	8.00	3.00(?)	.....	....	3.00(?)	37.5(?)	81.2
9	3	9.06	7.37	.....	6.9	7.13	78.6	.....
10	3	8.68	10.00	.....	6.9	8.45	97.3	.....
11	3	9.12	8.36	.....	6.9	7.63	83.6	.....
12	3	.....	.....	.....	7.9	.....	.....	.....
13	3	8.77	8.90	.....	7.9	8.40	95.7	89.6
14	4	9.37	10.00	.....	7.9	8.90	94.8	.....
15	4	8.86	10.00	.....	9.4	9.70	109.4	.....
16	4	10.41	10.00	.....	6.9	8.40	80.6	94.8
17	5	7.15	.....	5.30	5.0(?)	5.10	71.3	.....
18	5	11.83	.....	5.92	8.6	7.20	60.8	.....
19	5	10.00	.....	8.38	6.9	7.60	76.0	.....
20	5	10.25	.....	5.00(?)	7.9	6.40	62.4	.....
21	5	12.16	.....	8.69	8.6	8.60	70.7	70.7
22	6	9.69	.....	7.61	8.6	8.10	83.5	.....
23	6	12.25	.....	11.42	11.4	11.40	93.0	.....
24	6	.....	.....	.....	....	.....	.....	.....
25	6	.....	.....	.....	....	.....	.....	.....
26	6	12.50	.....	10.83	10.3	10.50	84.0	.....
27	6	12.00	.....	6.83	13.2	10.00	83.3	.....
28	6	11.75	.....	9.38	10.3	9.80	83.5	.....
29	6	.....	.....	.....	....	.....	.....	.....
30	6	9.60	.....	6.53	8.6	7.50	77.3	.....
31	6	11.91	.....	9.07	11.4	10.30	86.5	84.0
32	7	11.33	.....	8.07	12.1	10.00	88.2	.....
33	7	14.00	.....	13.87	13.2	13.50	96.4	.....
34	7	14.18	.....	15.09	13.2	14.10	99.4	.....
35	7	9.93	.....	7.01	9.4	8.20	82.5	.....
36	7	11.66	.....	7.07	11.4	9.20	78.8	.....
37	7	13.54	.....	10.00	15.5	12.70	93.8	91.0
38	8	11.33	.....	9.38	15.5	12.40	109.4	.....
39	8	11.58	.....	9.07	7.9	8.40	72.7	.....
40	8	15.00	.....	13.37	15.5	14.40	96.0	.....
41	8	13.09	.....	5.07	10.3	7.60	58.0	.....
42	8	12.08	.....	11.42	7.9	9.60	79.4	.....
43	8	18.50	.....	16.40	18.0(?)	17.20(?)	92.9(?)	86.1
44	8	.....	.....	.....	....	.....	.....	.....
45	9	15.36	.....	17.83	11.4	14.60	95.0	.....
46	9	15.18	.....	18.33	12.1	15.10	99.4	.....
47	9	14.45	.....	6.07	10.3	8.10	56.0	.....
48	9	14.54	.....	13.87	15.5	14.60	100.4	.....
49	9	14.63	.....	12.50	15.5	14.00	95.7	.....
50	9	17.20	.....	15.27	18.0(?)	16.60(?)	96.5(?)	.....
51	9	16.28	.....	6.23	19.0(?)	12.60(?)	77.4(?)	.....
52	9	20.00(?)	.....	17.00	19.0(?)	18.00(?)	90.0(?)	.....
53	9	16.28	.....	12.50	16.5	14.50	89.0	.....
54	9	13.45	.....	12.62	15.5	14.00	104.0	.....
55	9	12.08	.....	10.16	12.1	11.10	91.8	95.0
56	10	13.90	.....	10.83	12.1	11.45	82.0	.....
57	10	19.66	.....	16.44	11.4	18.90	96.1	.....
58	10	15.54	.....	19.00	18.0(?)	18.50(?)	119.0	96.1
				Central tendency for grade medians			87.8	

Table 35 gives this measure for each of the Rustad school children. Child number one has a mental age of the average six-year-old as determined by the use of the Detroit First Grade Intelligence Test, Form A. (Table 16). But his reading achievement (Table 18) was equal only to that of the average five-year-old. This makes his achievement ratio 83.3.

Child number eighteen in grade five has a mental age of 11.83 years as measured by the Haggerty Intelligence Examination Delta 2. (Table 13.) His achievement in silent reading (Table 20) is on the 5.92 year age level and in arithmetical reasoning on the 8.6 year level. This makes his average achievement that of a child of 7.2 years and his achievement ratio but 60.8.

These measures for mentality and for achievement are insufficient. More tools should be used for both. This cannot be done, however, until more investigators publish chronological age norms as well as grade norms, as Haggerty has done.

The figures in Table 35 are, then, simply illustrative so far as each individual pupil is concerned. Enough tools have not been used so that individual diagnosis may be attempted. But, even with the small groups investigated, the ratios are significant as indicating levels of grade achievement, and the median level for the system (87.8) is very probably a more scientific statement for the efficiency of instruction in the Rustad schools than could be made in terms of any of the traditional units.

LIST OF TABLES

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