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A survey of intelligence and scholastic achievement in the Harrisburg Illinois Township High School

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A SURVEY OF INTELLIGENCE AND SCHOLASTIC ACHIEVEMENT
IN THE HARRISBURG ILLINOIS TOWNSHIP
HIGH SCHOOL

by
Louise Trevey Rice

Contributions of the Graduate School
Indiana State Teachers College
Number 404

Submitted in Partial Fulfillment of
the Requirements for the
Master of Arts Degree
in Education

1939

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HARRISBURG ILLINOIS

The thesis of Louise Trevey Rice,
Contribution of the Graduate School, Indiana State
Teachers College, Number 404, under the title _____
A Survey of Intelligence and Scholastic
Achievement in the Harrisburg Illinois
Township High School

is hereby approved as counting toward the completion
of the Master's degree in the amount of 8 hour's
credit.

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CHAPTER I

THE PROBLEM, REVIEW OF RELATED LITERATURE, AND METHOD OF PROCEDURE

Harrisburg, Illinois is situated in the extreme southern part of the state in Saline County. The town has a population of between 11,000 and 12,000 with the chief industry that of coal mining. The high school is a large township high school with more than a thousand students. More than half the pupils are children of miners or of people connected with the coal industry. There is a fairly large foreign element in the school but it is not the undesirable type often found in such communities. Most of the foreign pupils are Lithuanians and some of the best students are found among these. There are very few Italians and Hungarians. The language problem is of no consequence as practically all the foreign students are of the second or third generation and have no trouble with the English language.

I. THE PROBLEM AND ITS IMPORTANCE

The Harrisburg Township High School is of the purely traditional, highly mechanized type with only one curriculum which all pupils must enter. No attempt has been made to find out anything about the intelligence or ability of the pupils or to make provision for those of different ability.

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The purpose of this study was to give intelligence tests to the entire student body with the idea of finding out the level and range of their intelligence as compared with standard norms. Then the investigator wished to determine the correlation of the intelligence of the pupils with their achievement in terms of teachers' marks since no standard achievement tests were used in the school. This work was undertaken as a basis for recommending changes in organization and administration in the light of the findings which would bring about better adjustment of the pupil to his school.

This study is very general and gives only a broad view of conditions as they exist. Every school system should certainly make a survey of present conditions and compare them with those of other schools in order to find out whether the school in question is organized along modern educational lines. So, although this is a very basic study it is to be hoped that it will serve as a foundation for further research which will eventually improve conditions in the Harrisburg Township High School.

II. REVIEW OF RELATED LITERATURE

The term survey has been used more or less loosely, but in general it has been applied to careful factual studies of educational conditions and results together with constructive

criticisms of the findings.¹ Two main forces are responsible for the development of the movement--economic and scientific. From about 1910 on the public began to be interested in knowing how its money was being spent for education and in finding out more about the educational institutions which it was supporting. This led to an interest in the survey method. At the same time educational procedure was advancing along more scientific lines and before conditions could be bettered a knowledge of that which already existed had to be gained. Thus a more scientific method of survey study was developed.² While at first the survey was merely a study of existing conditions the later tendency is to furnish not only a critical evaluation of the system as it is operating, but to present and interpret the facts necessary for the formulation of a school policy for the future.³

Monroe⁴ believes that survey investigations are subject to various errors which decrease their dependability unless

¹ Jesse B. Sears, The School Survey (Boston, New York: Houghton Mifflin Company, 1925), p. 1.

² Ibid., p. 3.

³ Ibid., p. 10.

⁴ Walter S. Monroe, "Dependability and Value of Survey Types of Investigations," School and Society, 38:517-22, October 21, 1933.

special care is taken while making them. Test scores involve variable errors of measurement and validity which decrease, however, as the number of cases increases. Systematic errors of measurement and validity are not affected by the number of cases and since their magnitude cannot usually be determined they often make findings not highly dependable. Teachers' marks, if used in a survey, should not be completely relied upon as they are subject to halo effect. When samplings are taken it is difficult to be sure that they are representative. A survey is of value if some use is made of it and conditions are bettered.

"In many cases it is likely that more efficient practises would be planned if less attention was given to the status of present conditions and practises and more attention was given to thoughtful consideration of local conditions and to the application of educational theories."⁵

Since intelligence tests form the basis of this study a brief discussion of their history, value, and limitations will be given. According to Maxfield⁶ development of intelligence testing was begun in the last decade of the nineteenth century. In 1890 tests of simple reactions and

⁵ Ibid., p. 521.

⁶ F. N. Maxfield, "Trends in Intelligence Testing," Educational Research Bulletin, 15:134-41, May, 1936.

sensory discrimination were being given. In 1895 Binet and Henri in France argued for the inclusion of comprehension, different aspects of memory and imagination, aesthetic appreciation in addition to simpler mental processes. This was a trend in individual psychology which received little support in this country for some time. After the turn of the century when mass education was beginning to be prevalent and students with greater range of ability were appearing in schools, some provision had to be made for special classes for the subnormal and backward pupils, and further study was made of problems of retardation and elimination. In 1904 Binet was consulted as to methods of selection of pupils for such classes in Paris and his scale for measuring intelligence was published the following year. The Stanford revision by Terman in 1916 was used more extensively than any other revision.⁷ A later revision by Terman and Merrill in 1937 is replacing the 1916 revision, however.

Because Binet's scores gave good correlation with ability to do school work and because of the relative simplicity and economy of the methods, mental testing was oversold and careful psychological work in the field of individual differences still suffers from this effect. During the World War group tests of intelligence, verbal and non-verbal, were

⁷ Ibid., p. 136.

developed and used in unprecedented numbers. Since the war, development of tests has gone on rapidly and Thorndike became the leader in this country in the development of statistical procedures in dealing with test results. The child, instead of the curriculum, came to be the center of attention in better schools and the case study method was developed.

There are many misconceptions in regard to mental age and intelligence quotient. "Probably the most serious objection to the use of the intelligence quotient as the test score is that it gives no measure of deviation, except to indicate that the score is above or below average."⁸ Ways of obviating this difficulty have been suggested, among which McCall's T-score is probably the best known. The method of standard measures or standard scores expresses the deviation of any test score from the mean score made by the group on the same test as a multiple of the standard deviation. Massed data from intelligence tests should always be interpreted by statistical methods and a case study should always supplement interpretation of an intelligence test.⁹

In speaking of the limitations of intelligence tests Freeman¹⁰ says that they measure intellectual capacity in-

⁸ Ibid., p. 139.

⁹ Ibid., p. 140.

¹⁰ Frank N. Freeman, Mental Tests (Revised), (Cambridge, Massachusetts: The Riverside Press, 1939).

directly rather than indirectly. "A person exhibits capacity only as he acts, and it is only his acts which we can measure."¹¹ Along the same line of thought St. John states that intelligence tests measure directly, not the individual's native capacity to learn or even to any great extent his present ability to learn, but rather what he has learned, with the assumption, however, that the extent to which one has actually learned through such universal experience is proportionate to his capacity or ability.¹² He says that many tests are highly linguistic and scholastic and often do not fairly test persons who have had more or less than normal linguistic or scholastic experience for their age. In defense of such tests St. John says that the linguistic and scholastic experiences upon which they are so largely based probably constitute the greatest body of common and fairly uniform experience of all persons during the school age. Intelligence tests furnish a basis for prognosis on the theoretical assumption that the extent of learning through common experience in the past fairly forecasts what may be expected in the future; the constancy of the intelligence quotient

¹¹ Ibid., p. 395.

¹² Charles W. St. John, Educational Achievement in Relation to Intelligence (Cambridge, Mass., Harvard University Press, 1930), p. 28.

shows that this assumption is warranted.¹³ Specific reactions are tested but integration, the most important aspect of the individual's make-up, is tested very inadequately and indirectly and this fact should be taken into consideration in the interpretation of intelligence test scores.

Freeman gives two important uses of intelligence tests. First, when variations in achievement of children of a school or class are found it will be helpful in interpreting the causes of such variation to know the intelligence rating of the specified group. Second, the work of the individual teacher can be judged. An insight into the basis of teachers' marks can be gained, for the teacher should judge pupils' abilities fairly accurately to be successful in handling them.¹⁴ Other contributions of mental tests are that they form the basis for homogeneous grouping, make possible the comparison of capacities of high school students in different communities, indicate the wide range of capacities, and suggest why students drop out early.¹⁵

Countless surveys have been made of schools. It is not

¹³ Ibid., p. 28-32.

¹⁴ Frank N. Freeman, Mental Tests (Revised) (Cambridge, Mass.: The Riverside Press, 1939), p. 272, 273.

¹⁵ M. J. Van Wagenen, Educational Diagnosis and the Measurement of School Achievement (New York: The Macmillan Co., 1926), p. 203.

the investigator's intention to review these in this study, but to review briefly those studies which have to do with a comparison of intelligence and achievement and which seem to be of particular interest and significance.

Olander and Walker¹⁶ made an attempt to find out whether teachers can estimate pupils' intelligence quotients. They gave three intelligence tests to fifty-five freshman pupils and asked four teachers to estimate independently the intelligence quotients of these pupils. From a comparison it was found that probably the combined judgments of several teachers could be trusted in estimating intelligence quotients. The study, however, was not extensive.

Rundquist¹⁷ tested Minneapolis seniors in high school for the two years 1929 and 1933 to see whether the intelligence level was higher or lower in 1933 than in 1929 and whether there had been any change in the policy of teachers' marks. He found an increase in the intelligence level for 1933 as compared with 1929. He also found that while intelligence increased there had been a tendency to grade more

¹⁶ Herbert T. Olander and Bert S. Walker, "Can Teachers Estimate Intelligence Quotients?" School and Society, 44:744-6, December 5, 1936.

¹⁷ E. A. Rundquist, "Intelligence Test Scores and School Marks of High School Seniors in 1929 and 1933," School and Society, 43:301-4, February 29, 1936.

severely despite this increase in intelligence. "The data illustrate clearly the need for systematic surveys of the student population in any particular district or school system."¹⁸

Traxler¹⁹ made a study to determine whether a significant relation exists between achievement-test scores and school marks when the relationship is not affected by intelligence. Intelligence tests were given and achievement tests in several different subjects. It appeared that all median correlations between achievement-test scores and marks are reduced to some extent by holding the intelligence score constant. Intelligence has more influence on the relation between achievement-test scores and school marks in English than in any other subject or department. The general conclusion was that although intelligence operates to raise the correlation between scores on achievement tests and school marks, a positive and significant degree of relation usually exists aside from the influence of this factor.

Burgert²⁰ compared the intelligence quotients and teachers' marks for 191 pupils in grades 6A and 9A in the

¹⁸ Ibid. p. 304.

¹⁹ A. E. Traxler, "Correlation of Achievement Scores and School Marks," School Review, 45:776-80, December 1937.

²⁰ Robert H. Burgert, "Relation of School Marks to Intelligence in Secondary Schools," Journal of Applied Psychology, 19:606-14, October, 1935.

Roosevelt Junior High School of San Diego, California to determine the value of the intelligence quotient as a means of predicting school success as measured by teachers' marks. He found the correlations low and positive and decided that the intelligence quotient is unsatisfactory as a means of predicting academic success as generally measured by grades. A combination of several factors such as intelligence quotient, mental age scores, achievement ratios, and teachers' judgments will provide a better means of predicting success.

Adkins²¹ attempted to show which of three intelligence tests was of the most value in predicting scholarship scores. These tests were the Kuhlmann-Anderson, Morgan, and Otis tests. Three scholarship indices were used, Point-Subject-Ratio, Total Credit Points, and Credit-Subject-Ratio. She found that the Total Credit Points had the highest average correlation (.56) with the three tests and the highest inter-correlation with the other two scholastic indices (.96). For ninth grade data Otis had the highest average correlation, Kuhlmann-Anderson second and Morgan third. The best combination of two tests for the ninth grade is the Morgan and Otis. The Morgan test has the highest retest reliability

²¹ Dorothy C. Adkins, "Efficiency of Certain Intelligence Tests in Predicting Scholarship Scores," Journal of Educational Psychology, 28:129-34, February, 1937.

with an average of .76, Kuhlmann-Anderson second with .71 and Otis third with .66.

Collier²² tried to determine the value of admission examinations in determining success in a secondary institution in the County of Northumberland. Examinations in arithmetic, English and intelligence were given in 1926. At the end of five years Head Masters and Head Mistresses made a special assessment of the 1926 pupils' suitability for the secondary school course. Coefficients of correlation were obtained by comparing secondary school assessments with each of the three admission examinations. The coefficient of correlation is highest in the intelligence test, showing that this was the most effective part of the examination. The arithmetic test was the least effective and the best result was obtained by a combination of the arithmetic, English, and Intelligence scores.

Wolf²³ made a study of two groups of girls, fifty in each, of relatively equal intelligence, but differing markedly in achievement as measured by standard tests, in order to try to ascertain how they differed and what might be the

²² J. W. Collier, "The Predictive Value of Intelligence Tests for Secondary Education," British Journal of Educational Psychology, 3:65-70, February, 1933.

²³ S. J. Wolf, "A Comparative Study of Two Groups of Girls of Relatively Equal Intelligence but Differing Markedly in Achievement," Journal of Applied Psychology, 21:304-10, June, 1937.

cause for their variation in achievement. There is a high correlation between intelligence and academic achievement and children of normal intelligence generally do normally well in their school subjects. This study was devoted to those of normal intelligence who yet fail in their subjects. The two groups were found to manifest measurable differences in personality traits which were measured by the personality tests. The failing group was not endowed with special non-verbal abilities that might warrant a disinterest in verbal tasks. They differed in certain test items on the intelligence tests. The achievement tests indicated that the two groups differed most in subjects that require reasoning such as arithmetic fundamentals, and least in drill subjects such as spelling. This study seems to show that further work in this field is needed to establish definite conclusions.

III. METHOD OF PROCEDURE

The best method of administering the Otis Quick-Scoring Mental Ability Tests, Gamma A, to more than a thousand students presented a problem of no little importance. The writer was aware of the fact that the ideal procedure would be for one person to give all the tests at one time. Physical conditions, however, made this plan impossible. If the students were divided into groups of three or four hundred the tests would have to be given with intervention of time

and this would mean that students taking the test at a later time would be more or less informed of the test items.

Groups as large as three or four hundred place the students in an unfamiliar setting and make explanation of a test more difficult. So it was decided that it would be better to give all the tests at one time in a familiar setting which would put the students at ease. The first hour classes and assemblies were chosen as a suitable time.

Since it would be necessary for all teachers having first hour classes and assemblies to give the tests a faculty meeting was called two days before the tests were to be given. The writer carefully explained the manner of giving the tests with special attention called to the importance of the time element, and gave each teacher a copy of the manual of directions which comes with the tests. The teachers had two days in which to become familiar with the tests and the manner of giving them. On January twelfth the tests were administered by thirty-two teachers with the classes averaging about thirty-two. The faculty was much interested and cooperated in a fine manner and the writer believes that the results were as reliable as if the tests had been given under one of the conditions first mentioned.

The tests were graded and tabulated according to the four classes. The median score of each class was found and compared with the standard norm for the median chronological

age. The table of standard norms was furnished with the tests. The intelligence quotients were found as suggested in the manual of directions, this method being to add to or subtract from 100 the amount which each pupil made above or below the standard norm for his chronological age. The median intelligence quotient for the entire school and for each class was computed and the standard deviation of these intelligence quotients. The frequencies, medians, and standard deviations of the intelligence quotients of the four classes are shown in tabulated form. Another table shows a comparison of the frequencies and medians of the intelligence quotients of the boys with those of the girls.

Histograms were made which show the frequencies of the intelligence quotients of the entire school and of each class separately. A frequency curve of the chronological ages of the whole school was made and is included here.

Since standard achievement tests have never been given in the Harrisburg high school the only source available for studying scholastic achievement was teachers' marks. At the close of the school year a general average for each pupil in all his subjects was found and a frequency curve made of these averages. From a scatter diagram showing the correlation between the intelligence quotients and the scholastic averages, the coefficient of correlation and probable error were computed.

In conclusion, recommendations for various changes in the organization and administration of the high school were suggested which seem to be advisable from a consideration of the findings of this study.

CHAPTER II

REPORT OF FINDINGS

The Otis Quick-Scoring Mental Ability Tests, Gamma A were administered to 1039 pupils of the Harrisburg, Illinois Township High School, of whom 329 were freshmen, 256 sophomores, 252 juniors, and 202 seniors. The results of a comparison of the median scores of each class with the standard norm for the median chronological age of each class is shown in Table I.

From this table we see that the freshmen rank 1.12 points below the standard norm, the sophomores, 1.28 below, the juniors, 1.09 points above the norm, and the seniors,

TABLE I

A COMPARISON OF THE MEDIAN SCORES OF THE FOUR
CLASSES WITH STANDARD NORMS FOR THE
OTIS GAMMA A TEST

Median age	Standard norm	Median score on test
Freshmen 14 yrs. 7.4 mo.	32	30.88
Sophomores 15 yrs. 7 mo.	36	34.72
Juniors 16 yrs. 7 mo.	38	39.09
Seniors 17 yrs. 8 mo.	40	42.61

2.61 points above. The rise above the norm in the junior and senior classes is, no doubt, due to the drop-outs along the way which leave the groups more select. Consideration of the size of the freshman class, 329, and the senior class of 202 shows that the matter of drop-outs is serious. No data for the size of the present senior class when it entered high school was available, but if the present freshman and senior classes are of average size, and they seem to be, this would mean that 38.6 per cent drop out before they become seniors. This is a high figure and is perhaps due in large part to the undifferentiated curriculum. A detailed study of the drop-outs would be quite interesting and valuable.

The scores on the tests were changed into intelligence quotients by adding or subtracting the difference between the score and the standard norm from 100. Then the median intelligence quotients for the entire school and the four classes were found. Table II shows the frequencies, medians, and standard deviation of the intelligence quotients of the four classes. The intelligence quotients range from 72 to 140 with the greatest range in the sophomore class, from 72 to 132, which has a standard deviation of 10.75. As might be expected from a more select group the senior range is the smallest, from 80 to 129 with a standard deviation of 9.45.

The histogram of the intelligence quotients of the whole school in Figure I shows that the intelligence quotients

TABLE II
 FREQUENCY DISTRIBUTION OF THE INTELLIGENCE
 QUOTIENTS OF THE FOUR HIGH
 SCHOOL CLASSES

Intervals	F r e q u e n c y			
	Freshmen	Sophomores	Juniors	Seniors
140-144			1	
135-139				
130-134		1		
125-129			4	2
120-124	3	7	7	10
115-119	17	16	14	11
110-114	25	25	22	21
105-109	43	27	41	39
100-104	61	47	51	46
95-99	52	43	48	37
90-94	64	40	28	19
85-89	42	31	22	12
80-84	15	15	11	5
75-79	7	2	3	
70-74		2		
Medians	98.51	99.41	101.37	103.04
Standard Deviations	9.75	10.75	10.25	9.45

number of cases

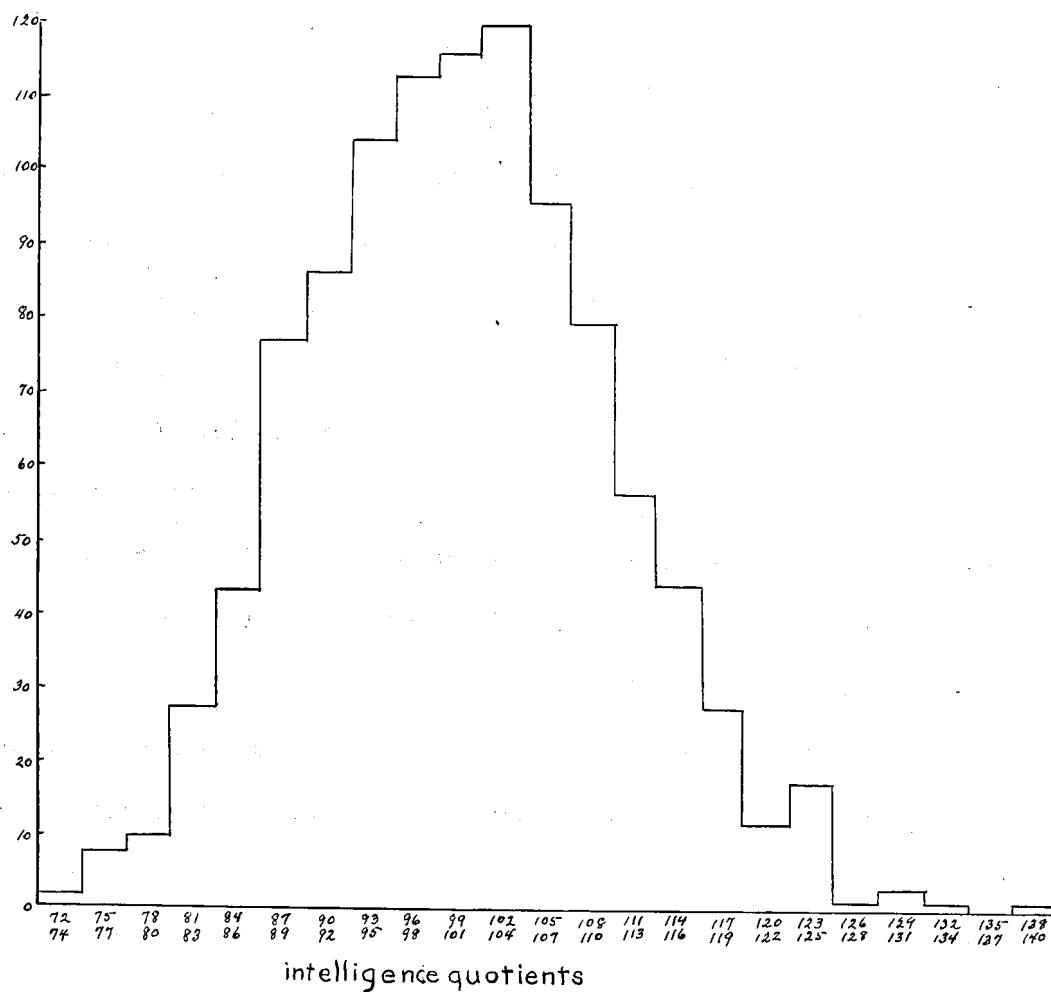


FIGURE 1

FREQUENCY DISTRIBUTION OF THE INTELLIGENCE
QUOTIENTS OF THE ENTIRE SCHOOL

follow the normal frequency curve fairly closely but with a tendency to be heavier on the low side. In a community of the type of Harrisburg this result might be predicted. The median of the entire school is 100.31.

The histograms in Figure 2 make an interesting comparison of the intelligence quotients of the four classes. In the freshman and sophomore classes again can be seen the shift to the low side with the junior and senior classes more closely following the normal curve. The medians of course are shifted to the right, from 98.5 for the freshmen to 103.04 for the seniors.

A study of the extremes of the range of intelligence quotients shows that 253 or 24.3 per cent of the students have intelligence quotients of 90 or below while 34 or 3.3 per cent have intelligence quotients of 120 or above. Suggested plans for dealing with these extremes will be discussed in Chapter III.

Table III shows the frequencies and medians of the intelligence quotients of the boys and girls of the entire school. In this table the range of the boys is seen to be slightly greater than that of the girls with boys having the highest and lowest intelligence quotients in the school. The girls' intelligence quotients cluster more around the average but the difference in arrangement of both sexes is so small that it is of little significance.

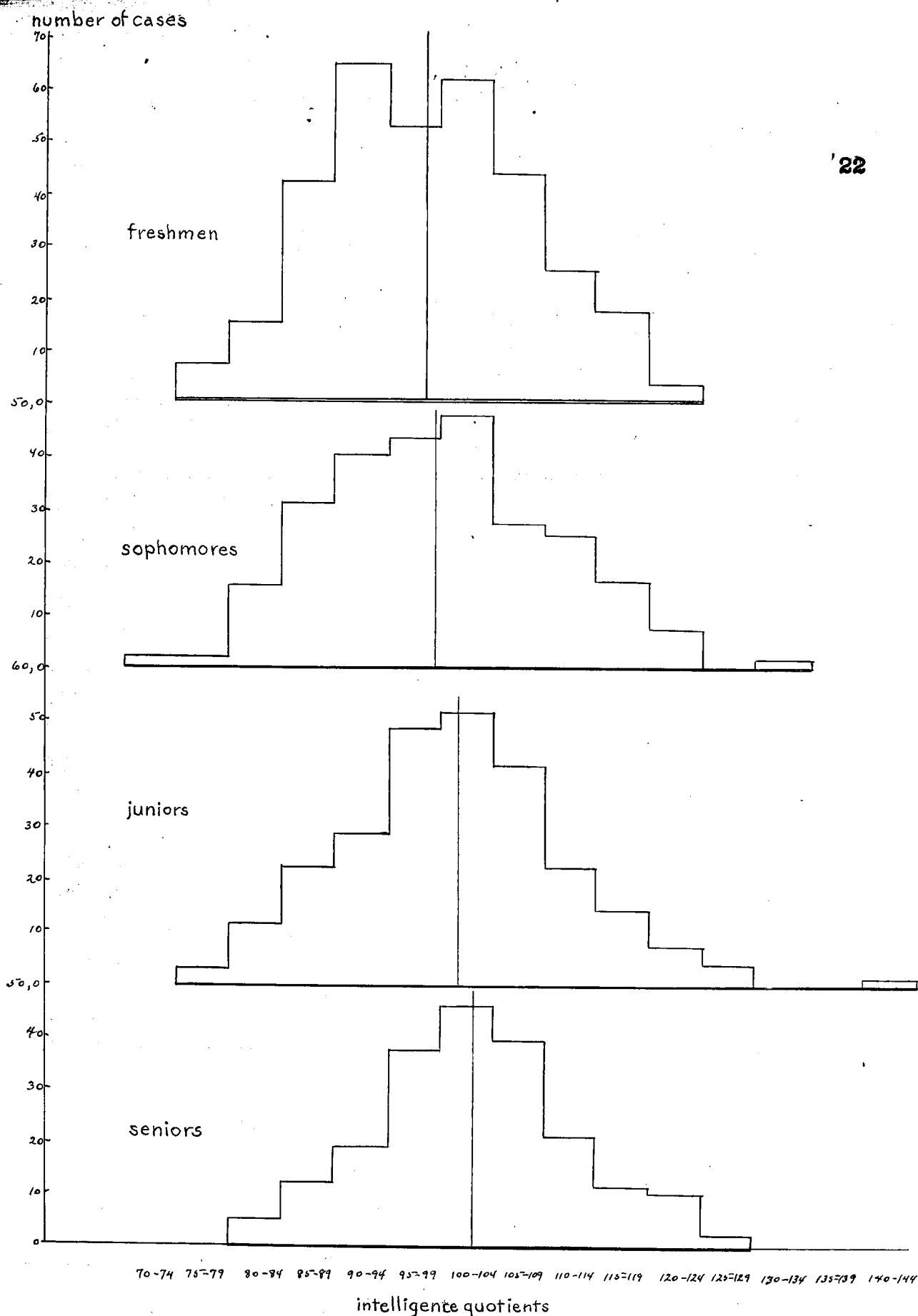


FIGURE 2

FREQUENCY DISTRIBUTION OF THE INTELLIGENCE QUOTIENTS OF THE
FOUR CLASSES WITH THE MEDIANS INDICATED IN RED

TABLE III
 FREQUENCIES AND MEDIANS OF THE INTELLIGENCE
 QUOTIENTS OF THE BOYS AND GIRLS
 OF THE ENTIRE SCHOOL

Intervals	F r e q u e n c i e s	
	Boys	Girls
140-144	1	
135-139		
130-134		1
125-129	3	3
120-124	15	12
115-119	33	25
110-114	42	51
105-109	73	77
100-104	95	111
95-99	91	91
90-94	72	78
85-89	58	49
80-84	29	18
75-79	7	5
70-74	2	
Medians	100.08	100.88

A study of the chronological ages in Figure 3 shows a wide range, from 12 years 6 months to 23 years 6 months. In the junior class there is a boy 13 years old with an intelligence quotient of 112 and a scholastic average of 82. He is a country boy who has been pushed along through school too rapidly with the result that his work is hard for him and he is a social misfit. He has few friends since he is too babyish for members of the junior class to care for, and he feels superior to the lower classmen of his own age. If he were superior intellectually the situation might be different. Also in the junior class is a boy 23 years 6 months old who has been married and divorced, and because he aspires to be a dietician in a CCC camp is back in high school to complete his work. He has an intelligence quotient of 100 and a scholastic average of 82. He feels rather inferior and out of place in school but the fact that he is an excellent wrestler gives him a certain amount of prestige among the pupils. These two cases are mentioned to show that a significant departure from the normal chronological age usually has an effect upon the emotional life of the child unless there is some compensating influence. The median chronological ages for the four classes are as follows:

Freshmen . . .	14 years, 7 months
Sophomores . . .	15 years, 7 months
Juniors . . .	16 years, 7 months
Seniors . . .	17 years, 8 months

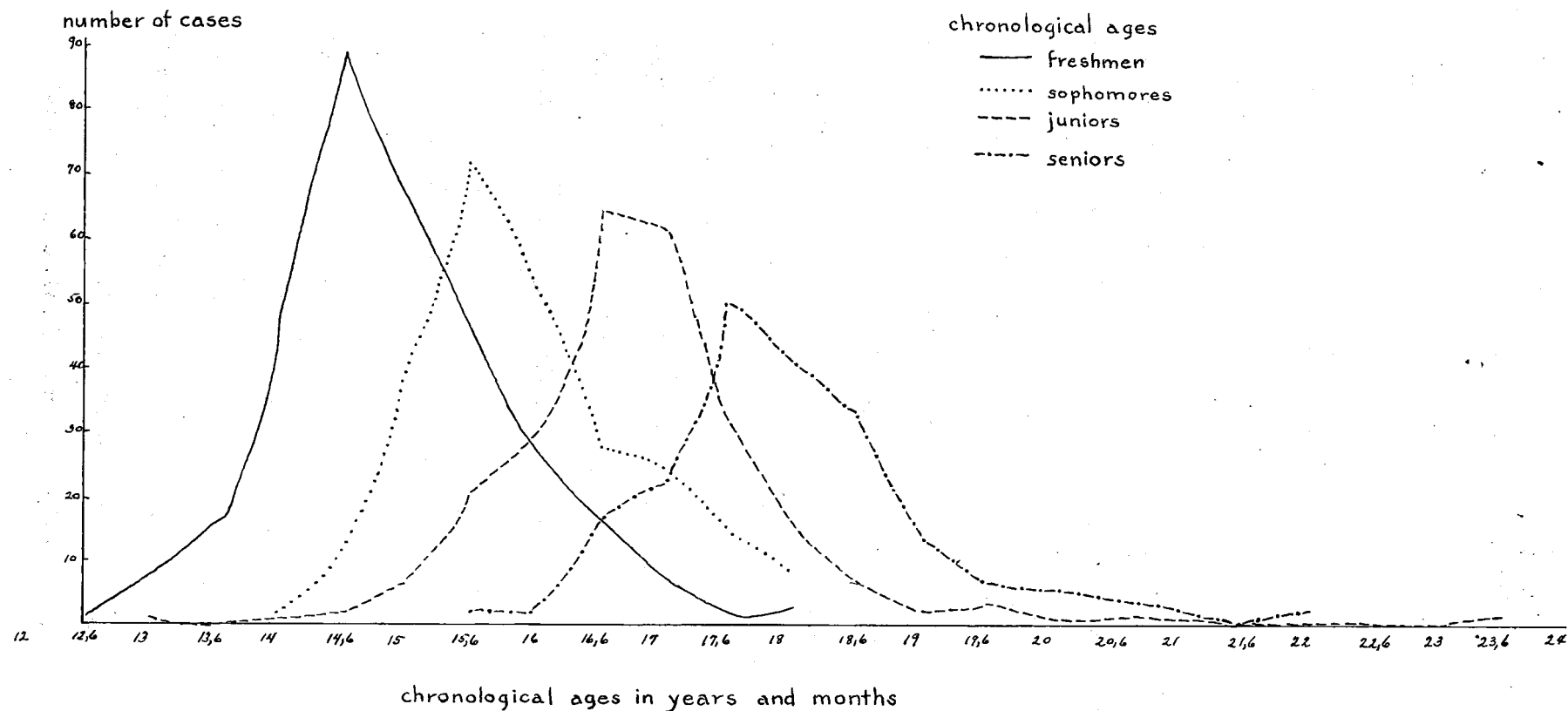


FIGURE 3

FREQUENCY DISTRIBUTION OF THE CHRONOLOGICAL AGES OF THE FOUR CLASSES

Teachers' marks are not a reliable method for measuring scholastic achievement, but, as has been stated above, this was the only source available. Too often does the personality of the teacher affect the grades he gives, especially if they are not based upon some definite measure such as standard achievement tests which have not yet been introduced into the Harrisburg high school. The fact that the percentage system is used also lowers the reliability of the marks, for, as is usually the case with this system, the upper part of the scale is used too freely and the lower part suffers from neglect. This, of course, pushes the median up too high, in this case to 84.56 for the entire school. Figure 4 shows the curve of scholastic averages for the school with the high median indicated in red. This figure clearly shows the result of using the percentage system by the large number of cases on the upper side of the scale. Two hundred and five pupils or 19.2 per cent made averages of 90 or above, and this is too large a percentage, especially when the intelligence quotients cluster around 100 as they do. On the other hand, fifty seven made grades below 75 or failed. This represents 5.6 per cent of the student body, and while high, is not as great a departure from the normal expectancy as the per cent ranking above 90.

From a scatter diagram showing the correlation of intelligence quotients and scholastic averages of the entire

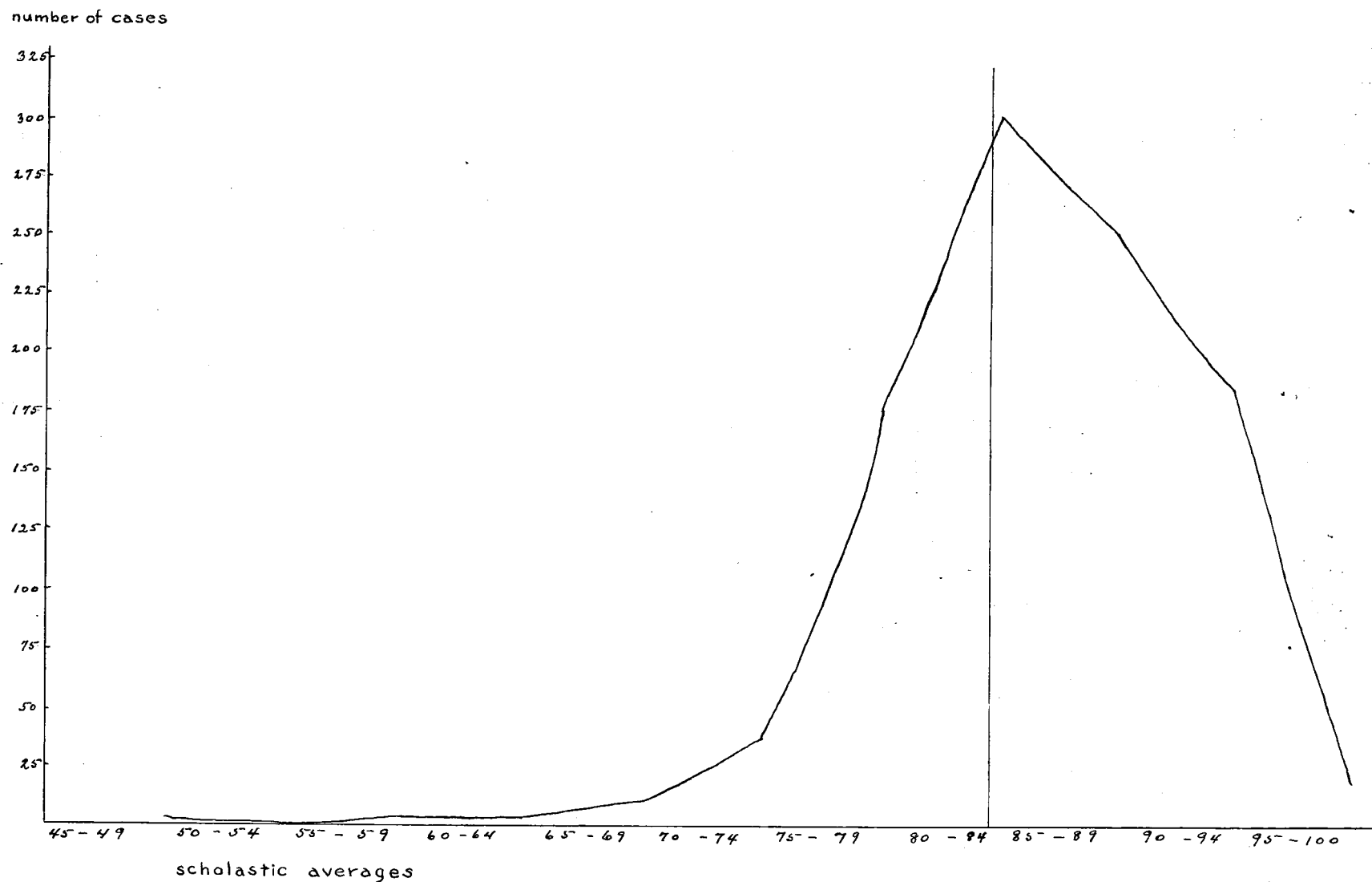


FIGURE 4

FREQUENCY CURVE OF THE SCHOLASTIC AVERAGES OF THE ENTIRE SCHOOL
WITH THE MEDIAN INDICATED IN RED

school the coefficient of correlation was found by the formula $r = \frac{\frac{\sum x'y'}{N} - c_x c_y}{\sigma_x \sigma_y}$

The coefficient of correlation was found to be .58 with the probable error $\pm .0146$. This correlation shows a substantial or marked, though not high, relationship between the intelligence quotients and scholastic achievement.²

¹ Henry E. Garrett, Statistics in Psychology and Education (New York: Longmans, Green and Company, 1926), p. 167.

² Ibid., p. 298.

CHAPTER III

SUMMARY OF FINDINGS AND RECOMMENDATIONS FOR CHANGES IN ORGANIZATION

I. SUMMARY OF FINDINGS

The results from administering the Otis Quick-Scoring Mental Ability Tests, Gamma A, showed that the freshman median score was 30.88, the sophomore 34.72, the junior 39.09, and the senior 42.61. The freshmen and sophomores fell a little below the standard norm and the juniors and seniors a little above. The median intelligence quotients of the four classes were, freshmen 98.51, sophomores 99.41, juniors 101.37, and seniors 103.4, with standard deviations of 9.75, 10.75, 10.25, and 9.45 respectively. The intelligence quotients ranged from 72 to 140 with the largest range in the sophomore class. The histograms of the intelligence quotients follow the normal curve fairly closely but with a tendency to be a little heavy on the low side. In comparing the intelligence quotients of the boys and girls, so little difference in arrangement was found that it was thought to be of little or no significance. There was a wide range in chronological ages with the median for the freshmen 14 years 7 months, for the sophomores 15 years 7 months, for the juniors 16 years 7 months, and for the seniors 17 years 8 months. The median for teachers' marks for the whole school was 84.56.

The coefficient of correlation for the intelligence quotients and school marks of the entire school was found to be .58 with a probable error of .0146.

II. RECOMMENDATIONS FOR CHANGES IN ORGANIZATION

The purpose of a survey of an institution should be twofold. First, it should be made with the idea of studying and understanding conditions as they exist. Too often we are a part of an institution about which we know little or nothing except the particular niche into which we have been fitted. This is often true even of administrators. From a survey, then, we should obtain a view of the broad and general pattern. If, however, a survey accomplished only this, half its value would be lost. After studying the cross section or general pattern, then changes should certainly be made or suggested which would benefit the institution in the light of the findings from such a study. It is with this idea that the following recommendations are being made for the Harrisburg, Illinois Township High School with the sincere hope that some, if not all, of them will in time be adopted.

With the range of intelligence as wide as it is, from 72 to 140, it is evident that some differentiation in curricula is needed. As has been stated before, it was found that 253 pupils, or 24.3 per cent of the student body have intelligence quotients of 90 or below. It is generally con-

ceded that an intelligence quotient of about 100 is necessary for a pupil to carry successfully high school work of the traditional type. The 5.6 per cent of failures as based upon scholastic averages for the year might seem to argue that pupils of a much lower intelligence quotient than 100 can successfully do high school work, but it is the writer's belief that most of the pupils with an average of 75 or a little above have not been successful in their work and should have been failed except for the grace of their teachers and the school's policy of having a minimum number of failures. Many of these people on the border line in the freshman and sophomore years will fail during the next two years as the work becomes more difficult and will drop out of school as the result. If these people with intelligence quotients of 90 or below could be placed in courses or curricula more suitable to their mentality they could know the satisfaction that comes from actually doing their work successfully and would not experience the feeling of failure or of knowing that they were given a passing grade for work that they did not do.

As it is, there is only one curriculum which permits a student to graduate and this is a form of the college preparatory curriculum. True, he has some choice in the matter of electives but these cannot offset the struggle that many of low mentality have with the prescribed courses. How much

better it would be, for those who wished or whose intelligence quotients indicated, if they could graduate from a course in commercial work, one in home economics, one in agriculture, one in shop work or manual arts, and one in fine arts including music, art, and dramatics, instead of the college preparatory course. Special aptitudes and interests in these different fields are not discovered by means of mental tests but there are special tests by which these interests may be determined. Some of these, such as the Seashore Musical tests, should be given to those pupils who fall in the low range of intelligence and perhaps some new interest might be discovered.

In a school of the size of Harrisburg, provision should be made for these various curricula. The scarcity of courses in some of the fields may be seen from the fact that in commercial work there are only three courses--shorthand, typing, and bookkeeping; in home economics--foods and clothing; in manual arts--two courses in woodwork and one in mechanical drawing; in agriculture, two courses; in art, two courses, and in music--chorus, band, orchestra, harmony, and appreciation. The faculty would have to be increased, no doubt, if there was much enrichment of the curriculum but more courses could be added by having the teachers in the different departments teach a variety of allied courses with perhaps not more than one or two classes in each subject.

Enrollment in the different curricula should be based partly on intelligence and partly on the choice of the pupil. No intelligence tests had been given to the students until those in connection with this study last year. It is hoped that a precedent may be established whereby intelligence tests will be given every year to the freshmen. These should be given at the first of the school year before the students enroll and the pupils of lower than 90 intelligence quotient should be directed into curricula or certain courses in a curriculum to which they would be mentally suited. There should be less difficult courses in all the curricula. For example, if a student wished to enroll in the college preparatory course when it seemed doubtful that he could carry the work, there might be a general mathematics course instead of algebra that he could probably master with the same idea being worked out in English and history. The teachers who help the pupils enroll should have the list of intelligence quotients before them and should understand thoroughly the offerings and possibilities in all the curricula.

Enrollment in one curriculum should not be so rigid but that a student could transfer to another for valid reasons and within a reasonable length of time--perhaps at the end of the first semester. This brings up the matter of division of the school year into semesters, a plan which has not yet been adopted in Harrisburg, which still gives nine month-

ly reports. If a student fails in a subject he fails for a whole year and has to take a whole year's work over. This is discouraging to a pupil and is responsible for many of the drop-outs. It would be much better if there were beginning classes each semester so that a pupil could take one semester's work over with more chance of being able to carry the second semester's work successfully.

In arranging a program to meet the needs of the lower fourth of the school--those with intelligence quotients of 90 or below--the pupils at the upper end of the range should not be overlooked.

Hollingworth, in an interesting article, states that too often the interests of the gifted are overlooked and they are the ones of most importance to society. "It is upon these minds that society must depend for the conservation and advancement of that abstract knowledge which underlies the learned professions, modern finance, and all other human concerns that call for competent abstract thinking about complex matters."¹ And in another apt quotation, "What American education needs is a clear comprehension of the extent, nature and origin of individual differences in mental caliber. The need is to measure the capacity of pupils, and to give to each in accordance with his capacity for learning and serving.

¹ L. S. Hollingworth, "Bright Students Take Care of Themselves," North American Review, 243;261-73, June, 1937, p. 265.

At present the waste that comes from forcing upon small containers what can never be received, and from leaving large containers unfilled, in our schools, is unrealized, except where mental measurement has partially illuminated the scene."²

In Harrisburg there are 34 pupils or 3.3 per cent with intelligence quotients of 120 or above. This is not a large percentage but provision for their needs should certainly be made. This can be done in large part by the teachers in whatever classes they happen to be enrolled, by giving them extra work which will challenge them to work up to the limit of their ability. Too often teachers are content if students of superior ability do the required work and make good grades, and spend little time in finding out whether or not these students are really being challenged. This, of course, would call for individual attention on the part of the teacher and this cannot adequately be given with the present system of no vacant periods for the teacher.

In addition to the enrichment of the present courses for the mentally superior a few courses should be added which approach college level. As it is there are only two courses which offer much of a challenge to the mentally superior--an advanced Latin class and one in advanced mathematics. A more difficult course in history and English departments, at

² Ibid., p. 272.

least could easily be added.

In addition to adding courses in various departments in which these superior students are enrolled there should be some advanced courses in art, dramatics and music which would challenge such students. They should be urged to enroll in these even though they may think they have no particular talent as some new interest or talent may thus be discovered.

The pupils who drop out of school should be studied more carefully, for at present there is no system of checking on them. As has been stated before, about 38.6 per cent of the student body drop out before they become seniors. In a school as large as Harrisburg checking on these students and trying to keep them in school would present quite a problem. This could be accomplished best through a home-room system which would be an innovation at Harrisburg. There are three large assemblies with three or four hundred students in each. If these students could be sent to home-rooms for at least one period a day with each teacher responsible for about thirty students much good could be accomplished. The teacher would get to know these students personally, a thing which is now practically impossible. She could carry on some guidance work, of which there is none at present. She would have personal records of the home-room students and understand conditions at home and other factors influencing their school work. She would have a chance to find out whether the ment-

tally superior pupils are working up to the limit of their ability, and could make arrangements with their other teachers for extra work or for entrance into some of the classes in art, dramatics, and music which have been suggested above.

If one of the pupils dropped out it would be the duty of the home-room teacher to inquire into the causes and to do what she could to bring him back. With a little encouragement from one who seems genuinely interested in him, a pupil usually will respond. This personal contact with the students by the faculty is one respect in which the Harrisburg School falls far below the standard, and a system of home-rooms would do much to remedy this situation. A larger faculty might be needed but if the program were enriched, more teachers would have to be employed anyway. If each teacher were given four classes and a home-room instead of five classes and an assembly, as at present, this would take care of the home-room plan and give the teachers a much needed free period. The teacher now has very little time for individual work with the pupils and with the present system of one curriculum and the wide range of intelligence quotients, it is evident that both the slow and superior students certainly need individual attention.

From a consideration of the median intelligence quotient of the school, 100.31, and the median of scholastic marks, 84.6, it is evident that the teachers are marking too

high. This situation would be helped if a system of letters instead of per cents were used. The middle and lower part of the range in the letter system is used more than in the percentage system.

These suggested changes may seem drastic but Harrisburg is financially able to bring them about; and if some of these could be made within the next few years, and all of them eventually, the school would approximate the ideal--that of a school in which the pupils are more suitably and happily adjusted.

This study is by no means exhaustive but it is hoped that it may serve as a beginning for further study and survey. A detailed study of drop-outs would be valuable. More work along the line of comparison of the sexes in intelligence and achievement would be interesting. The matter of guidance deserves special attention, and when this is done individual case studies of the pupils to determine whether they are working up to their mental ability and the causes for marked variations in mental ability and achievement can be made. A study of personality is a relatively new field growing out of work in guidance which should be made in the future.

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