

A COMPARATIVE STUDY OF URBAN RESIDENT, RURAL RESIDENT,  
AND RURAL NON-RESIDENT PUPILS IN THREE  
KANSAS HIGH SCHOOLS

A THESIS

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## CHAPTER I

### INTRODUCTION

#### The Problem

Many rural families face the problem each year as to whether they should send their children away from home to high school, let them drive to school every day and live at home, or move the family to town in order that the children may attend high school.

This study is an attempt to determine which group of high school students do the best work: the ones who live in town and stay at home; the ones who live in the country but stay at home and drive, walk, or are transported; or the students that are away from home during the week. This study also attempts to answer the following questions. Do males or females do the best work when they are away from home? How does the work done by this group compare with the work of the males and females in the other two groups? In what year of high school do these three groups do their best work?

#### Related Studies

A number of studies have been made in different parts of the United States which have had for their purpose a comparison of rural and urban pupils. The studies,

in nearly every case, have been directed toward judging the quality of preparatory work rather than the influence of the environment on the scholastic achievement in high school. There have also been several studies showing the sex differences in securing marks in high school. These sex studies are related to one phase of this study, but they are hardly of sufficient value to warrant reviewing in this section.

A request for information in this field was sent to twenty-six of the leading libraries in the United States, in an attempt to find unpublished material. An unpublished master's thesis by Keister<sup>1</sup> at the University of Chicago made a comparison of resident and non-resident pupils in two Nebraska high schools, but a copy of this study was not available.

Many fine letters were received in answer to the request. Mr. W. H. Gaumnitz, Senior Specialist in Rural-Education Problems, Bureau of Education, Washington, D. C., wrote:

We regret to advise you that so far as we know there have been no careful studies of the question of which group of high school students do the best work--those living in town, those living in the country and driving to school, or

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<sup>1</sup> Baird Vinton Keister, A Comparison of Resident and Non-resident Pupils in Two Nebraska High Schools. (unpublished master's thesis, University of Chicago, 1928).

those who board away from home. . . . The effect of living at home, boarding out, or traveling long distances to attend school has not been studied except that children who are compelled to travel long distances are found to attend less regularly than those living near to their schools.

Herman G. Richey, Librarian and Assistant Professor of Education, University of Chicago, wrote the following:

I have not been able to make an exhaustive search, but I am convinced that studies on the subject are very rare if existant and are probably in the form of unpublished theses.

Mr. J. C. Peterson, Professor of Psychology, Kansas State College, Manhattan, Kansas, wrote:

We have no studies here going directly or extensively into this problem, but there are some studies which are somewhat related to it.  
\* \* \*

Your problem is interesting and worthy of extensive investigation. Under proper statistical controls and precautions, such a study would make an excellent master's thesis.

#### Source of Data

The data used in this study were taken from the permanent records of the Dickinson County Community High School at Chapman, Kansas; the Smith Center High School at Smith Center, Kansas; and the Lincoln High School at Lincoln, Kansas. These schools represent the three county plans common in Kansas. The first is a community high school. The second is a tuition-county school, and the third is a "Barns Law" high school.

The records that were used in this study were taken from the students that entered these schools as freshmen in the fall of 1925 and all others that have entered since, up to and including the spring semester of 1934.<sup>2</sup>

Scope of the Study

The scope of this study is limited to the Chapman, Smith Center, and Lincoln High Schools. The urban students who live at home and go to school will be called group I; the rural students who stay at home but must drive or be transported will be referred to as group II; the students who must be away from home during the week will be called group III. Many of the students who were in these schools during the period covered by this study were not used. The figures shown in Table I represent only the students included in the study. On examination of the data, it will be found that the schools have had about the same enrollment since 1925. Chapman has had the largest with 686; Smith Center is next with 636; Lincoln is the smallest with 598. There is a much greater variation in the number of students in the three groups than there is in

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<sup>2</sup> The original plan was to secure the data from ten or twelve schools and to use students from only the last two or three years. The difficulty of securing access to the records of so many schools caused the adoption of the plan described above.

**TABLE I**  
**NUMBER OF PUPILS BY TOWNS AND GROUPS**

School	Group I			Group II			Group III			Total
	M	F	T	M	F	T	M	F	T	
Chapman	49	77	126	132	98	230	143	187	330	686
Smith Center	120	179	299	112	70	182	45	110	155	636
Lincoln	167	162	329	84	38	122	51	96	147	598
Total	336	418	754	328	206	534	239	393	632	1920

Read table thus: In Chapman there were 49 males and 77 females, or a total of 126 in group I. In Smith Center there were 120 males and 179 females, or a total of 299 in group I. The total for each school is in the right column. The total for each group is in the last line of the table.

the total enrollments. In Smith Center and Lincoln the largest number of students is in group I; this same group has the smallest number in Chapman. Group II has the second largest number of students in Chapman and Smith Center but the smallest number in Lincoln. Nearly half of all the students at Chapman are in group III; this is the smallest group at Smith Center and the largest at Lincoln. There is no great variation in the total numbers from the various groups, however, when the students from the three schools are combined.

#### Method

The student's record was first tabulated on a data sheet. On this sheet a record was kept of the name, age, sex, school, date entered, and the grades made by years in each subject. All subjects that are allowed to count toward a high school diploma by the State Department of Education were included in this study.

Chapman and Lincoln used the per cent method of grading. Smith Center used A, B, C, D, and F, with the plus and minus with each grade except F, as suggested by the Kansas Uniform Grading Plan. To make the grades comparable, the letter and per cent grades were recorded on the data sheet with a numerical value. They were converted in the manner shown in Table II.

**TABLE II**  
**NUMERICAL VALUE OF PER CENT AND LETTER GRADES**

Per Cent	Letter	Numerical Value
99 - 100	A+	.66
97 - 98	A	1.00
95 - 96	A-	1.33
93 - 94	B+	1.66
91 - 92	B	2.00
89 - 90	B-	2.33
87 - 88	C+	2.66
85 - 86	C	3.00
81 - 82	C-	3.33
79 - 80	D+	3.66
77 - 78	D	4.00
75 - 76	D-	4.33
74 or lower	F	5.00

Read table thus: The first column shows the distribution of the per cent scores. The second column shows the letter distribution. The third column shows the numerical value recorded for the per cent and letter grades.

The data sheets from each town were sorted into the groups<sup>3</sup> that are being compared. They were further divided by years in high school and by sex. In all, this made seventy-two groups. The grades from each group were tallied and grouped into a frequency distribution table. Subjects of one-half unit weight were tallied as one; subjects of unit weight were tallied twice; vocational subjects that are worth two units of credit were tallied four times.

These frequency distribution tables were used in figuring the ninetieth, seventy-fifth, fiftieth, twenty-fifth, and tenth percentiles shown for the seventy-two groups in Tables III, IV, and V. The data from these frequency distributions form the basis for most of the other comparisons made in this study.

The percentiles in Tables III, IV, and V were used for two reasons: first, they follow approximately the normal distribution curve; second, they fit into the Kansas Uniform Grading Plan better than other statistical devices.

### Control of the Study

It has been assumed in this study that teachers' marks are valid criteria for evaluating the work of high school students. The students in the towns and groups

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<sup>3</sup> See "Control of Study."



TABLE III

## COMPARISON OF GRADES BY GROUP, SEX, AND YEAR AT CHAPMAN

	90th %-ile	75th %-ile	50th %-ile	25th %-ile	10th %-ile	Number of Grades
<b>Group I</b>						
Ninth year						
Male	1.97	2.59	3.07	4.19	5.00	338
Female	1.36	2.07	2.80	3.12	3.89	453
Tenth year						
Male	2.00	2.79	3.32	4.21	4.97	251
Female	1.69	2.07	2.89	3.71	4.48	410
Eleventh year						
Male	2.05	2.73	3.09	3.99	4.94	230
Female	1.46	1.97	2.68	3.12	4.08	395
Twelfth year						
Male	1.93	2.74	3.05	3.93	4.69	139
Female	1.53	2.03	2.80	3.16	4.03	351
<b>Group II</b>						
Ninth year						
Male	2.08	2.84	3.11	3.96	4.95	876
Female	1.76	2.15	2.93	3.23	4.14	522
Tenth year						
Male	2.10	2.89	3.28	4.16	4.98	647
Female	1.99	2.63	3.07	4.00	4.93	493
Eleventh year						
Male	2.16	2.85	3.10	4.13	4.97	476
Female	1.93	2.28	2.96	2.49	4.30	353
Twelfth year						
Male	1.96	2.56	3.05	3.55	4.24	354
Female	1.96	2.14	2.85	3.16	4.08	264
<b>Group III</b>						
Ninth year						
Male	2.06	2.67	3.05	3.91	4.88	947
Female	1.85	2.14	2.90	3.35	4.34	1191
Tenth year						
Male	2.02	2.64	3.37	4.38	4.99	800
Female	1.87	2.17	2.99	3.89	4.90	1042
Eleventh year						
Male	1.93	2.37	3.04	4.02	4.91	675
Female	1.67	2.05	2.87	3.29	4.29	859
Twelfth year						
Male	1.96	2.47	2.97	3.60	4.22	617
Female	1.64	2.09	2.87	3.14	4.10	826

Read table thus: The ninetieth percentile of the marks for ninth year males in group I is 1.97; for the females it is 1.36. The ninetieth percentile for the tenth year males is 2.00; for the females, 1.69; and so forth.

TABLE IV

## COMPARISON OF GRADES BY GROUP, SEX, AND YEAR AT SMITH CENTER

	90th %-ile	75th %-ile	50th %-ile	25th %-ile	10th %-ile	Number of Grades
<b>Group I</b>						
<b>Ninth year</b>						
Male	1.62	2.12	2.98	3.73	4.14	889
Female	1.50	2.02	2.89	3.54	4.08	1249
<b>Tenth year</b>						
Male	1.60	2.06	3.14	3.64	4.04	689
Female	1.48	2.01	2.88	3.34	4.04	993
<b>Eleventh year</b>						
Male	1.54	2.20	3.01	3.67	4.14	569
Female	1.38	1.92	2.79	3.30	4.01	834
<b>Twelfth year</b>						
Male	1.28	1.93	2.55	3.17	3.92	460
Female	1.25	1.70	2.36	3.05	3.89	678
<b>Group II</b>						
<b>Ninth year</b>						
Male	1.86	2.32	3.02	3.88	4.24	816
Female	1.32	1.87	2.57	3.20	3.95	515
<b>Tenth year</b>						
Male	1.79	2.18	2.93	3.59	4.09	678
Female	1.35	1.89	2.62	3.55	4.15	444
<b>Eleventh year</b>						
Male	1.64	2.33	3.00	3.70	4.13	565
Female	1.56	2.12	2.89	3.75	4.23	309
<b>Twelfth year</b>						
Male	1.78	2.16	2.78	3.35	4.04	443
Female	1.27	1.60	2.11	3.12	3.82	211
<b>Group III</b>						
<b>Ninth year</b>						
Male	1.89	2.38	3.01	3.66	4.11	308
Female	1.56	2.05	2.91	3.44	4.06	745
<b>Tenth year</b>						
Male	2.19	2.62	3.06	3.74	4.40	228
Female	1.56	2.05	2.91	3.44	4.06	745
<b>Eleventh year</b>						
Male	1.82	2.54	3.09	3.85	4.39	199
Female	1.51	2.02	2.88	3.33	3.99	559
<b>Twelfth year</b>						
Male	2.05	2.36	2.98	3.64	4.12	159
Female	1.31	1.89	2.51	3.05	3.48	439

Read table thus: The ninetieth percentile of the marks for ninth year males in group I is 1.62; for the females it is 1.50. The ninetieth percentile for the tenth year males is 1.60; for the females, 1.48; and so forth.

TABLE V

COMPARISON OF GRADES BY GROUP, SEX, AND YEAR AT LINCOLN

	90th %-ile	75th %-ile	50th %-ile	25th %-ile	10th %-ile	Number of Grades
<b>Group I</b>						
Ninth year						
Male	1.80	2.42	2.97	3.45	4.11	1261
Female	1.54	2.09	2.77	3.30	4.10	1295
Tenth year						
Male	1.99	2.63	3.07	3.58	4.37	1011
Female	1.55	2.13	2.85	3.31	4.07	1004
Eleventh year						
Male	2.17	2.65	3.04	3.49	4.11	849
Female	1.70	2.21	2.84	3.20	3.91	855
Twelfth year						
Male	1.95	2.39	2.88	3.26	3.75	620
Female	1.65	2.23	2.79	3.13	3.67	580
<b>Group II</b>						
Ninth year						
Male	1.94	2.58	3.06	3.53	4.25	610
Female	1.59	1.99	2.49	3.05	3.87	300
Tenth year						
Male	1.81	2.46	3.03	3.60	4.28	478
Female	1.68	2.05	2.59	3.09	3.63	253
Eleventh year						
Male	2.18	2.57	3.02	3.57	4.21	357
Female	1.80	2.19	2.61	3.09	3.84	338
Twelfth year						
Male	1.73	2.35	2.92	3.29	3.46	278
Female	1.88	2.21	2.63	3.05	3.49	182
<b>Group III</b>						
Ninth year						
Male	2.15	2.84	3.15	3.75	4.32	395
Female	1.82	2.41	2.93	3.39	4.29	729
Tenth year						
Male	2.04	2.63	3.07	3.73	4.39	323
Female	1.71	2.39	2.96	3.39	4.05	591
Eleventh year						
Male	2.41	2.90	3.15	3.67	4.18	242
Female	1.80	2.42	2.95	3.38	4.15	520
Twelfth year						
Male	2.28	2.87	3.19	3.76	4.23	190
Female	2.08	2.68	3.05	3.45	4.13	422

Read table thus: The ninetieth percentile of the marks for ninth year males in group I is 1.80; for the females it is 1.54. The ninetieth percentile for the tenth year males is 1.99; for the females, 1.55 and so forth.

were equated according to age. No over age or under age students were used. Fourteen was considered the usual age of high school entrance. Deviation from this age was allowed to the extent of one year each way. In each town the students were put in one of four groups: first, the ones who lived in town and stayed at home; second, the ones who lived in the country and stayed at home but drove back and forth to school; third, the ones who were away from home during the week; fourth, the ones about whom reliable information could not be found. Many students stayed away from home during the winter and drove at other times. These and similar cases were put in group four and were not included in the study. The information for grouping the students was secured from several sources. The school records, in some cases, gave the desired information. When these were lacking, interviews were arranged with the office help, janitors, and members of the classes. All records were put in the same group by at least two of the sources. If there was a disagreement, the record was put in group four and was not used in the study. Table I shows nine hundred three males and one thousand seventeen females in the study. The reliability of the study may be checked by comparing the findings in each of the three towns. All of the students who were not ruled out by the criteria named above and who started

from 1925 to the spring of 1934 were used.

## CHAPTER II

### THE SCHOLASTIC WORK DONE BY THE THREE GROUPS OF HIGH SCHOOL STUDENTS

One of the major aims of this study was to find out whether there is any significant difference between the scholastic achievement of three groups of high school students. Group I consists of the town students who stay at home and go to school; group II consists of the ones who stay at home but must drive or be transported to school. The ones who must be away from home during the week make up the third group. Many rural families face the problem each year as to whether they should send their children away from home to high school, let them drive to school every day and live at home, or move the family to town in order that the children may attend high school. It is hoped that the findings of this study may furnish some information that will be helpful at least from a scholastic standpoint.

The grades used in Chapman, Smith Center, and Lincoln were converted into numerical values.<sup>1</sup> The highest score recorded had a numerical value of .66; the next highest, 1.00; the next, 1.33; the lowest score had a numerical

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<sup>1</sup> See Table II.

value of 5.00.

All of the comparisons are made on five levels, namely, the ninetieth, seventy-fifth, fiftieth, twenty-fifth, and tenth percentiles. These levels approximate the division of grades recommended by the Kansas Uniform Grading Plan.

A careful examination of Table VI will show that on the ninetieth-percentile level, group I has a mark of 1.61; group II, 1.80; and group III, 1.85. On the seventy-fifth-percentile level, group I has a mark of 1.93; group II has a mark of 2.29; and group III has a mark of 2.30. On the fiftieth-percentile level, group I is highest again, with a mark of 2.91; group II has a mark of 2.96; and group III has a mark of 2.98. The difference between group I and the other two groups is not so great here as it is on the other levels. On the twenty-fifth-percentile level the order is the same as before: group I is highest, with a mark of 3.41; group II is second, with 3.55; and group III is third, with 3.56. This same order is continued in the tenth percentile: group I has a mark of 4.10; group II, 4.28; and group III, 4.30. The probable errors of the medians are .0073, .0078, and .0068, respectively, for groups I, II, and III. When the difference between the medians is divided by the probable error of the difference, the quotient is considered a reliability index. It is called a critical ratio. The ratio of groups I and II is 4.7;

TABLE VI  
A COMPARISON OF THE SCHOLASTIC WORK DONE BY THE THREE  
GROUPS OF HIGH SCHOOL STUDENTS

	Group I	Group II	Group III
90th %-ile	1.61	1.80	1.85
75th %-ile	1.93	2.29	2.30
50th %-ile	2.91	2.96	2.98
25th %-ile	3.41	3.55	3.56
10th %-ile	4.10	4.28	4.30
P. E. (Median)	.0073	.0078	.0068
Number of marks	16,382	10,661	13,608

Read table thus: The ninetieth percentile of the grades received by group I is 1.61; by group II, 1.80; and by group III, 1.85. The seventy-fifth percentile for group I is 1.93; for group II, 2.29; and for group III, 2.30; and so forth.



for groups II and III the ratio is 1.9. A critical ratio of 4 or more is considered to be completely reliable. A ratio of 1.9 means that there are 90 chances in 100 that the true difference is greater than zero.

### Conclusion

The students in group I made much higher scholastic marks than either of the other two groups. This is probably due to a superior educational background, fewer out-of-school responsibilities, and the various beneficial influences of the home environment. The students in group II made higher marks than the ones in group III on all levels. The difference is not so great as between groups I and III, but it appears to be quite significant in view of the fact that the educational background of these two groups is very similar. It might be expected that group III would be more of a selected group than the others because of the expense of sending the children of this group to school away from home. They also have fewer out-of-school responsibilities. In spite of these two factors, group II does much better work. This is probably due to the beneficial influence of the home environment.

### CHAPTER III

#### SCHOLASTIC WORK DONE IN CHAPMAN, SMITH CENTER, AND LINCOLN

The schools from which the data were obtained for this study did not use the same system of marking. Chapman and Lincoln used the percentage system; and Smith Center used the marks A, B, C, D, and F, as suggested by the Kansas Uniform Grading Plan. It was, therefore, necessary to devise a system of equating the two types of marks for use in this study. The manner in which these systems were equalized is shown in Table II.

Table VII shows the marks received by the students in Chapman, Smith Center, and Lincoln for the five levels after the marks were converted into comparable grade points. The upper ten per cent made much higher marks at Smith Center than at the other schools. The ninetieth percentile at Smith Center is 1.59, as compared with 1.87 for Chapman and 1.89 for Lincoln. On the seventy-fifth-percentile level, Smith Center has the highest mark, 2.10, as compared with 2.43 and 2.75 for Lincoln and Chapman, respectively. On the fiftieth-percentile level, the order is the same: 2.83 for Smith Center, 2.92 for Lincoln, and 3.00 for Chapman. On the twenty-fifth-percentile level, the order is changed. Lincoln is high, with 3.40; Smith Center is

**TABLE VII**  
**COMPARISON OF THE SCHOLASTIC WORK DONE IN CHAPMAN,**  
**SMITH CENTER, AND LINCOLN**

	Chapman	Smith Center	Lincoln
90th %-ile	1.87	1.59	1.89
75th %-ile	2.75	2.10	2.43
50th %-ile	3.00	2.83	2.92
25th %-ile	3.69	3.49	3.40
10th %-ile	4.55	4.06	4.04
Number of marks	686	636	598

Read table thus: The ninetieth percentile of all marks made in Chapman is 1.87; in Smith Center it is 1.59; in Lincoln it is 1.89. The seventy-fifth percentile of all marks made in Chapman is 2.75; in Smith Center it is 2.10; in Lincoln it is 2.43; and so on.

next, with 3.49; and Chapman is low, with 3.69. The order on the tenth-percentile level is the same as on the twenty-fifth percentile: Lincoln, 4.04; Smith Center, 4.06; and Chapman, 4.55.

It can be seen that Chapman is the persistent "low" grader. It ranked third on all except the ninetieth percentile level. In that case it ranked second. On the median and on the upper levels, Smith Center gave the highest grades, while on the two lower levels, Lincoln was the high grader.

Grades from 95 to 100 are rare in the schools using the per cent system, whereas Smith Center gave from seven to eight per cent A's. Teachers that use the per cent system seem to retain the idea that a grade of 98 is very near perfection rather than one-thirteenth of the distance along the base line of the normal curve of distribution. This probably accounts for the comparatively high scores of Smith Center on the ninety and seventy-fifth-percentile levels.

#### Scholastic Work Done by Groups in Chapman, Smith Center, and Lincoln

In this study the students who live in town and stay at home are referred to as group I. The ones who live in the country and stay at home but must drive or be transported are included in group II. The ones who are away

from home during the week are referred to as group III.

### Chapman

The data for this section are given in Table VIII.

An examination of these data will show that on the ninetieth-percentile level, group I has the highest mark, 1.74; group III has the next highest, 1.88; and group II has the lowest mark, 1.99. On the seventy-fifth-percentile level, group III has the highest mark, 2.33; group I is second highest, with a mark of 2.38; and group II is the lowest again, with a mark of 2.54. On the fiftieth and twenty-fifth-percentile levels, the groups are ranked in the same order as on the ninetieth-percentile level. Group I is first on the fiftieth-percentile level, with a mark of 2.96; group III is second highest, with a mark of 3.01; group II is lowest, with a mark of 3.04. On the twenty-fifth-percentile level, groups I, III, and II have marks of 3.68, 3.69, and 3.71, respectively. On the tenth-percentile level, group I ranks highest again, with a mark of 4.50; group II, for the first time, ranks second, with a score of 4.57; group III is lowest on this level, with a mark of 4.58.

The group that is at home (group I) appears to make the best showing in scholastic work. The group that is away from home (group III) appears to do the next best work, and the group that stays at home but must drive

TABLE VIII  
COMPARISON OF THE SCHOLASTIC WORK DONE BY GROUPS IN  
CHAPMAN, SMITH CENTER, AND LINCOLN

		Group I	Group II	Group III
90th %-ile	Chapman	1.74	1.99	1.88
	Smith Center	1.46	1.58	1.73
	Lincoln	1.79	1.83	2.04
75th %-ile	Chapman	2.38	2.54	2.33
	Smith Center	2.00	2.06	2.24
	Lincoln	2.34	2.30	2.64
50th %-ile	Chapman	2.96	3.04	3.01
	Smith Center	2.83	2.74	2.92
	Lincoln	2.90	2.79	3.06
25th %-ile	Chapman	3.68	3.71	3.69
	Smith Center	3.43	3.52	3.52
	Lincoln	3.34	3.29	3.57
10th %-ile	Chapman	4.50	4.57	4.58
	Smith Center	4.03	4.08	4.08
	Lincoln	4.01	3.88	4.22

Read table thus: The ninetieth percentile of all marks made by group I in Chapman is 1.74; in Smith Center it is 1.46; in Lincoln it is 1.79. The seventy-fifth percentile of all marks made by group I in Chapman is 2.38; in Smith Center it is 2.00; in Lincoln it is 2.34; and so forth.

seems to make the poorest scholastic showing at Chapman. The fact that group III does better scholastic work than group II at Chapman is probably due to two important factors. First, group III is away from the outside work of the farm home. Second, Chapman has had a very large percentage of non-resident students for a number of years; in this time it has worked out a rather careful system of supervision, outside of school hours.

#### Smith Center

The marks at Smith Center, on the upper levels, are much higher than the marks at Chapman and Lincoln. As has been pointed out before, this may be due to the difference in the grading systems used. This difference, however, does not alter or influence the comparison of students within the school system. If the data for Smith Center, given in Table VIII, are examined, it will be noted that group I has the highest scholastic marks on four levels and the second highest on the fiftieth-percentile level. Group II would undoubtedly rank second in scholastic achievement, having received the highest mark on the fiftieth-percentile level and the second highest mark on the ninetieth and seventy-fifth-percentile levels. On the twenty-fifth and tenth percentiles, group II tied with group III for second place. Group III ranks lowest in scholastic achievement,

having been lowest or tied for low on all levels.

The students who live in town and stay at home to go to high school probably have an advantage because of their superior background. They probably have another advantage in that they do not usually have so many out-of-school responsibilities as do the students who live on the farm and drive to school. The scholastic achievement of group II is much better than that of group III on the three upper levels. The home and educational backgrounds of these two groups are undoubtedly very similar. Group II probably has more outside work to do than group III. The students in group III are usually more expensive to keep in school and would probably be more of a select group than the students in group II. In spite of the three factors just mentioned, group III did poorer work than group II. The reason for this is probably the poor environment of the students who are away from home attending high school.

### Lincoln

In both Chapman and Smith Center, group I made the highest scholastic marks. In Lincoln, group II has the highest marks on all levels except the ninetieth percentile. On that level, group II ranked second. The students who live in town and stay at home (group I) ranked second on all but the ninetieth percentile level, in which case they



ranked first. Group III was last on all five levels.

The lack of the proper environment is probably the cause of the poor scholastic showing made by group III. Why group II should pull so far away from group III at Lincoln is hard to understand. Why the students who live on the farm and drive to school should make a better scholastic record than the students who live in town is also puzzling. It might be that the intelligence level of the students in group II is above normal in this case. Possibly the preparatory schools from which these students came are better than the schools of the other two groups. It may be that the town environment is exceptionally detrimental to good school work.

#### Scholastic Work Done in Chapman, Smith Center, and Lincoln by Sex and Years in School

Table IX shows the variation of the school marks by years and sex for Chapman, Smith Center, and Lincoln. It will be noted that in Chapman and Smith Center the variation of the marks received by the males during their four years in high school is much less, on the whole, than is the variation for the females. In Lincoln the average of the variation for males and females is nearly equal. The greatest variation in the marks is on the tenth-percentile level. The females have a much greater variation of marks

TABLE IX  
COMPARISON OF THE SCHOLASTIC WORK DONE IN CHAPMAN,  
SMITH CENTER, AND LINCOLN, BY SEX AND BY YEAR

	90th %ile	75th %ile	50th %ile	25th %ile	10th %ile
<b>Chapman</b>					
<b>Male</b>					
9	2.04	2.70	3.08	4.02	4.94
10	2.04	2.77	3.32	4.22	4.98
11	2.05	2.67	3.08	4.05	4.94
12	1.95	2.59	3.02	3.69	4.58
<b>Female</b>					
9	1.66	2.12	2.88	3.23	4.12
10	1.85	2.29	2.98	3.87	4.77
11	1.69	2.10	2.84	3.30	4.22
12	1.74	2.09	2.84	3.15	4.07
<b>Smith Center</b>					
<b>Male</b>					
9	1.79	2.27	3.00	3.76	4.16
10	1.86	2.29	3.05	3.66	4.18
11	1.88	2.36	3.03	3.74	4.22
12	1.70	2.15	2.77	3.39	4.05
<b>Female</b>					
9	1.46	1.98	2.79	3.39	4.05
10	1.44	1.98	2.81	3.44	4.10
11	1.43	2.02	2.85	3.46	4.08
12	1.28	1.73	2.33	3.07	3.73
<b>Lincoln</b>					
<b>Male</b>					
9	1.96	2.61	3.06	3.58	4.23
10	1.95	2.57	3.06	3.64	4.35
11	2.25	2.71	3.07	3.58	4.17
12	1.99	2.54	3.00	3.44	3.81
<b>Female</b>					
9	1.65	2.16	2.73	3.25	4.09
10	1.66	2.19	2.80	3.26	3.92
11	1.76	2.27	2.80	3.22	3.97
12	1.85	2.37	2.82	3.21	3.43

Read table thus: The ninetieth percentile of all the marks made by the ninth year males at Chapman is 2.04; for the tenth year males it is 2.04; for the eleventh year males, 2.05; for the twelfth year males, 1.95. For the ninth year females the ninetieth percentile is 1.66; and so forth.

on this level than do the males.

It appears that the differences by years and sex do not vary greatly in the three towns.

### Summary and Conclusions

Some of the differences appearing in the marks in the three towns seem to be caused, at least in part, by the difference in the grading systems. The schools using the per cent system apparently do not distribute their grades according to the normal distribution curve. They seem to feel that a grade of 98 is almost perfection rather than one-thirteenth of the distance along the base line of the normal curve of distribution.

Students who live in town and stay at home do the best scholastic work in Chapman and Smith Center. This is probably due in part to the superior background for high school work. The steadying influence of the home is likely to be an important factor. The lack of out-of-school responsibilities may give them an advantage over the other two groups. Why group II should rank above group I at Lincoln is somewhat puzzling. The intelligence level of group II might be above that of the other two groups. The schools from which these students came might be exceptionally good. The town environment in Lincoln may be detrimental to groups I and III. Group III ranks second

in Chapman and last in Smith Center and Lincoln. The careful supervision given the non-resident students at Chapman probably accounts for the better showing of group III in that school. The poor environment and lack of the home guidance probably accounts for the poor showing of group III in Smith Center and Lincoln.

Over the period of four years the variation of school marks seems to be greater for the females than for the males. In both, the variation is greater in the twelfth year of school.

## CHAPTER IV

### SEX DIFFERENCES

This chapter aims to find the sex differences when all the students are considered together and when they are separated by groups. It also makes a comparison of the work of the males in the various groups and the females of the various groups. There are 903 males and 1017 females considered in this study. The total number of school marks (Each mark represents one-half unit.) for the males is 19,102; for the females, the total number is 21,686.

Table X shows quite vividly how the girls excel the boys in securing marks in high school. The difference between the two medians is only .20, which does not appear to be very great. If this were individual averages for monthly marks, many teachers would probably give both students a C. When the difference between the two medians, however, is divided by the probable error of the difference, a quotient of 26.5 is obtained. This quotient is called a critical ratio. A critical ratio of 4 is considered completely reliable. On the tenth-percentile level, the females excel by .25 grade points; on the seventy-fifth and twenty-fifth-percentile levels, they excel by .42 points; at the median the difference is only .20 points, which is much less than the difference on any other level. At the

**TABLE X**  
**COMPARISON OF THE SCHOOL MARKS EARNED**  
**BY MALES AND FEMALES**

	Males	Females	Difference
90th %-ile	1.95	1.59	.34 <sup>1</sup>
75th %-ile	2.50	2.06	.44
50th %-ile	3.08	2.88	.20
25th %-ile	3.73	3.31	.42
10th %-ile	4.38	4.10	.28
Quartile deviation	.695	.616	
P. E. (Median)	.0063	.0042	

Read table thus: The ninetieth percentile of all marks earned by the males is 1.95; of all those earned by the females, 1.59; and the difference between the ninetieth percentile marks for the males and females is .34; and so forth.

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<sup>1</sup> All of the differences shown in Table X are in favor of the females.

ninetieth-percentile level the difference is .54 points.

The variations shown here, if substantiated, will raise these questions. Why do the females do better work than the males? Why are the sex differences greater on the quartile levels than at the median or on the first and tenth deciles of the normal curve? Why is the sex difference less at the median than at the seventy-fifth and twenty-fifth percentiles or the highest and lowest deciles?

These are questions that are difficult to answer exactly and completely. The following are suggested as possible reasons:

1. Disciplinary problems may influence the teachers' marks. Since girls are usually much less of a problem than boys, they may be given better grades.

2. The boys who live on farms generally have more out-of-school responsibilities to keep them from studying than do the girls. A large number of the students included in this study live on farms.

3. The boys of high school age are probably more interested in outdoor sports and games than are the girls.

4. The earlier physiological development of the girls may cause them to take responsibilities at an earlier age than do boys.

This phase of the study attempts to find the variation of sex differences between the groups. The data for this purpose are shown in Table XI. All of the differences shown in the table are in favor of the females.

On the ninetieth-percentile level, there is an average difference of .34 grade points. Groups I, II, and III have a difference of .35, .33, and .34 points, respectively. This slight variation of the difference would lead to the conclusion that on this level the sex differences are comparatively constant regardless of the environment. On the seventy-fifth-percentile level, there is less difference in group I than in the other two groups. This is true of the other levels, with the exception of the fiftieth percentile. There is much less difference between the sexes on the fiftieth-percentile level than on the other levels. However, comparatively small probable errors of the fiftieth percentiles show that a true difference exists. The great difference between the sexes, in groups I and III, on the twenty-fifth-percentile level suggests the possibility that dull boys profit more in their school work from being in the home environment than do the dull girls.

The average of the differences on all levels shows a great difference in favor of the females in all groups. The sex difference in favor of the females is much less in the group that stays at home than in the other two groups.



TABLE XI  
COMPARISON OF THE SCHOOL MARKS OF MALES AND  
FEMALES IN EACH OF THE GROUPS

	90th %-ile	75th %-ile	50th %-ile	25th %-ile	10th %-ile	P. E. of Median
Group I						
Male	1.84	2.59	3.00	3.57	4.21	.009
Female	1.49	2.03	2.80	3.25	4.04	.008
Difference	.35 <sup>2</sup>	.56	.20	.32	.17	
Group II						
Male	1.92	2.52	3.06	3.72	4.37	.009
Female	1.59	2.08	2.84	3.30	4.11	.013
Difference	.33	.46	.22	.42	.26	
Group III						
Male	2.02	2.59	3.08	3.91	4.46	.016
Female	1.68	2.14	2.91	3.37	4.15	.008
Difference	.34	.45	.17	.54	.31	

Read table thus: The ninetieth percentile of the school marks earned by the males in group I is 1.84. The ninetieth percentile of the marks earned by the females in group I is 1.49. The difference is .35 grade points. The other groups and percentiles may be read in the same manner.

<sup>2</sup> All of the differences are in favor of the females.

The increase in sex difference in group II might be caused by the added home responsibilities of the farm boys who drive. In group III it would tend to indicate that male children of high school age do not do so well when they are away from home as do the females.

It will be seen by Table XII that the males in group I excel the other two groups on every level. The males in group II received higher marks than the males in group III on every level, but the difference is not so great. The females in group I made higher marks than the females in either group II or group III. The females in group II made higher marks than the females in group III.

Table XIII shows the difference on the various levels. It appears significant that without exception, irrespective of level or sex, the students that stay at home get the highest marks; the ones who stay at home and drive get the next highest marks; and the ones who are away from home during the week get the lowest marks. The critical ratios show complete reliability with the exception of groups II and III male and I and II female. A critical ratio of 1.5 signifies that there are 81 chances out of 100 that a real difference exists. A ratio of 2.5 signifies that there are 95 chances out of 100 that a real difference exists. The critical ratio is based on the median. Since there is less measured difference between

**TABLE XII**  
**COMPARISON OF THE SCHOOL MARKS OF THE MALES IN THE THREE**  
**GROUPS AND THE FEMALES IN THE THREE GROUPS**

	90th %ile	75th %ile	50th %ile	25th %ile	10th %ile	P. E. of Median
<b>Male</b>						
Group I	1.84	2.39	3.00	3.57	4.21	.009
Group II	1.92	2.52	3.06	3.72	4.37	.009
Group III	2.02	2.59	3.08	3.91	4.46	.016
<b>Female</b>						
Group I	1.40	2.03	2.80	3.25	4.04	.008
Group II	1.59	2.06	2.84	3.30	4.11	.013
Group III	1.68	2.14	2.91	3.37	4.15	.008

Read table thus: The ninetieth percentile of all the marks made by the males in group I is 1.84; the ninetieth percentile of the marks made by all the males in group II is 1.92; and so forth.

TABLE XIII  
 THE DIFFERENCE BETWEEN THE MARKS OF THE MALES  
 BY GROUPS AND OF THE FEMALES BY GROUPS

Groups Compared	90th %ile	75th %ile	50th %ile	25th %ile	10th %ile	Critical Ratio
I and II Male	.08 <sup>3</sup>	.13	.06	.15	.16	4.6
I and III Male	.18	.20	.08	.34	.25	4.4
II and III Male	.10	.07	.02	.13	.09	1.3
I and II Female	.10	.03	.04	.05	.07	2.5
I and III Female	.19	.11	.11	.12	.11	10.0
II and III Female	.09	.08	.07	.07	.04	4.7

Read table thus: The difference between the ninetyeth percentile marks of groups I and II is .08; the difference between the ninetyeth percentile marks of groups I and III is .18; and so forth.

<sup>3</sup> In all cases in this table the first group listed exceeded the second.

the medians in both these groups than between the average of the difference on the other levels, it appears that there are greater chances for a true difference than the critical ratio indicates.

The great difference here between group I and the other two groups may be on account of a difference in the educational background of the urban and rural students<sup>4</sup> rather than a difference in environment during the high school years. This, however, can hardly be said of the difference between groups II and III. The most probable cause of this difference is the fact that the students in group II are at home under the care of their parents and the ones in group III are away from home and are largely on their own responsibility.

It can be seen by Table XIV that there is a great difference in the marks received by the males and females, as has been shown at another place in this chapter. There is also a great difference on the various levels; but there seems to be but little significant variation according to the year in school. On the ninetieth-percentile level, there is a difference of .34 grade points in the ninth and eleventh years. There is a difference of .29 points in the tenth year and .26 points in the twelfth year. On the

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<sup>4</sup> Numerous studies have found that high school students from urban schools do better work than students from rural schools.

TABLE XIV  
SEX DIFFERENCES, BY YEARS, FOR ALL STUDENTS

	90th %-ile	75th %-ile	50th %-ile	25th %-ile	10th %-ile
Ninth year					
Male	1.93	2.53	3.05	3.78	4.44
Female	1.59	2.08	2.80	3.50	4.08
Tenth year					
Male	1.95	2.54	3.14	3.84	4.50
Female	1.66	2.15	2.87	3.56	4.26
Eleventh year					
Male	1.99	2.58	3.06	3.79	4.44
Female	1.65	2.13	2.83	3.53	4.09
Twelfth year					
Male	1.88	2.43	2.93	3.51	3.96
Female	1.62	2.06	2.66	3.15	3.76

Read table thus: The ninetieth percentile of the marks earned by the males in the ninth year is 1.93; the ninetieth percentile of the marks earned by the females in the ninth year is 1.59. In the tenth year the ninetieth percentile for the males is 1.95; the same measure for the females is 1.66; and so forth.

seventy-fifth-percentile level, there are differences of .45, .39, .45, and .57 grade points for the ninth, tenth, eleventh, and twelfth years, respectively. The differences on the fiftieth percentile range from .23 points to .27 points. The ninth, tenth, eleventh, and twelfth years on the twenty-fifth percentile gave a sex difference of .48, .28, .46, and .36 grade points, respectively. The variation on the tenth-percentile level is from a difference of .20 points in the twelfth year to .36 points in the ninth year.

The sex differences in the fiftieth-percentile column increase and decrease in a manner opposite to the variations at all of the other levels. From the ninth to the tenth year the difference between the fiftieth percentiles becomes greater. On all other levels it decreases. From the tenth to the eleventh year, the difference between the fiftieth percentiles decreases, while on the other levels, it increases. From the eleventh to the twelfth year, the difference between the fiftieth percentiles increases, while on the other levels, the difference decreases. This peculiar condition is very likely due to chance, since many of the differences are very slight.

#### Summary and Conclusions

The female sex is far superior to the male sex in securing marks in high school. An analysis of thirty-six

divisions of each sex on five different levels showed that there was not a single case in which the males ranked above the females. This may be due to: (1) the influence of disciplinary problems on the teachers' marks, (2) outside responsibilities of farm boys, (3) interest of boys in outdoor sports and games, or (4) earlier physiological development of girls.

There seems to be a greater difference between the males and females on the twenty-fifth and seventy-fifth-percentile levels than at the fiftieth or the tenth and ninetieth percentiles. Further studies will be necessary to substantiate and find the cause of this phenomenon.

There is considerable difference between the marks received by males and females in the upper ten per cent; but the fact that they stay at home, drive, or are away from home does not appear to alter that difference. However, on the lower levels the boys appear to profit more than the girls from the home environment.

A critical ratio of 4.6 indicates that the boys who live in town and stay at home (group I) will receive better marks than the boys who live in the country (group II) and stay at home. The boys that live in town (group I) receive better marks than the boys that are away from home (group III). The critical ratio for this comparison was 4.4. A critical ratio of 4 is considered completely reliable.



The differences between the groups of girls are more reliable than the differences found between the groups of boys. The critical ratio between groups I and II is 2.5. This means that there are 95 chances in 100 that a true difference exists. The critical ratio between groups I and III is 10. The critical ratio between groups II and III is 4.7. The difference between group I and the other two groups may be caused by a difference in the educational background of the urban and rural students rather than the environment during high school years. The difference between groups II and III is likely due to the lack of the home environment for group III.

## CHAPTER V

### A COMPARISON OF THE SCHOLASTIC WORK DONE BY STUDENTS IN THE VARIOUS GRADES OF HIGH SCHOOL

In this chapter an attempt is made to determine whether there is a significant difference in the quality of work done by high school students in different years and in different schools.

For purposes of this study it is, of course, necessary to assume that school marks obtained in various years are a true index of scholastic attainment.

The basic data are contained in Table XV. A careful examination of these data will reveal some interesting tendencies. The ninetieth percentile of the ninth year is 1.76; in the tenth and eleventh years the same students made a mark of 1.78, or .02 points less than in their first year of high school. In the twelfth year they made a mark of 1.68, which was higher than any previous mark. On the seventy-fifth-percentile level the ninth year students made a mark of 2.19; in the next two years they dropped to 2.28 and 2.30, respectively. In their last year of high school they gained to 2.20 but lacked .01 point of making as high a mark as they had made in their ninth year. There is a greater uniformity of scores for the four years of high school on the median level than on any other level

TABLE XV  
COMPARISON OF THE SCHOLASTIC WORK DONE IN THE NINTH,  
TENTH, ELEVENTH, AND TWELFTH YEARS

	Ninth Year	Tenth Year	Eleventh Year	Twelfth Year
90th %-ile	1.76	1.73	1.78	1.68
75th %-ile	2.19	2.28	2.30	2.20
50th %-ile	2.96	2.97	2.95	2.87
25th %-ile	3.51	3.72	3.56	3.28
10th %-ile	4.23	4.36	4.24	3.99
P. E. of median	.007	.009	.008	.008
Number of marks	13,494	10,936	9,212	7,535

Read table thus: In the ninth year the mark at the ninetieth-percentile level was 1.76. At the seventy-fifth-percentile level the mark was 2.19; at the fiftieth-percentile level, it was 2.96; and so forth.

computed. In the ninth year, the median is 2.96; in the tenth year it is 2.97. In the eleventh and twelfth years the median went up to 2.95 and 2.87, respectively. To check the reliability of these differences, the critical ratio was figured for each combination of medians. When years nine and ten were compared, a ratio of .9 was obtained in favor of the ninth year median. When nine and eleven were compared, a ratio of .9 was obtained, but the ratio was in favor of the eleventh year median. When nine and twelve were compared, the ratio was 3.2 in favor of the twelfth year median. The ratio obtained by comparing ten and eleven was 1.7 in favor of the eleventh year median; for years ten and twelve it was 3.3 in favor of the twelfth year; for eleven and twelve the ratio was 7.3 in favor of the latter. With a critical ratio of 1 there are 75 chances in 100 that the true difference is greater than zero; with a ratio of 2, the chances are 91 in 100; with a ratio of 3, the chances are 98 in 100; a ratio of 4 is considered completely reliable.

The variation of scores made on the twenty-fifth and tenth-percentile levels is much greater than that of the other three levels. The twenty-fifth percentile in the ninth year is 3.51; in the tenth year it is down to 3.72. In the eleventh year it gained to 3.56; the next year the gain is .28 points, making the twenty-fifth percentile

3.28 in the twelfth year. There is not quite so great a variation of scores on the tenth-percentile level as on the twenty-fifth percentile, but a much greater one than on any of the other levels.

In the ninth year the tenth percentile is 4.23; the next year it dropped to 4.36. In the eleventh and twelfth years it gained back to 4.24 and 3.99, respectively. In the last year of high school the gain was .25, nearly as great as for the same year on the twenty-fifth percentile.

Figures 1, 2, 3, 4, and 5 present graphically the data listed in Table XV. It will be noted that on all levels the students secure better marks in their ninth year than in the tenth. On the ninetieth-percentile level they make practically the same grades in the eleventh year as they did in the tenth. On the other three levels the tenth year is the low year as far as marks in high school are concerned. On all levels the twelfth year shows a great gain over the marks received in the eleventh year. Students receive their best marks in high school in the twelfth year, with the exception of the seventy-fifth percentile. In that case the best scores are obtained in the ninth year.

The causes of these variations are not known for certain. It would seem that the process of selection would cause the marks to improve from one year to the other.

## TREND OF MARKS BY YEARS

90th %-ile

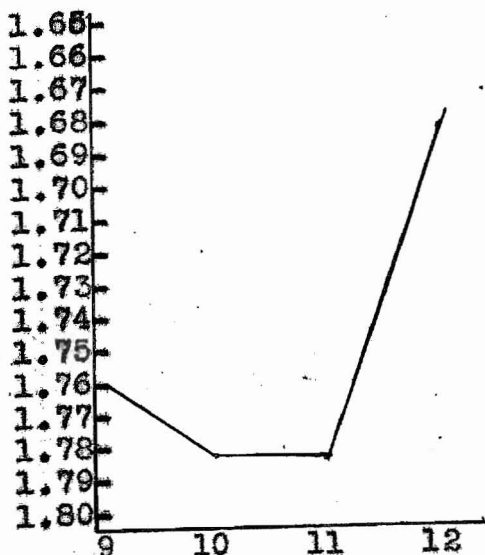


Fig. 1.

70th %-ile

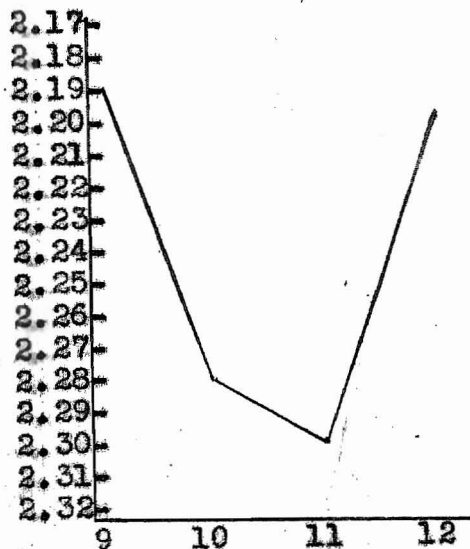


Fig. 2.

Median

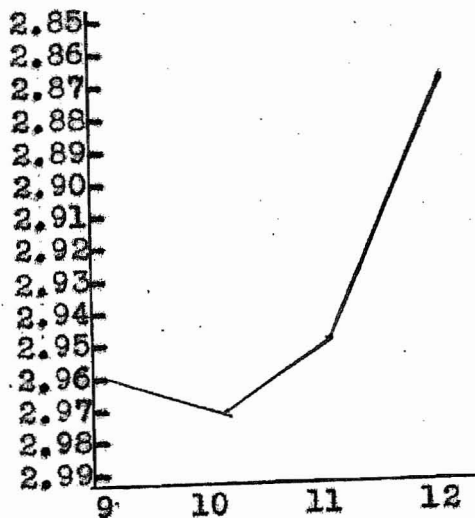


Fig. 3.

Figures 1, 2, 3, 4, 5, Trend of marks by years. The numbers on the base line give the year in school; the marks received are on the y-axis.

TREND OF MARKS BY YEARS

25th %-ile

10th %-ile

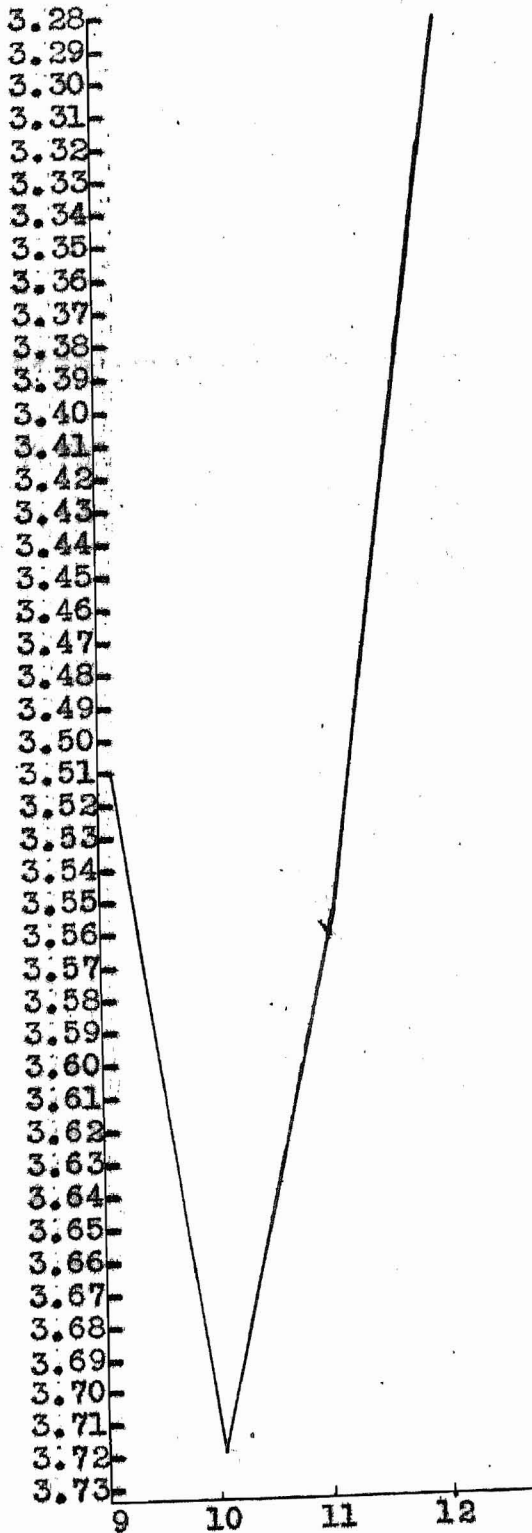


Fig. 4.

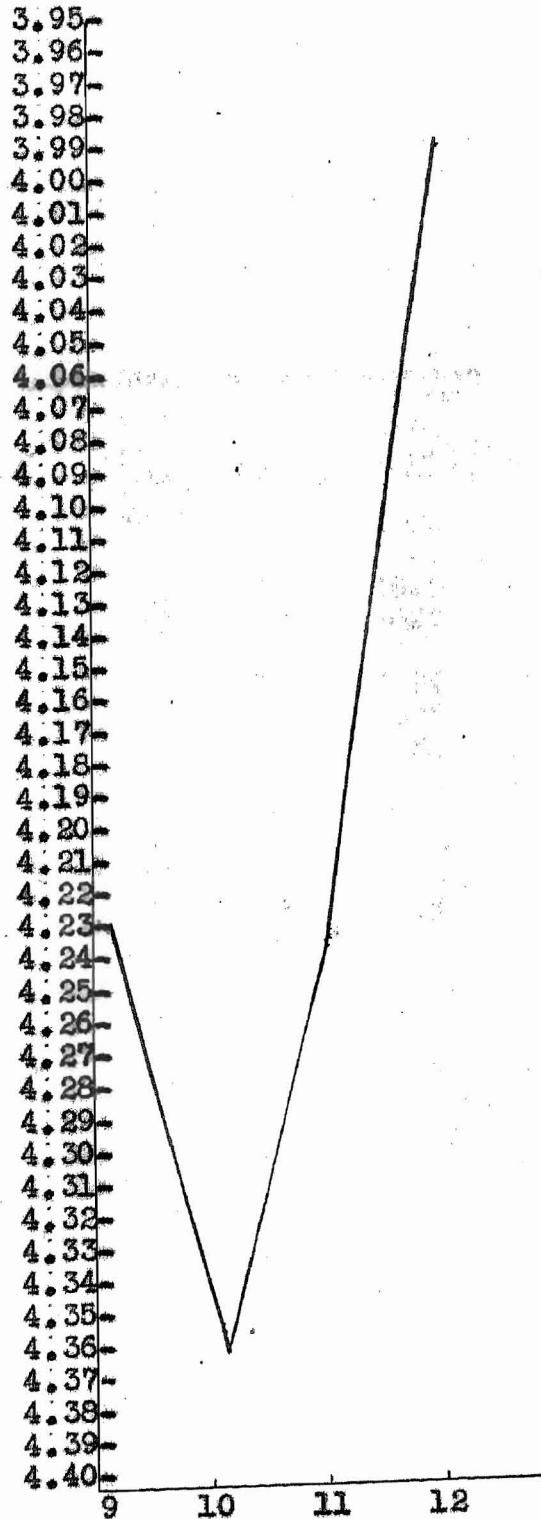


Fig. 5.

TABLE XVI  
COMPARISON OF SCHOLASTIC ATTAINMENT OF STUDENTS  
BY GROUPS IN THE VARIOUS YEARS

Group	Year	90th %-ile	75th %-ile	50th %-ile	25th %-ile	10th %-ile	Number of Marks	P. E. of Median
I	9	1.60	1.95	2.91	3.47	4.13	5485	.013
	10	1.66	2.16	2.96	3.50	4.16	4358	.013
	11	1.66	2.19	2.92	3.38	4.09	3096	.012
	12	1.49	2.05	2.73	3.16	3.92	2827	.013
II	9	1.81	2.28	2.99	3.53	4.25	3694	.013
	10	1.81	2.30	3.00	3.77	4.44	2992	.017
	11	1.87	2.45	3.01	3.82	4.35	2350	.018
	12	1.70	2.22	2.89	3.25	3.99	1851	.015
III	9	1.88	2.33	2.97	3.54	4.31	4315	.012
	10	1.87	2.38	3.03	3.88	4.48	3586	.016
	11	1.80	2.25	2.93	3.47	4.29	3186	.014
	12	1.87	2.32	2.98	3.38	4.07	2857	.012

Read table thus: Ninety per cent of the ninth year students in group I did not exceed a mark of 1.60; 90 per cent of the tenth year students in group I did not exceed a mark of 1.66; 90 per cent of the eleventh year students in the same group did not exceed 1.66; and 90 per cent of the twelfth year students in group I did not exceed 1.49. Ninety per cent of the ninth year students in group II did not exceed a mark of 1.81; and so forth.



**TABLE XVII**  
**COMPARISON OF THE SCHOLASTIC WORK DONE BY DIFFERENT**  
**SCHOOLS IN THE VARIOUS GRADES OF HIGH SCHOOL**

Town	Year	90th %-ile	75th %-ile	50th %-ile	25th %-ile	10th %-ile	Number of Marks
Chapman	9	1.85	2.41	2.93	3.63	4.53	592
	10	1.95	2.52	3.15	4.04	4.88	480
	11	1.87	2.38	2.96	3.67	4.58	392
	12	1.93	2.34	2.93	3.42	4.23	317
Smith Center	9	1.63	2.13	2.90	3.58	4.10	572
	10	1.65	2.13	2.93	3.55	4.13	462
	11	1.58	2.19	2.94	3.60	4.15	380
	12	1.49	1.94	2.55	3.23	3.88	298
Lincoln	9	1.81	2.39	2.89	3.41	4.16	572
	10	1.80	2.38	2.93	3.45	4.13	469
	11	2.01	2.49	2.94	3.40	4.07	376
	12	1.93	2.46	2.91	3.32	3.62	297

Read table thus: Ninety per cent of the students at Chapman did not exceed a mark of 1.85 in the ninth year; in the tenth year 90 per cent did not exceed a mark of 1.95; in the eleventh year 90 per cent did not exceed a mark of 1.87; and in the twelfth year 90 per cent did not exceed 1.83. Ninety per cent of the students at Smith Center did not exceed a mark of 1.63 in the ninth year; and so forth.

It is apparent, however, that this is not a correct assumption. Nineteen per cent of the students dropped out between the ninth and tenth years; twenty per cent, between the tenth and eleventh years; and twenty and one-half per cent, between the eleventh and twelfth years. It can be seen that in this study the per cent to drop out from one year to the next is comparatively uniform, whereas, the marks received vary greatly.

When students enter high school in Chapman, Smith Center, or Lincoln, they go to school in a building and to teachers that are new to them. This new environment may be a factor in causing them to earn comparatively high marks. In the junior high school they have been the oldest and most advanced students; when they enter high school, they become the youngest and most lowly group. This change of position might cause them to take their school work more seriously. The fear of not being successful in high school may cause them to work a little harder.

Nineteen per cent of the students who attend school in the ninth year at Chapman, Smith Center, and Lincoln drop out by the tenth year. Probably most of the ones who drop out are poor students; but, in spite of this condition, the students in the second year of high school do poorer work than they did in the first. Probably they are no longer afraid of not being able to do high school work,

and so they ease up a little. The physiological development at this age may retard their work. An increased number of social contacts may tend to take their minds away from school work. The improvement shown in the eleventh and twelfth years is likely due to age, selection, and the added incentive that results from nearing the objective.

#### Scholastic Attainment by Groups in the Various Grades of High School

A study was also made of the differences in the attainment of the three types of residence groups in the various years of high school. Table XVI shows the ninetieth, seventy-fifth, fiftieth, twenty-fifth, and tenth percentiles for each year of high school for each group. The significance of the basic data presented in this table is portrayed more clearly by means of Figures 6 to 10 inclusive. The black line represents the marks earned by group I. The red line represents the marks earned by group II. The green line represents the marks earned by group III. It can be seen that group I is above the other two groups on every level in every year. In this group there is a drop from the ninth to the tenth on every level. The marks in the tenth and eleventh years on the ninetieth percentile level are the same. On the seventy-fifth level the eleventh year is even lower than the tenth. On the fiftieth, twenty-

TREND OF MARKS IN GROUPS BY YEARS

90th %-ile

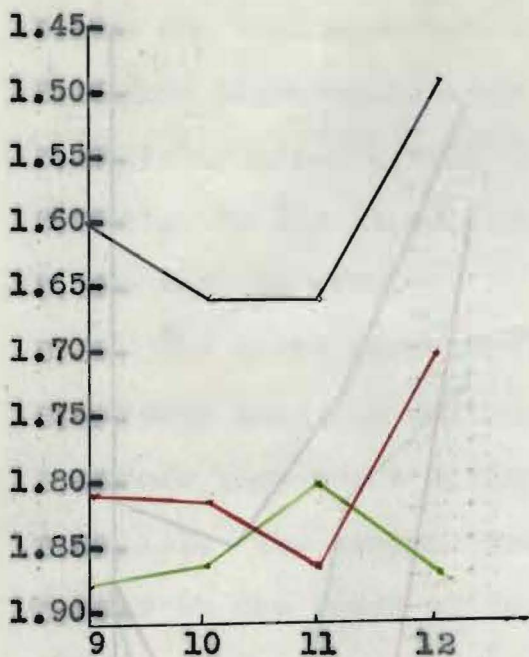


Fig. 6.

75th %-ile

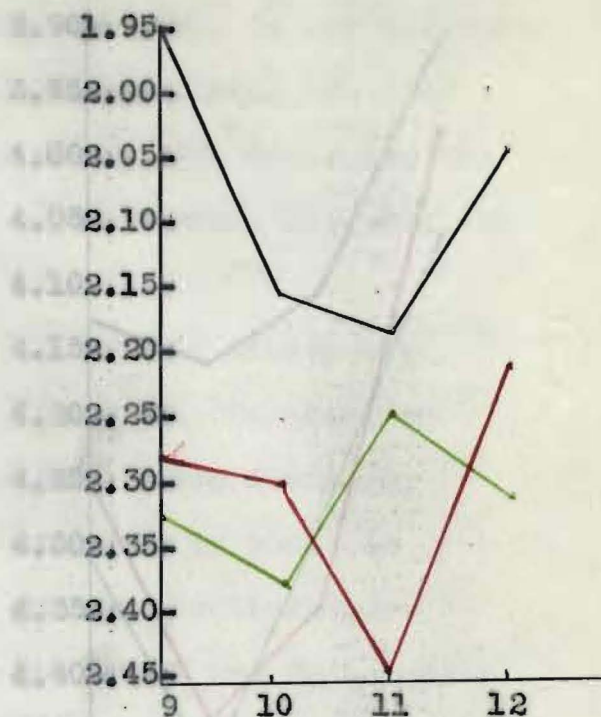


Fig. 7.

Median

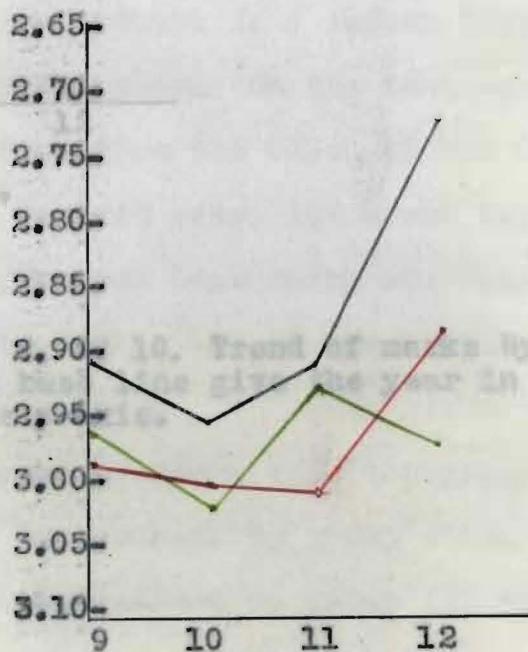


Fig. 8.

- Group I
- Group II
- Group III

TREND OF MARKS IN GROUPS BY YEARS

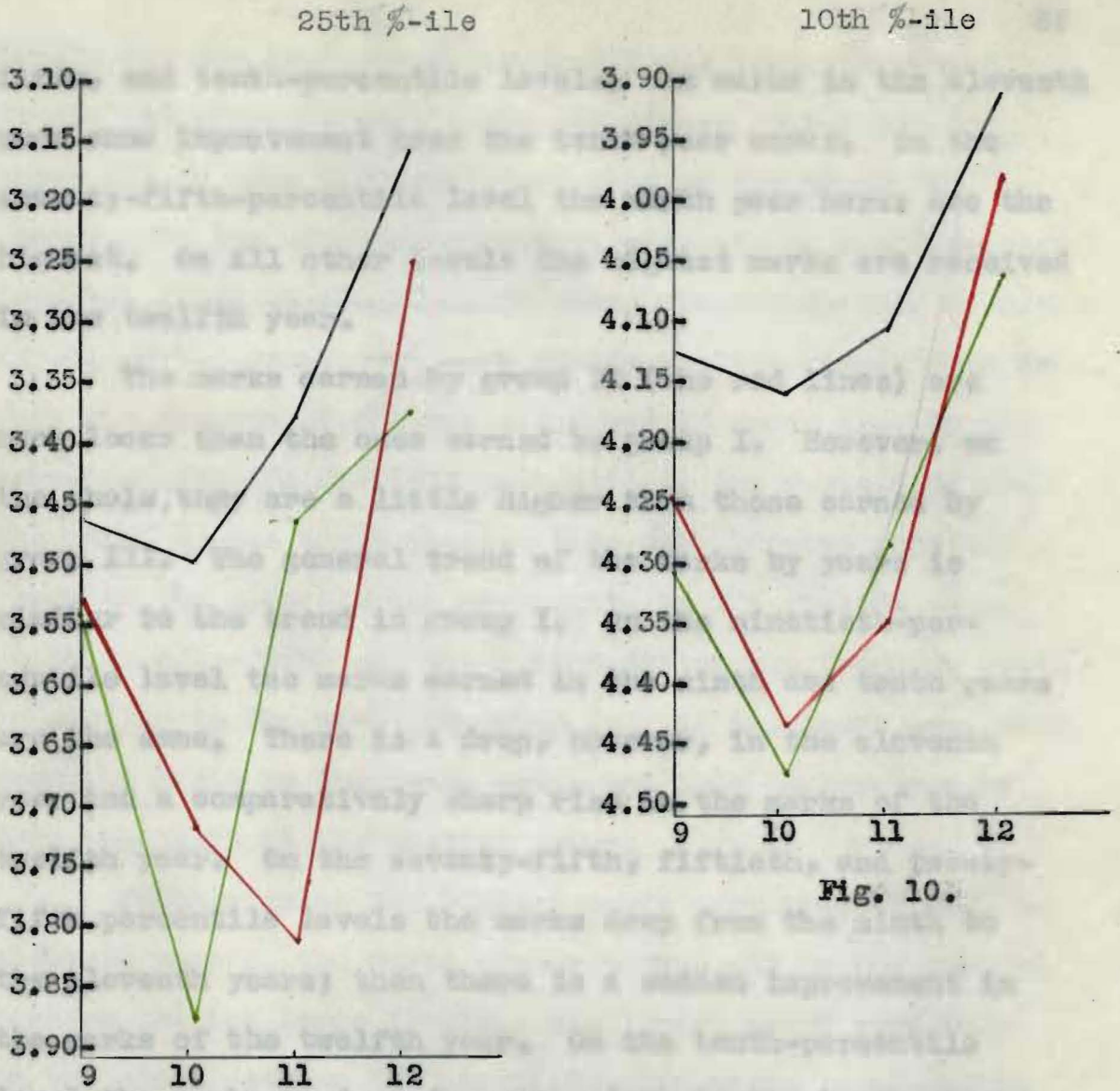


Fig. 9.

Fig. 10.

Figures 6, 7, 8, 9, 10. Trend of marks by groups and years. The numbers on the base line give the year in school; the marks received are on the y-axis.

The marks earned by group III (the green line) are much lower than the marks earned by group I and lower, on the whole, than the marks earned by group II. On the five

fifth, and tenth-percentile levels, the marks in the eleventh year show improvement over the tenth year marks. On the seventy-fifth-percentile level the ninth year marks are the highest. On all other levels the highest marks are received in the twelfth year.

The marks earned by group II (the red lines) are much lower than the ones earned by group I. However, on the whole, they are a little higher than those earned by group III. The general trend of the marks by years is similar to the trend in group I. On the ninetieth-percentile level the marks earned in the ninth and tenth years are the same. There is a drop, however, in the eleventh year and a comparatively sharp rise in the marks of the twelfth year. On the seventy-fifth, fiftieth, and twenty-fifth-percentile levels the marks drop from the ninth to the eleventh years; then there is a sudden improvement in the marks of the twelfth year. On the tenth-percentile level the marks go down from the ninth to the tenth years. In the eleventh and twelfth years the marks improve greatly. In this group the best marks are received in the eleventh year on four levels and in the tenth year on the other level.

The marks earned by group III (the green line) are much lower than the ones earned by group I and lower, on the whole, than the ones earned by group II. On the five

levels for the four years, group III was lowest fourteen times; and group II was lowest six times. The trend in group III is much different from that of the other two groups. On the ninetieth-percentile level the marks improve from the ninth to the eleventh year. Then they drop to within .01 of the ninth year mark in the twelfth year. This is just the reverse of the general trend in group II. On the seventy-fifth and fiftieth percentiles, the marks drop from the ninth to the tenth years. Then they improve from the tenth to the eleventh and drop again in the twelfth year. On the twenty-fifth and tenth percentiles the trend by years is similar to the trend in group I; that is, there is a drop from the ninth to the tenth years and then an improvement from the tenth to the twelfth years.

In this group the highest marks were made in the eleventh year on the three higher levels and in the twelfth year on the two lower levels. The lowest marks were made in the ninth year on the ninetieth-percentile level and in the tenth year on the other four levels.

One significant fact disclosed by this phase of the study is the apparent "let down" of the students on the upper levels who are away from home in their senior year of high school. It may be that the ones on the lower levels are spurred on by the fear of failure. The students on the twenty-fifth percentile do not improve so much in the

twelfth year as do the ones on the tenth percentile. This may be due to the fact that the latter is nearer the failing point. This tends to substantiate the idea that the improvement may be due to fear of failure. The students who are away from home and are doing reasonably good scholastic work may take a more active part in school activities and school and community social life in their last year of high school.

#### Scholastic Work Done by Different Schools in the Various Grades of High School

This phase of the study aims to find the difference in the scholastic work done in the various grades by different schools. The data for this section is shown in Table XVII.

#### Chapman

In Chapman the marks in the ninth year are all higher than the marks in the succeeding year. The drop is quite abrupt, amounting to .10 on the ninetieth percentile, .11 on the seventy-fifth, .17 on the fiftieth, .41 on the twenty-fifth, and .35 on the tenth. The lowest mark on each level was made in the tenth year. Without exception, the marks improve in the eleventh and twelfth years. On the seventy-fifth and fiftieth-percentile levels the loss



from the ninth to the tenth year is more than regained in the eleventh year. On the other three levels the ninth year marks are not surpassed until the twelfth year. The highest marks are all made in the twelfth year.

#### Smith Center

In Chapman the trend of the variations was the same on every level. This is not true in Smith Center. In general the trend is similar to that found in the Chapman scores, but there are several exceptions. On the ninetieth-percentile level the scores dropped from the ninth to the tenth year and then improved from the tenth to the twelfth. On the seventy-fifth-percentile level the scores are the same for the ninth and tenth years and then drop .06 in the eleventh. On this level there is a gain of .25 from the eleventh to the twelfth years. On the fiftieth-percentile level the marks go down from the ninth year to the tenth and from the tenth year to the eleventh. In the twelfth year there is a gain of .39. On the twenty-fifth-percentile level the variation is unusual in that the tenth year mark is higher than the ninth. The eleventh year mark drops below both the ninth and tenth years. The twelfth year mark, however, is much higher than any of the others. On the tenth-percentile level the marks have a downward trend from the ninth to the eleventh years, with a good gain

from the eleventh to the twelfth year.

The highest marks were all made in the twelfth year. Four of the lowest marks are in the eleventh year and one in the tenth.

### Lincoln

The general trend of marks found in Chapman and Smith Center is not visible in the Lincoln data. The ninth year has the highest mark on the median level and the lowest mark on the seventy-fifth and tenth percentiles. The tenth year has the highest mark on the ninetieth and the seventy-fifth percentiles, but the lowest on the twenty-fifth. The eleventh year has the lowest mark on the ninetieth percentile and the fiftieth-percentile levels. The twelfth year has the highest mark on the twenty-fifth and tenth percentiles.

### Summary and Conclusions

The students in the three schools studied make their highest marks in the twelfth year; the next highest marks are earned in the ninth year. The lowest marks are earned in the tenth year; the next lowest marks are earned in the eleventh year. There are probably several factors that contribute to these variations. The tendency to put forth increased effort when the goal is near is probably one reason for the high marks in the twelfth year. Natural

selection may also be a contributing factor. Why the tenth and eleventh years should make lower marks than the ninth year is not known. Certainly some factors are quite powerful enough to more than offset the gain that would be made by culling out twenty per cent each year.

The students who live in town and stay at home and the ones who live in the country and stay at home follow the same general trend in securing marks by years. The students who are away from home during the week follow much the same trend on the two lower levels but the three upper levels are much different. The ninetieth-percentile level reverses the trend. This difference may be due to the absence of the home environment.

In Chapman all of the highest marks are made in the twelfth year; all of the lowest marks are made in the eleventh year. In Smith Center the highest marks were made in the twelfth year; four of the lowest marks were in the eleventh year and one in the tenth. In Lincoln the "highs" and "lows" were widely distributed.

## CHAPTER VI

### SUMMARY AND CONCLUSIONS

The urban students (group I) secured much higher scholastic marks than either of the other two groups. The difference was much greater on the ninetieth, seventy-fifth, twenty-fifth, and tenth-percentile levels than on the median level. The critical ratio values for groups I and II and groups I and III show complete reliability. The rural students who stay at home (group II) do better work than the rural students who are away from home during the week (group III). The ratio here is 1.9, which means that there are 90 chances in 100 that the true difference is greater than zero.

Some of the differences appearing in the marks in the three towns seem to be caused, at least in part, by the difference in the grading systems. Group I secures the best marks in Chapman and Smith Center; group II secures the best marks at Lincoln. Group III gets the second highest marks at Chapman and the lowest marks at Smith Center and Lincoln. The variation of school marks seems to be greater for the females than for the males; in both the variation is greater in the twelfth year.

The female sex is far superior to the male sex in securing marks in high school. There seems to be a greater

difference between the males and females on the seventy-fifth and twenty-fifth-percentile levels than at the ninetieth, fiftieth, and tenth percentiles. The sex difference appears to be quite uniform among the various groups. Dull boys appear to profit more from the home environment than do the dull girls.

The students in the three schools studied make their highest marks in the twelfth year; the next highest marks are earned in the ninth year. The lowest marks are earned in the tenth year; the next lowest marks are earned in the eleventh year. In Chapman the highest marks on each level are made in the twelfth year; all of the lowest marks are made in the eleventh year. In Smith Center the highest marks are made in the twelfth year; four of the lowest marks are in the eleventh year and one in the tenth year. In Lincoln the highs and lows do not follow any definite trend.

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