

122

PENMANSHIP IN GRADES 5, 6, 7, 8, OF
THE URBANA PUBLIC SCHOOLS
IN 1879 AND 1912

BY

SIMEON JAMES BOLE

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THESIS

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DEGREE OF
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IN

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IN

THE GRADUATE SCHOOL

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THE GRADUATE SCHOOL

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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

Sherman James Bole

ENTITLED *Penmanship in Grades V, VI, VII and VIII
Urbana Public Schools in 1879 and 1912.*

BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE

DEGREE OF *Master of Arts*
W. C. Bagley

In Charge of Major Work

Head of Department

Recommendation concurred in:

Committee

on

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Table of Contents.

Introduction-----	p.1.
Data from the Urbana Schools-----	p.3.
Method Used in Comparing Data-----	p.20.
Distribution of Pupils as to Quality in Penmanship,	p.22.
School Factors that Influence the Quality of	
Penmanship-----	p.27.
Length of the School Year-----	p.28.
Age of Pupils-----	p.28.
Number of Pupils in a School Room----	p.34b.
Course of Study-----	p.35b.
The Daily Practice of Penmanship-----	p.35b.
Quality and Method of Teaching	
Penmanship-----	p.39.
Systems of Writing-----	p.41.
Summary-----	p.42.
Comparison of Thorndike and Ayres Scales-----	p.44.
Sex and Quality in Penmanship-----	p.36b.
Bibliography-----	p.58.



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Introduction

The primary object of the following investigation is to compare the quality of penmanship in schools of the same community-the Urbana Public Schools-for the years 1879 and 1912. Bound volumes of school work, bearing the dates of 1877 to 1879 respectively, were recently discovered by Dr. Bagley of the School of Education, in University Hall-the oldest building of the University of Illinois. Since penmanship gave by far the greatest number of samples of pupils' work and since Prof. E. L. Thorndike had recently published his standards, by means of which penmanship may be either measured or compared, it was thought best to take the Thorndike scale and compare the quality of the penmanship in the fifth, sixth, seventh and eighth grades for the school years ending in 1879 and 1912. The samples for the school year ending in 1879 were selected because a report book of that year, containing the names of pupils in each grade; the names of the teachers and samples of their penmanship; the length of the school year; and the age, sex, and attendance of each pupil, was also found. As all of the papers are samples, selected and prepared for exhibition purposes, it is fair to assume that they were written by the best writers in the several grades and that each pupil did his or her best as to neatness and quality of penmanship. The chief difficulty in the experiment is that only a portion, about 30 per cent, are represented. In order to get the conditions the same for both years, teachers in the several elementary schools in Urbana were requested to get for the

writer a sample of the best writing of each pupil in the room of the following sentence:

"Then the carelessly dressed gentleman stepped lightly into Warren's carriage and held out a small card; John vanished behind the bushes and the carriage moved along." In addition to the above sentence, each pupil wrote his or her name, age and grade in school. Each teacher furnished, along with her pupils' samples, a statement in writing of her name, name of building, number of grade or grades in room, number of pupils in room, and the number of boys and girls. The teachers were not asked to write neatly or well, and they did not know that their writing was to be graded. From 1879 to 1912 the teachers in these four grades increase from four to eleven, and the total enrollment of pupils from 245 to 478. The per cent of pupils in each ^{grade} having samples in the school work of 1879 was first found, and then the same per cent of samples for each grade was selected from the best writing of the year 1912. Of course, this makes the number of samples in the same grade different for the two years, but the per cents are the same for each grade. There is only one thing that favors either year, and that is the inequality as to the time of year the samples were written. In 1879, the samples may have been and probably were selected from the work of the "spring term" while the samples of 1912 were all written shortly after the Thanksgiving vacation. The results of this inequality are in favor of the work of 1879. In the investigation the data will be given first, and will be followed by the methods employed and the results deduced.

Data from the Urbana Public Schools

Grade 5, 1879.

Name of Pupil	Age	S.J.B.	H.M.B.	W.S.M.	Avg.
Blisard, William	12	10	12	12	12
Briggs, Nora	12	12	12	9	12
Dougan, Mollie	13	10	10	9	10
Elliott, Bettie	12	9	12	10	10
Fenderson, Ora	11	13	12	13	13
Grant, Mollie	12	12	12	11	12
Gerbing, Anna	13	13	13	14	13
Goodspeed, Anna	12	9	10	9	9
Heller, Opal	11	11	11	11	11
Houchin, Graham	13	11	13	11	11
Johnson, Belle	10	11	12	11	11
Johnson, Gertie	12	10	11	9	10
McLennan, Alex.	13	11	12	13	12
Martin, Eunice	13	13	12	11	12
Mapes, Freddie	11	9	11	9	9
McLennan, Agnes	15	11	11	10	11
Nichol, John	11	9	11	10	11
Prestine, Freddie	13	10	12	9	10
Randall, Hattie	11	10	11	9	10
Sim, Willie	10	12	13	13	13
Sell, Augusta	11	11	12	11	11
Weber, Alex.	13	10	11	9	10
Weber, Minnie	10	10	12	11	11
Webber, Grace	11	11	11	9	11

Summary for Grade 5,1879:

Total number boys enrolled-----	40
Total number girls enrolled-----	36
Total enrollment in room-----	80
Average age of boys-----	12.05 yrs.
Average age of girls-----	11.83 yrs.
Average age of pupils-----	11.95 yrs.
Samples of boys used-----	9
Samples of girls used-----	15
Samples of pupils used-----	24
Per cent of grade -----	30
Per cent of boys-----	20.5
Per cent of girls-----	41.7
Average age of boys graded-----	11.9 yrs.
Average age of girls graded-----	11.8 yrs.
Average age of pupils graded-----	11.8 yrs.

Grade 6, 1879.

Name of Pupil	Age	S.J.B.	H.M.B.	W.S.M.	Avg.
Bing, Leon	14	15	14	16	15
Benford, Harry	12	14	13	13	13
Downey, Mary	14	13	11	9	11
Dunlop, Fannie	11	13	13	12	13
Fenner, Maggie	12	12	11	11	11
Gile, Grant	15	10	12	12	12
Kyle, Minnie	12	14	12	12	12
Morris, Allie	12	15	13	14	14
Morris, Flora	10	14	12	11	12
Turner, Eva	13	13	12	11	12

Summary for Grade 6, 1879:

Total number boys enrolled-----	26
Total number girls enrolled-----	33
Total enrollment in room-----	59
Average age of boys-----	13.26 yrs.
Average age of girls-----	13.25 yrs.
Average age of pupils-----	13.25 yrs.
Samples of boys used-----	3
Samples of girls used-----	7
Samples of pupils used-----	10
Per cent of grade-----	16.9
Per cent of boys-----	11.5
Per cent of girls-----	21.2
Average age of boys graded-----	13.7 yrs.
Average age of girls graded-----	12.0 yrs.
Average age of pupils graded-----	12.5 yrs.

Grade 7, 1879.

Name of Pupil	Age	S.J.B.	H.M.B.	W.S.M.	Avg.
Bagley, Olive	13	12	12	12	12
Brown, Belle	13	15	13	15	15
Busey, Clara	13	14	13	12	13
Blackwell, G.	13	13	13	16	13
Chapman, Warren	13	12	12	14	12
Fugate, Minnie	16	12	12	14	12
Heislar, Josie	12	13	11	12	12
Lawrence, Kate	14	13	13	14	13
McClain, Mary	13	14	13	12	13
Parks, Flora	14	13	13	12	13
Rittenhouse, M.	14	15	13	16	15
Rogers, Alice	12	14	12	11	12
Reeves, Willie	13	14	15	16	15
Rea, Edward	14	13	13	12	13
Webber, Emma	12	12	12	11	12
Webber, Clarence	12	14	13	16	14

Summary for Grade 7, 1879:

Total number boys enrolled-----	23
Total number girls enrolled-----	32
Total enrollment in room-----	55
Average age of boys-----	13.52 yrs.
Average age of girls-----	13.51 yrs.
Average age of pupils-----	13.51 yrs.
Samples of boys used-----	4
Samples of girls used-----	12
Samples of pupils used-----	16
Per cent of grade-----	16.9
Per cent of boys-----	15.0
Per cent of girls-----	36
Average age of boys graded-----	13.0 yrs.
Average age of girls graded-----	13.2 yrs.
Average age of pupils graded-----	13.2 yrs.

Grade 8, 1879.

Name of Pupil	Age	S.J.B.	H.M.B.	W.S.M.	Avg.
Ayres, Belle	11	14	13	12	13
Brown, Harry	16	16	16	16	16
Busey, G.W.	18	14	17	16	16
Call, Ada	13	15	13	15	15
Elder, Mantie	14	15	15	13	15
Ermentrout, Mae	13	14	13	13	13
Gay, Nattie	13	16	15	16	16
Hastings, Bennie	19	16	15	15	15
Harvey, Agnes	15	14	13	11	13
Hubbard, Harry	13	13	14	12	13
Lowenstern, M.	14	13	12	12	12
Mapes, Charley	14	13	13	12	13
Miller, Minnie	15	15	15	16	15
Nowlin, Hattie	14	14	14	13	14
Riley, Maggie	13	14	15	13	14
Webber, George	11	12	10	12	12

Summary fo Grade 8,1879:

Total number boys enrolled-----	30
Total number girls enrolled-----	21
Total enrollment in room-----	51
Average age of boys-----	15.83 yrs.
Average age of girls-----	14.62 yrs.
Average age of pupils-----	15.33 yrs.
Samples of boys used-----	7
Samples of girls used-----	9
Samples of pupils used-----	16
Per cent of grade-----	31
Per cent of boys-----	23
Per cent of girls-----	43
Average age of boys graded-----	15.0 yrs.
Average age of girls graded-----	13.3 yrs.
Average age of pupils graded-----	14.1 yrs.

Grade 5, 1912.

Name of Pupil	Age	S.J.B.	H.M.B.	W.S.M.	Avg.
Avery, Nellie	13	13	13	10	13
Adkins, Gladys	12	11	13	12	12
Boswell, Wm.	13	12	13	12	12
Bogue, Irene	12	12	14	12	12
Bartell, Bertha	14	13	14	14	14
Briscoe, Marg.	10	12	13	12	12
Bing, Arline	11	11	12	10	11
Barr, Andrew	10	11	13	12	12
Cash, Mary	12	13	14	14	14
Cottrell, Fran.	12	13	14	13	13
Crump, Flossie	11	14	14	14	14
Clark, Hazel	11	12	13	12	12
Carpenter, Leon	11	13	13	14	13
Delap, Robert	13	12	12	12	12
Fitzsimmons, M.	11	12	12	12	12
Grace, Florence	12	13	13	14	13
Golden, Eugene	12	12	12	12	12
Glowe, Clara	11	12	13	12	12
Harvey, Adaline	12	12	13	11	12
Howe, Dorothy	12	12	15	12	12
Hullinger, Ven.	13	13	14	14	14
Knight, Ethel	12	12	13	13	13

Leonard, Hazel	12	12	12	12	12
Martin, Gladys	11	12	13	12	12
Niblick, Louis	11	11	12	12	12
Price, Ella	13	14	13	14	14
Patterson, Daisyl	2	14	14	14	14
Potts, Ethel	14	13	15	11	13
Reiley, Kathar.	10	13	13	13	13
Smith, Bernice	10	13	13	12	13
Sims, Lillian	10	12	12	12	12
Slater, Esther	14	13	13	14	13
Taylor, Harold	11	13	12	12	12
Todd, Gladys	11	12	13	12	12
Lewis, Marie	11	13	13	12	13
Langholf, Emma	14	13	14	14	14
Wascher, Ruth	10	12	13	13	13

Summary for Grade 5, 1912:

Total number boys enrolled-----	54
Total number girls enrolled-----	68
Total enrollment in grade-----	122
Average age of boys-----	11.13 yrs.
Average age of girls-----	11.50 yrs.
Average age of pupils-----	11.33 yrs.
Samples of boys used-----	7
Samples of girls used-----	30
Samples of pupils used-----	37
Per cent of grade-----	30.3
Per cent of boys-----	12.2
Per cent of girls-----	44.1
Average age of boys graded-----	11.57 yrs.
Average age of girls graded-----	11.76 yrs.
Average age of pupils graded-----	11.73 yrs.

Grade 6, 1912.

Name of Pupil	Age	S.J.B.	H.M.B.	W.S.M.	Avg.
Besore, Ardath	12	13	13	13	13
Connour, May	14	14	14	14	14
Emch, Arnold	12	15	13	13	13
Dickerson, Esther	13	13	12	11	12
Freeman, Lela	13	13	13	13	13
Gerbing, Edna	12	12	12	11	12
Fryer, Clyde	14	13	13	13	13
Hawk, Russell	14	14	13	14	14
Hopkins, Helen	11	13	13	12	13
Harmon, Helen	14	14	14	15	14
Hullinger, Leota	11	13	13	14	13
Kirkpatrick, Elsiell		13	13	13	13
Kennedy, Viola	15	13	12	12	12
Knipp, Pauline	11	14	13	14	14
Keegan, Catherine	12	13	13	13	13
Lovett, Arthur	13	13	13	11	13
Langhoff, Anita	14	13	14	13	13
Lincicome, Arthur	11	13	13	12	13
Lockhart, Nora	15	14	14	14	14
McGehee, Mahala	13	15	13	13	13
Miller, Ona	13	13	14	13	13
Newton, Lloyd	13	13	13	12	13
Stamey, Russell	13	13	13	12	13
Sommer, George	11	14	14	13	14

Grade 7, 1912.

Name of Pupil	Age	S.J.B.	H.M.B.	W.S.M.	Avg.
Brady, Georgia	12	12	13	13	13
Brown, Dora	11	15	15	13	15
Blair, Josie	12	13	13	13	13
Brooks, Frona	10	14	13	11	13
Brownfield, Goldia	12	13	14	12	13
Cooper, Stella	15	13	12	10	12
Dunseth, Clara	13	14	13	13	13
Easterday, Helen	13	13	14	12	13
Ernest, Nellie	11	13	14	14	14
Garman, Eliza	10	13	13	13	13
Gillespie, Lucile	12	12	12	12	12
Hamlin, Iva	11	13	13	13	13
Johnson, Paul	12	13	13	11	13
Johnson, Julia	12	13	13	13	13
Justus, Edward	14	13	13	13	13
Keegan, James	14	14	16	14	14
Love, Constance	13	13	13	12	13
Meyeres, Clarence	13	14	14	15	14
Ogle, Flossie	14	14	14	15	14
Roberts, Nettie	14	13	13	13	13
Richter, Gladys	12	11	13	12	12
Sullivan, Vergil	13	13	13	13	13
Shute, Ruth	18	13	13	13	13
Sims, Sybil	15	13	14	14	14
Yantis, Ruth	13	15	15	15	15
Turner, Nellie	13	14	15	15	15
VanDoren, Paul	13	14	14	14	14
Walter, Mabel	12	14	15	13	14
Wharmby, Ada	13	14	15	16	15
Webber, Martha	12	12	14	13	13

Summary for Grade 6, 1912:

Total number boys enrolled-----	71
Total number girls enrolled-----	69
Total enrollment in grade-----	140
Average age of boys-----	12.30 yrs.
Average age of girls-----	12.35 yrs.
Average age of pupils-----	12.37 yrs.
Samples of boys used-----	8
Samples of girls used-----	16
Samples of pupils used-----	24
Per cent of grade-----	17.10
Per cent of boys-----	11.20
Per cent of girls-----	23.20
Average age of boys graded-----	12.63 yrs.
Average age of girls graded-----	12.75 yrs.
Average age of pupils graded-----	12.70 yrs.

Summary for Grade 7, 1912:

Total number boys enrolled-----	52
Total number girls enrolled-----	60
Total enrollment in grade-----	112
Average age of boys-----	13.1 yrs.
Average age of girls-----	12.8 yrs.
Average age of pupils-----	13.0 yrs.
Samples of boys used-----	6
Samples of girls used-----	24
Samples of pupils used-----	30
Per cent of grade-----	26.8
Per cent of boys-----	11.5
Per cent of girls-----	40.0
Average age of boys graded-----	13.0 yrs.
Average age of girls graded-----	12.6 yrs.
Average age of pupils graded -----	12.7 yrs.

Grade 8, 1912.

Name of Pupil	Age	S.J.B.	H.M.B.	W.S.M.	Avg.
Adler, Emily	12	14	13	13	13
Birdzell, Ruth	14	16	14	15	15
Britton, Nellie	14	13	14	14	14
Broadhurst, M.	14	15	13	13	13
Bean, Lucy	14	14	13	12	13
Crane, Bessie	15	15	15	13	15
Furst, Elsie	15	14	14	12	14
Greene, Ethel	14	15	13	12	13
Greeley, Hazel	16	13	14	14	14
Hormel, Hattie	13	13	13	13	13
Hendricks, Dora	14	13	13	12	13
Hill, Mabel	14	14	15	13	14
Kegley, Robert	13	13	12	12	12
Lincicome, Inez	13	14	14	14	14
Leming, Lois	14	13	13	13	13
Lawrence, Julia	14	15	15	14	15
Morgan, Herbert	15	14	15	13	14
Mills, Hazel	12	13	14	13	13
Martin, Bernice	13	13	13	13	13
McKelvey, Olive	15	13	14	12	13
Mosier, Henry	12	14	13	13	13
Nogle, Caroline	16	14	15	14	14

Rahe, Stella	17	14	14	14	14
Rea, Ruth	14	13	13	12	13
Rahe, Clinton	16	15	15	13	15
Scroggin, June	14	13	13	13	12
Small, Tryphosa	14	13	14	14	14
Stamp, Juanita	14	14	14	12	14
Winklepleck, C.	15	13	14	13	13
Ward, Charlott.	13	15	13	13	13
Whitaker, Rovene	15	15	13	12	13
Woody, Gladys	14	13	15	12	13

Summary for Grade 8, 1912:

Total number boys enrolled-----	44
Total number girls enrolled-----	60
Total enrollment in grade-----	104
Average age of boys-----	13.93 yrs.
Average age of girls-----	14.10 yrs.
Average age of pupils-----	14.03 yrs.
Samples of boys used-----	6
Samples of girls used-----	26
Samples of pupils used-----	32
Per cent of grade-----	30.80
Per cent of boys-----	13.64
Per cent of girls-----	43.33
Average age of boys graded-----	14.17 yrs.
Average age of girls graded-----	14.08 yrs.
Average age of pupils graded-----	14.09 yrs.

Method Used in Comparing Data.

In the above data the grades were secured by comparing the samples of penmanship with Thorndike's standards and marking each sample accordingly. This was done by three persons working independently. The first, S.J.B., is a student in education who has been a superintendent of schools for several years. The second, H.M.B., is a normal school graduate who has been a very successful teacher in the elementary schools. The third person, W.S.M., is a specialist in psychology who has had several years of teaching experience. The Thorndike standards are not here shown as they can readily be found in the Teachers College Record, Vol. XI, No. 2 or in Thompson's, Psychology and Pedagogy of Writing. The so called average in the column to the right was secured by (1) using the mode of the three grades, or where there is no mode (2) by using the median to the nearest whole number. The following illustration will make this clear:

Grade A	Grade B	Grade C	Avg.
13	13	12	13
11	14	11	11
13	12	11	12
12	13	10	12
12	14	11	12

From the average qualities thus secured, the tables following are made. These are placed on the right hand page and they indicate the number of cases in each grade under each quality of penmanship in the Thorndike scale for each of the

school years ending 1879 and 1912 in grades V, VI, VII, and VIII of the Urbana Public Schools. From each table graphs are drawn, showing the distribution of pupils as to quality in penmanship. In each case the curve in red represents the work of the year 1879, and in black, the work of the year 1912. As is indicated, the number of cases are plotted on the X-axis and the qualities are plotted on the Y-axis. These sets of curves are placed opposite the corresponding tables. In the brief discussion of results which is placed opposite each set of curves, "mode" will be used to indicate the most frequent of the individual cases, and "median" will be used to indicate the middle measure, or the point or place where the number of measures greater than it equals the number less than it.

1. See Thorndike's Educational Psychology, Appendix 3.

DISTRIBUTION OF PUPILS - AS TO QUALITY IN PENMANSHIP.

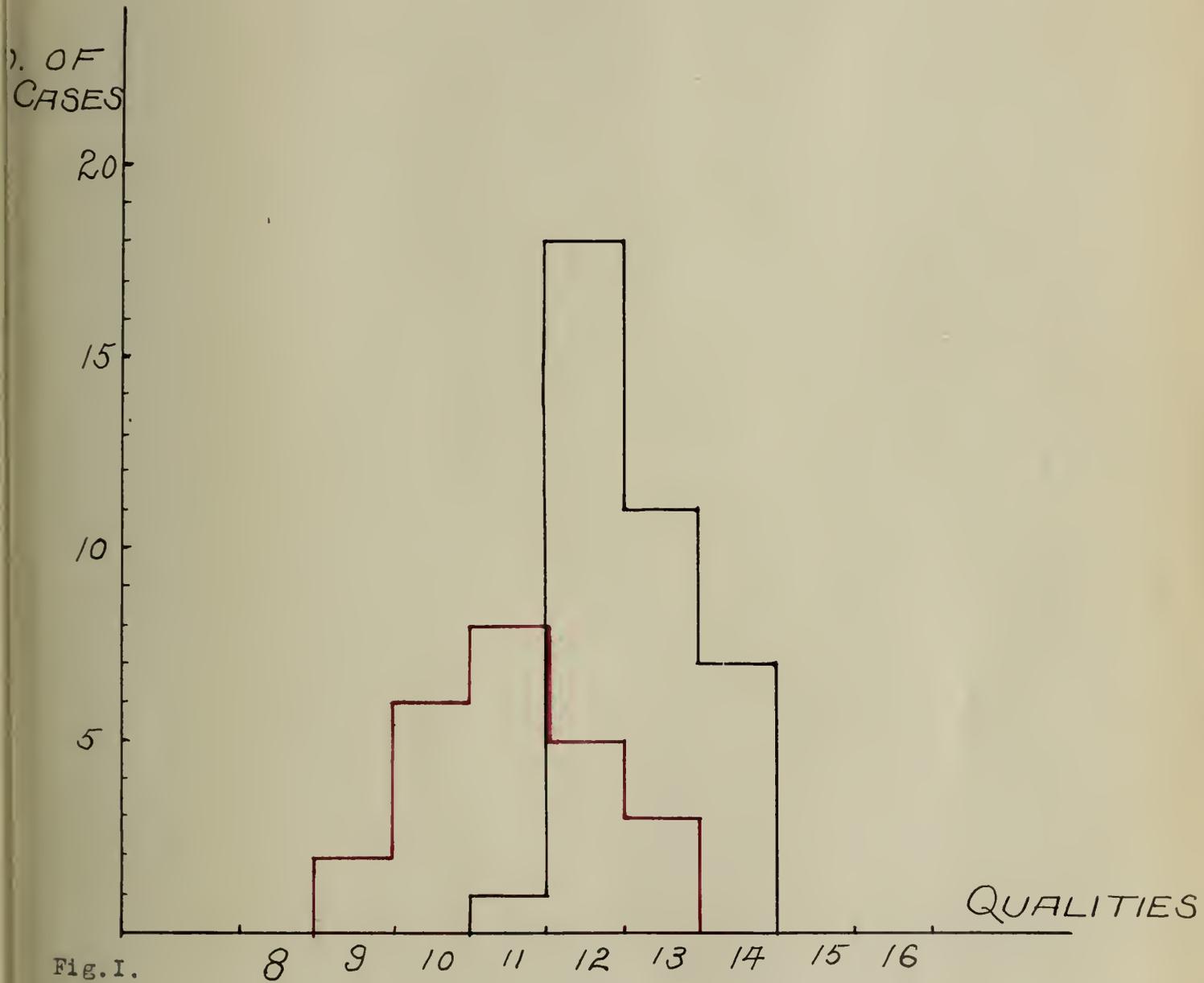


Fig. I.

GRADE 5.

▨ - 1912

▨ - 1879

Distribution of Pupils as to Quality in
Penmanship--Grade V.

Quality	1879	1912
15	0	0
14	0	7
13	3	11
12	5	18
11	8	1
10	6	0
9	2	0
8	0	0

Explanation of Fig.1. The curve for the year 1879 has both its mode and median at quality 11, while the curve for the year 1912 has its mode and median each at quality 12. The forms of the two curves are quite different, the curve for 1879 giving about the same number below as above the mode, while the curve for 1912 has by far more cases above than below its mode.

DISTRIBUTION OF PUPILS AS TO QUALITY IN PENMANSHIP.

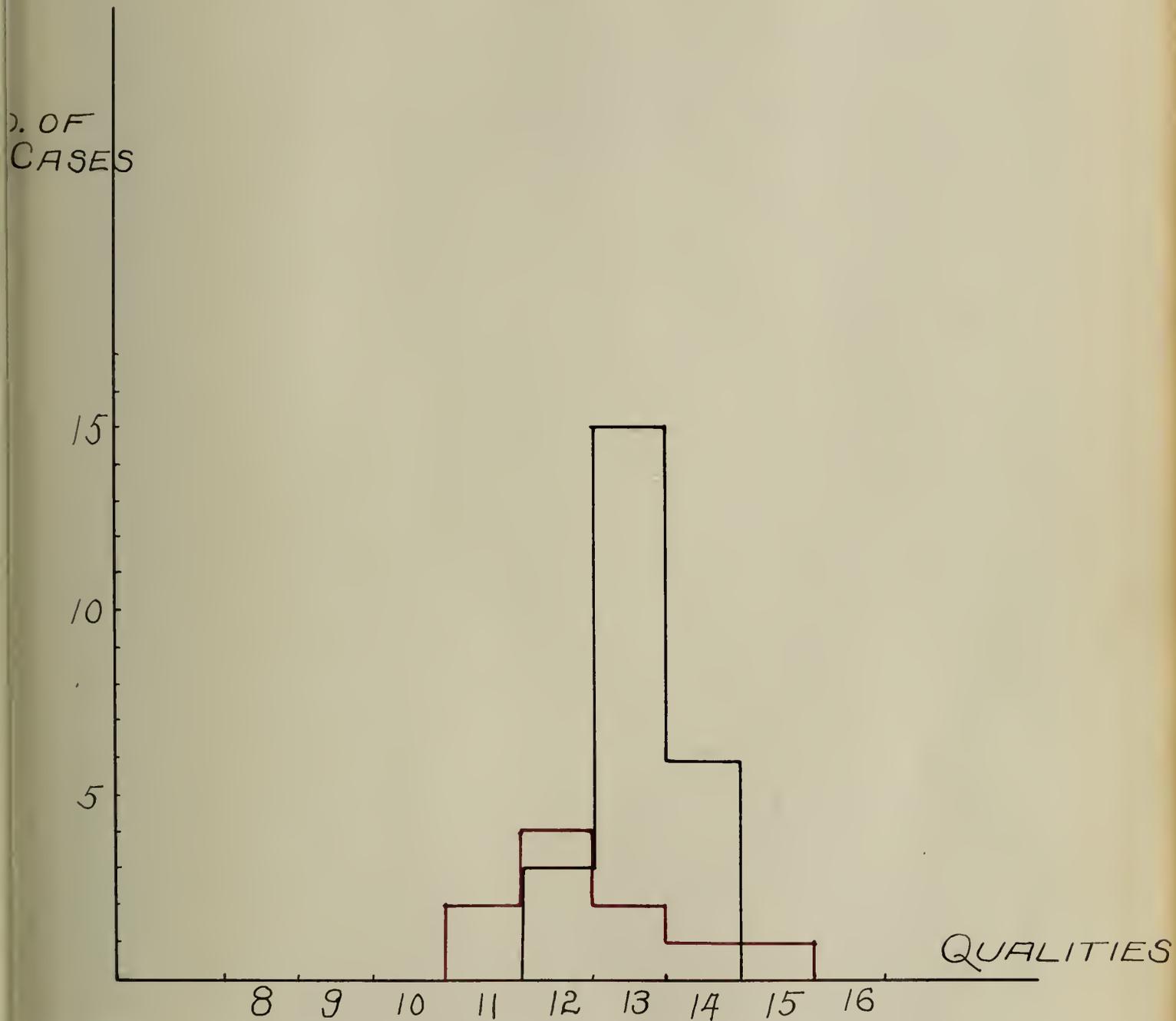


Fig. II.

GRADE 6

▨ - 1912

▩ - 1879

Distribution of Pupils as to Quality
in Penmanship-Grade VI.

Quality	1879	1912
15	1	0
14	1	6
13	2	15
12	4	3
11	2	0
10	0	0
9	0	0
8	0	0

Explanation of Fig.2. The curve for the year 1879 has its mode at 12 and its median at quality 12 +, while the curve for the year 1912 has its mode at quality 13 and its median at 13 +. The forms of the two curves are quite different, the curve for 1912 having a pronounced mode with fewer variations on either the upper or lower sides than the curve for 1879.

DISTRIBUTION OF PUPILS AS TO QUALITY
IN PENMANSHIP.

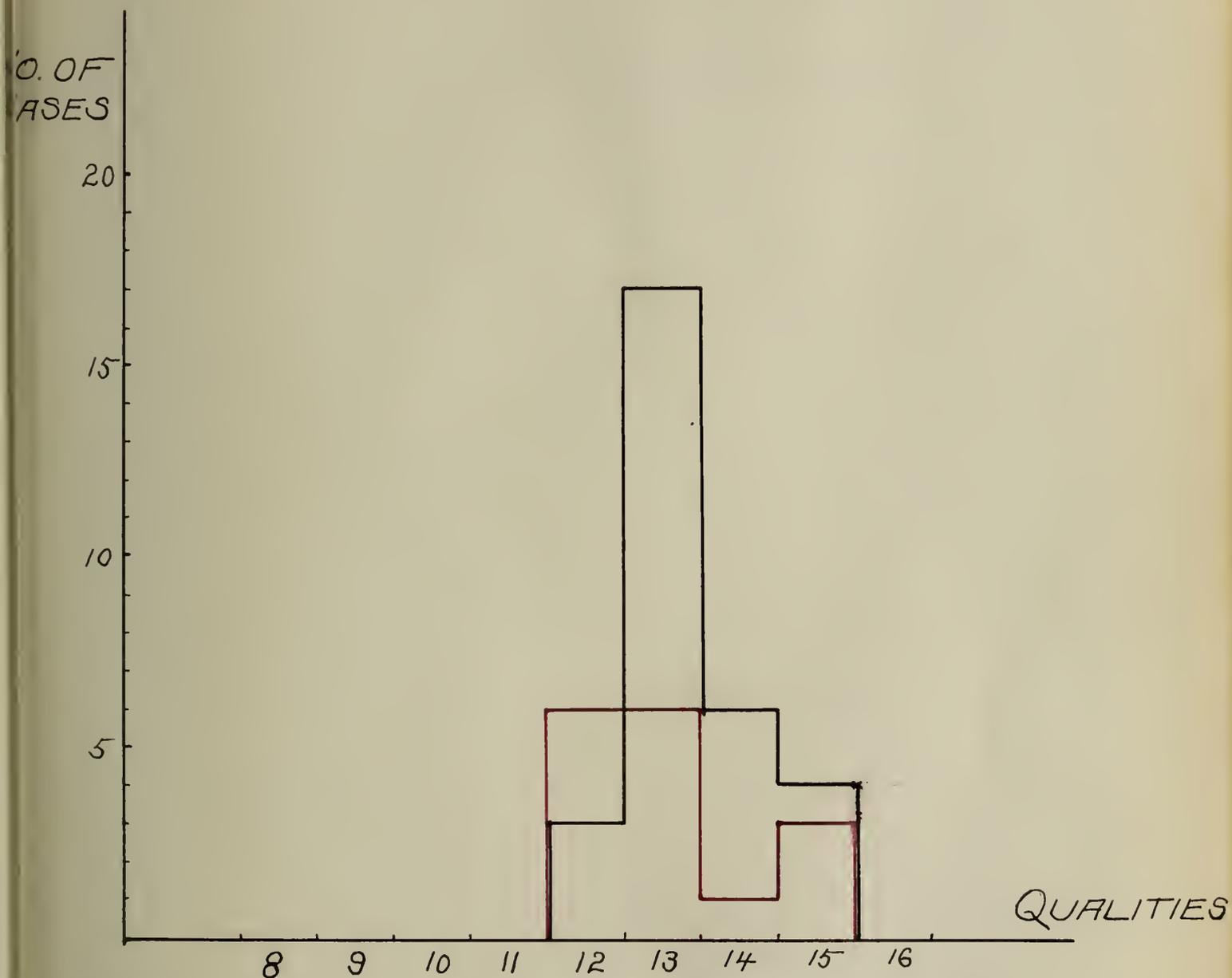


Fig. III.

GRADE 7.

 -1912

 -1879

Distribution of Pupils as to Quality
in Penmanship-- Grade VII.

Quality	1879	1912
16	0	0
15	3	4
14	1	6
13	6	17
12	6	3
11	0	0
10	0	0
9	0	0

Explanation of Fig.3. The curve for the year 1879 has a double mode at qualities 12 and 13, while the curve for the year 1912 has its mode at quality 13. The corresponding medians are at qualities 12+ and 13+. The forms of the two curves are quite different again, the mode for the latter being very pronounced while the former has no point of "greatest frequency."

DISTRIBUTION OF PUPILS AS TO QUALITY
IN PENMANSHIP

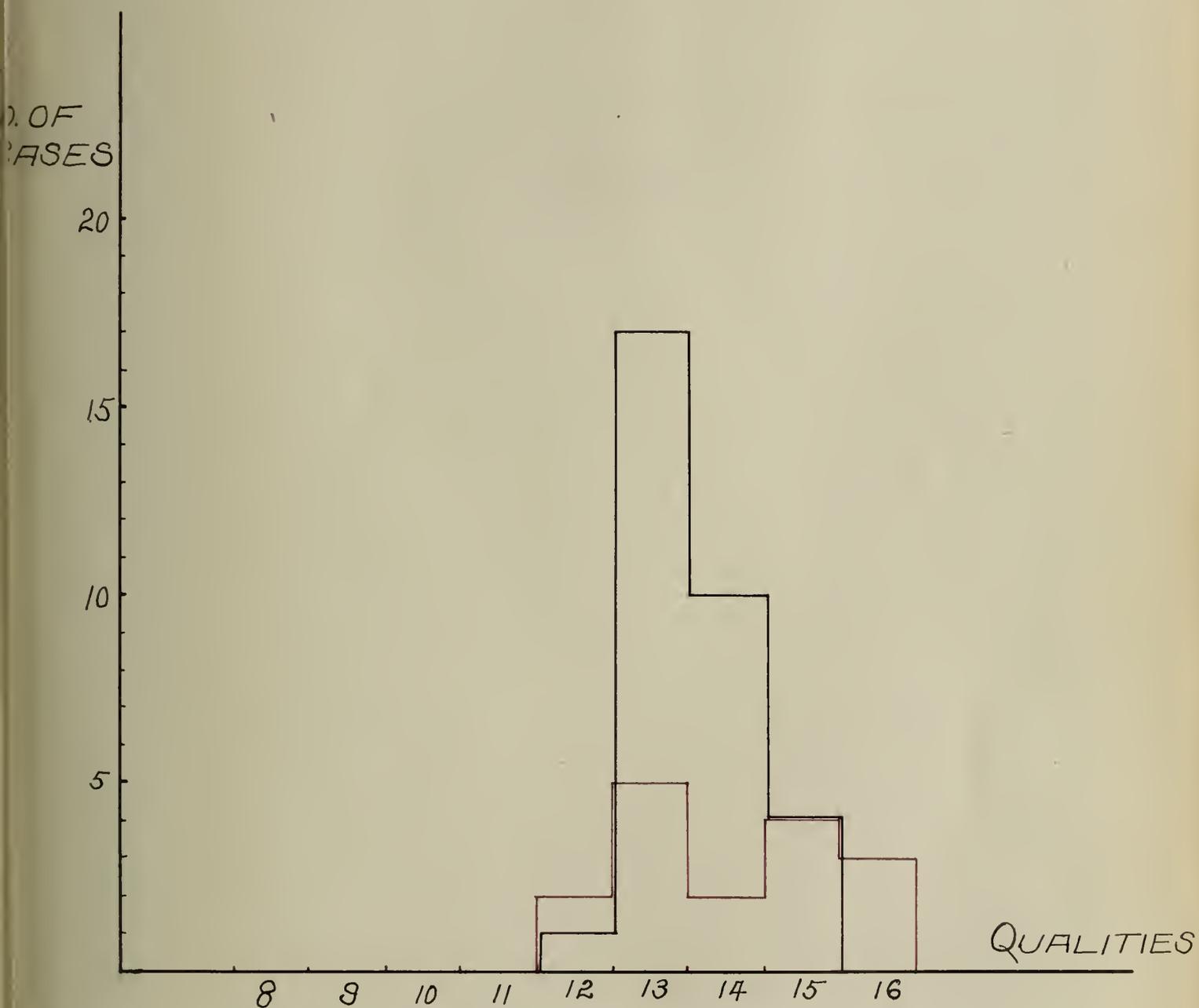


Fig. IV.

GRADE 8.

 - 1912

 - 1879

Distribution of Pupils as to Quality
in Penmanship-- Grade VIII.

Quality	1879	1912
16	3	0
15	4	4
14	2	10
13	5	17
12	2	1
11	0	0
10	0	0
9	0	0

Explanation of Fig.4. The curve for the year 1879 has its mode at 13 and its median at 14, while the curve for the year 1912 has its mode at 13 and its median at 13+. The quality is higher for the year 1879 than for the year 1912 in this grade, but the variability is much less for the year 1912, 84 per cent of the cases falling in qualities 13 and 14.

DISTRIBUTION OF PUPILS AS TO QUALITY IN PENMANSHIP.

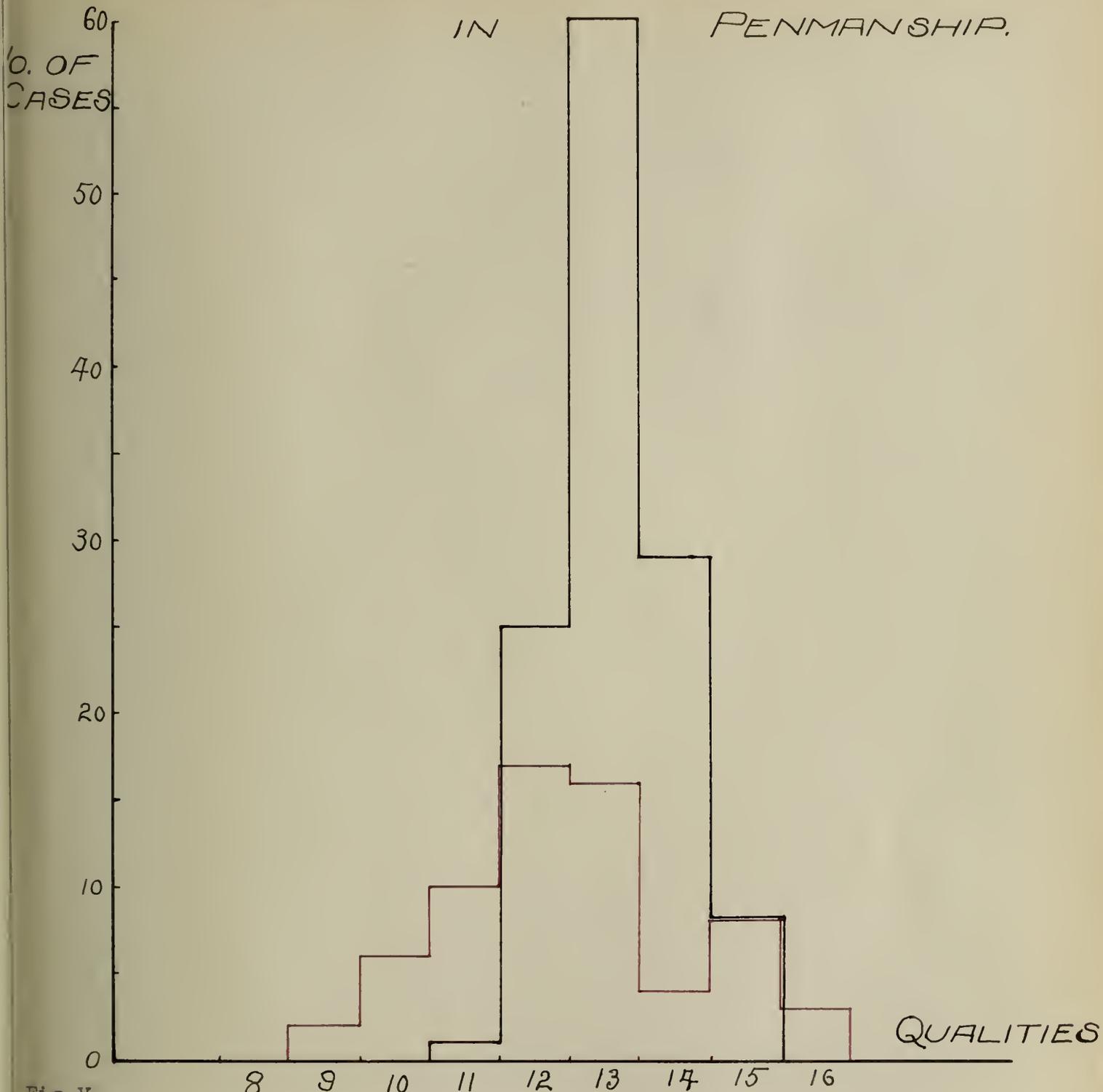


Fig.V.

GRADES 5 TO 8 COMBINED.

▨ -1912

▨ -1879

Distribution of Pupils as to Quality
in Penmanship— Grades V, VI, VII, and VIII.

Quality	1879	1912
16	3	0
15	8	8
14	4	29
13	16	60
12	17	25
11	10	1
10	6	0
9	2	0

Explanation of Fig. 5. The curve for the year 1879 has its mode at 12 and its median at 12 + , while the curve for the year 1912 has its mode at 13 and its median at 13 + . The forms of the two curves are again quite different, the curve for the year 1912 having a pronounced mode and little variation from the mode, while the curve for the year 1879 has within a single case of a double mode,

School Factors that Influence the Quality of Penmanship.

Thus far the comparison has been in favor of the year 1912 with the exception of the eighth grade, where the two are about equal. Where the four grades are combined as in Fig. 5 both the mode and median are one quality higher for the year 1912 over that of the year 1879. These then are the primary results of the investigation—that the pupils write better now than they did 33 years ago in the above named schools. However, the student of education not only wishes to know the results but he also wishes to explain, more or less satisfactory, the causes as well.

At the outset one is led to ask one's self concerning the following factors:

1. Length of school year.
2. Age of pupils.
3. Number of pupils in a room.
4. Course of Study.
5. Length of daily practice.
6. Quality of teaching the subject.
in
7. Method of teaching the subject.
8. System of writing in use.

in so far as we have the necessary data, we shall discuss each of these in turn.

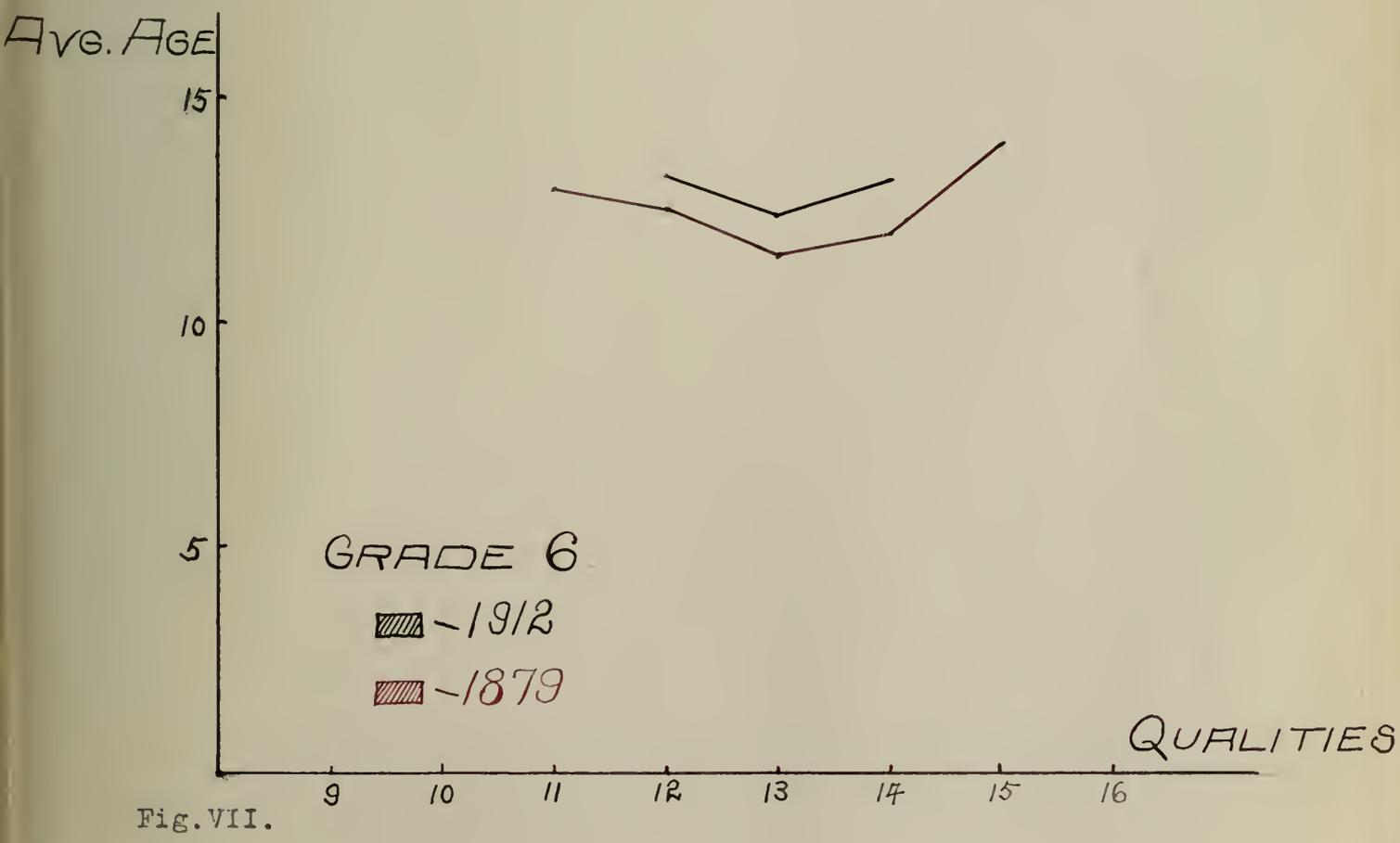
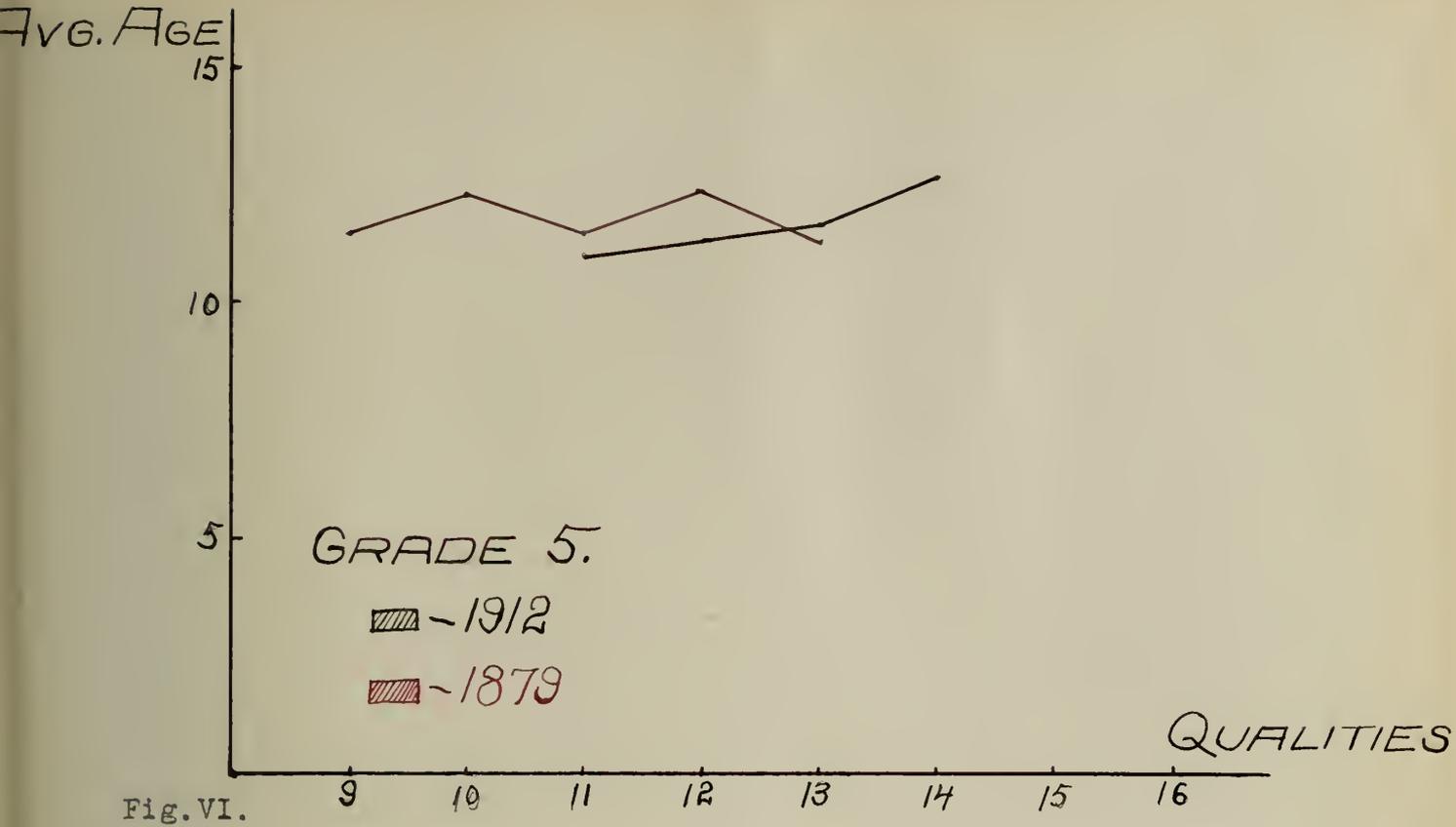
Length of the School Year.

As to the length of the school year ending in 1879, we have definite information. The report for that year indicates that school began September 9 th. and ended April 4th. It is probable that there were two or more short vacations during this period. At most, there could not have been more than seven months of school during the school year ending in 1879. School is in session nine months during the current school year. This is two months to the advantage of the present-day schools over those of 1879.

Age of Pupils.

Knowing the age of each pupil and the quality of his or her penmanship, we are enabled to correlate quality of penmanship with age for each period and then compare the ages of pupils having the same quality of writing. To do this we first formulate tables showing the ages and the corresponding qualities of penmanship of each group. We can then find the average age of pupils possessing each quality of writing ability and compare the averages of each grade, and the whole school. As such a comparison can not readily be shown by means of the tables alone. The avg. age is plotted on the **Y**-axis and the qualities of penmanship on the **X**-axis.

QUALITY IN PENMANSHIP AND AGE.



Relation of Quality of Penmanship to Age-Grade V, 1879.

Age	Quality of Penmanship					
	9	10	11	12	13	14
10	0	0	2	0	1	0
11	1	1	4	0	1	0
12	1	2	0	3	0	0
13	0	3	1	2	1	0
14	0	0	0	0	0	0
15	0	0	1	0	0	0
Total	2	6	8	5	3	0
Avg. Age	11.5	12.3	11.5	12.4	11.3	

Relation of Quality of Penmanship to Age-Grade V, 1912.

Age	Quality of Penmanship					
	9	10	11	12	13	14
10	0	0	0	3	3	0
11	0	0	1	7	2	1
12	0	0	0	6	3	2
13	0	0	0	2	1	2
14	0	0	0	0	2	2
15	0	0	0	0	0	0
Total			1	18	11	7
Avg. Age			11	11.4	11.7	12.7

Relationship of Quality of Penmanship to Age-Grade VI, 1879.

Age	Quality of Penmanship						
	9	10	11	12	13	14	15
10	0	0	0	1	0	0	0
11	0	0	0	0	1	0	0
12	0	0	1	1	1	1	0
13	0	0	0	1	0	0	0
14	0	0	1	0	0	0	1
15	0	0	0	1	0	0	0
16	0	0	0	0	0	0	0
Total			2	4	2	1	1
Avg. Age			13	12.5	11.5	12	14

Relationship of Quality of Penmanship to Age-Grade VI, 1879.

Age	Quality of Penmanship						
	9	10	11	12	13	14	15
10	0	0	0	0	0	0	0
11	0	0	0	0	4	2	0
12	0	0	0	1	3	0	0
13	0	0	0	1	6	0	0
14	0	0	0	0	2	3	0
15	0	0	0	1	0	1	0
Total				3	15	6	
Avg. Age				13.3	12.4	13.2	

QUALITY IN PENMANSHIP AND AGE.

AVG. AGE

15

10

5

0

GRADE 7.

▨ - 1912

▨ - 1879

QUALITIES

Fig. VIII.

9 10 11 12 13 14 15 16

AVG. AGE

15

10

5

0

GRADE 8.

▨ - 1912

▨ - 1879

QUALITIES

Fig. IX.

9 10 11 12 13 14 15 16



Relationship of Quality of Penmanship to Age-Grade VII, 1879.

Age	Quality of Penmanship						
	10	11	12	13	14	15	16
11	0	0	0	0	0	0	0
12	0	0	3	0	1	0	0
13	0	0	2	3	0	2	0
14	0	0	0	3	0	1	0
15	0	0	0	0	0	0	0
16	0	0	1	0	0	0	0
Total			6	6	1	3	0
Avg. Age			13	13.5	12	13.3	

Relationship of Quality of Penmanship to Age-Grade VII, 1912.

Age	Quality of Penmanship						
	10	11	12	13	14	15	16
10	0	0	0	2	0	0	0
11	0	0	1	1	1	1	0
12	0	0	1	6	3	0	0
13	0	0	0	5	0	3	0
14	0	0	0	2	1	0	0
15	0	0	1	0	1	0	0
16	0	0	0	0	0	0	0
18	0	0	0	1	0	0	0
Total			3	17	6	4	
Avg. Age			12.7	12.6	12.7	12.5	

Relationship of Quality of Penmanship to Age-Grade VIII, 1879.

Age	Quality of Penmanship						
	10	11	12	13	14	15	16
11	0	0	1	1	0	0	0
12	0	0	0	0	0	0	0
13	0	0	0	2	1	1	1
14	0	0	1	1	1	1	0
15	0	0	0	1	0	1	0
16	0	0	0	0	0	0	1
17	0	0	0	0	0	0	0
18	0	0	0	0	0	0	1
Total			2	5	2	4	3
Avg. Age			12.5	13.2	13.5	15.2	15.6

Relationship of Quality of Penmanship to Age-Grade VIII, 1912.

Age	Quality of Penmanship						
	10	11	12	13	14	15	16
11	0	0	0	0	0	0	0
12	0	0	0	3	0	0	0
13	0	0	1	3	1	0	0
14	0	0	0	9	4	2	0
15	0	0	0	2	2	1	0
16	0	0	0	0	2	1	0
17	0	0	0	0	1	0	0
18	0	0	0	0	0	0	0
Total			1	17	10	4	
Avg. Age			13	13.6	14.8	14.7	

QUALITY IN PENMANSHIP AND AGE.

AVG. AGE.



Fig.X.

GRADES 5 TO 8 COMBINED.

▨ - 1912

▨ - 1879

Relationship of Quality of Penmanship to Age-Grades V-VIII, 1879.

Age	Quality of Penmanship							
	9	10	11	12	13	14	15	16
10	0	0	2	1	1	0	0	0
11	1	1	4	1	3	0	0	0
12	1	2	1	7	1	2	0	0
13	0	3	1	5	6	1	3	1
14	0	0	1	1	4	1	3	0
15	0	0	1	1	1	0	1	0
16	0	0	0	1	0	0	0	1
18	0	0	0	0	0	0	0	1
19	0	0	0	0	0	0	1	0
Total	2	6	10	17	16	4	8	3
Avg Age	11.5	12.3	11.8	12.6	12.7	12.7	14.4	15.7

Relationship of Quality of Penmanship to Age-Grades V-VIII, 1912.

Age	Quality of Penmanship							
	9	10	11	12	13	14	15	16
10	0	0	0	3	5	0	0	0
11	0	0	1	8	7	4	1	0
12	0	0	0	8	15	5	0	0
13	0	0	0	4	15	3	3	0
14	0	0	0	0	15	10	2	0
15	0	0	0	2	2	4	1	0
16	0	0	0	0	0	2	1	0
17	0	0	0	0	0	1	0	0
18	0	0	0	0	1	0	0	0
Total			1	25	60	29	8	
Avg. Age			11	11.8	12.7	13.5	13.6	

NUMBER OF PUPILS ENROLLED PER ROOM ~
FOR THE YEARS 1879, 1912.

No. PUPILS

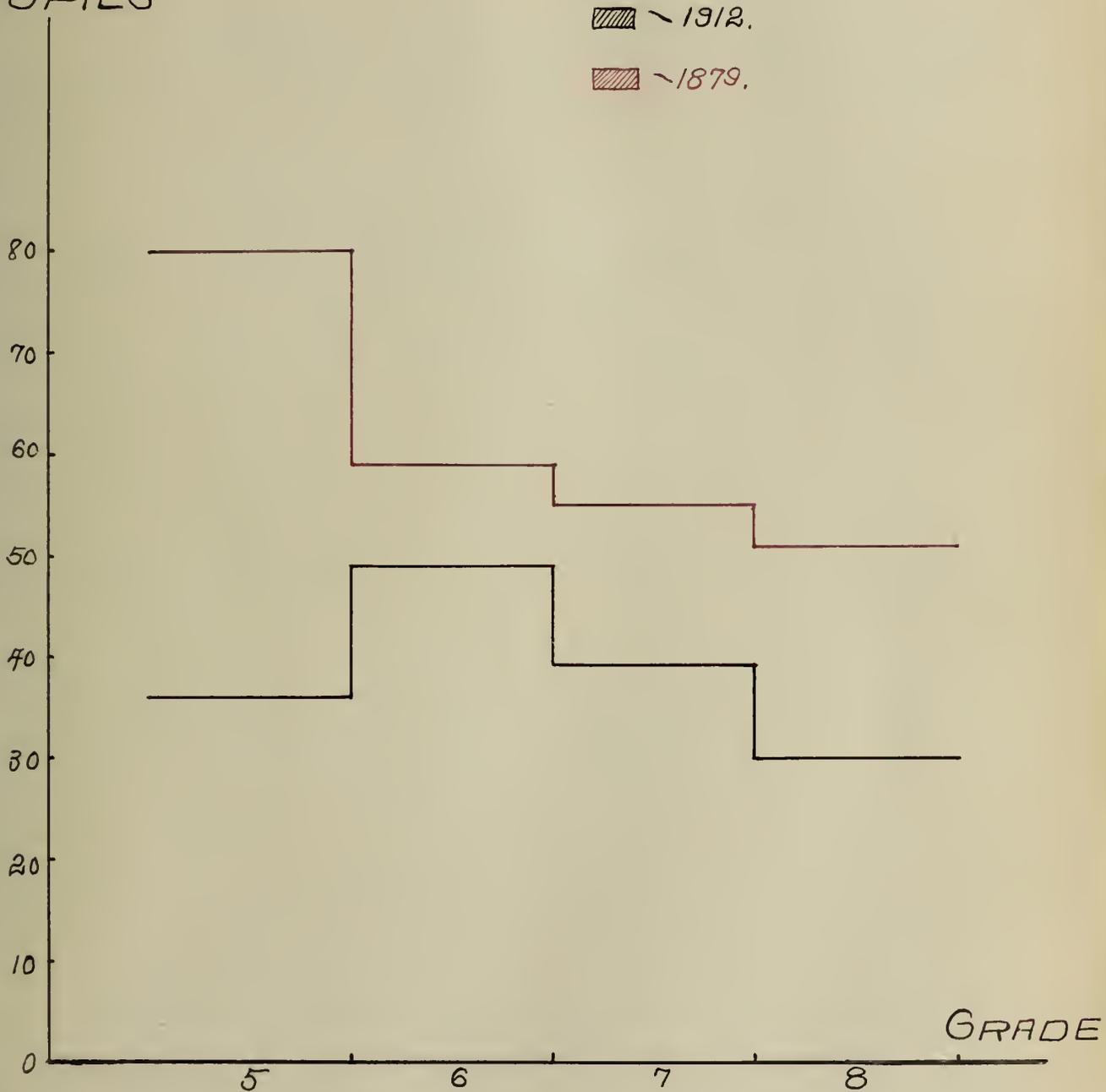


Fig. XI.

Number of Pupils in a School Room.

As to the number of pupils in the different school rooms in 1879 and 1912, the following tabulation will make clear:

Urbana Public Schools.

Grade	Number of Pupils Enrolled in Room		Avg.No.
	1879	1912	1912
5	80	33	36
		40	
		38	
		32	
6	59	51	49
		47	
		49	
7	55	33	39
		47	
		38	
8	51	30	30

The above data is shown graphically in Fig.XI. It is readily seen that the schools of 1912 have a decided advantage over those of 1879, as to the number of pupils to each teacher.

NUMBER OF SUBJECTS IN URBANA'S ELEMENTARY SCHOOLS - 1879, 1912.

No. OF SUBJECTS

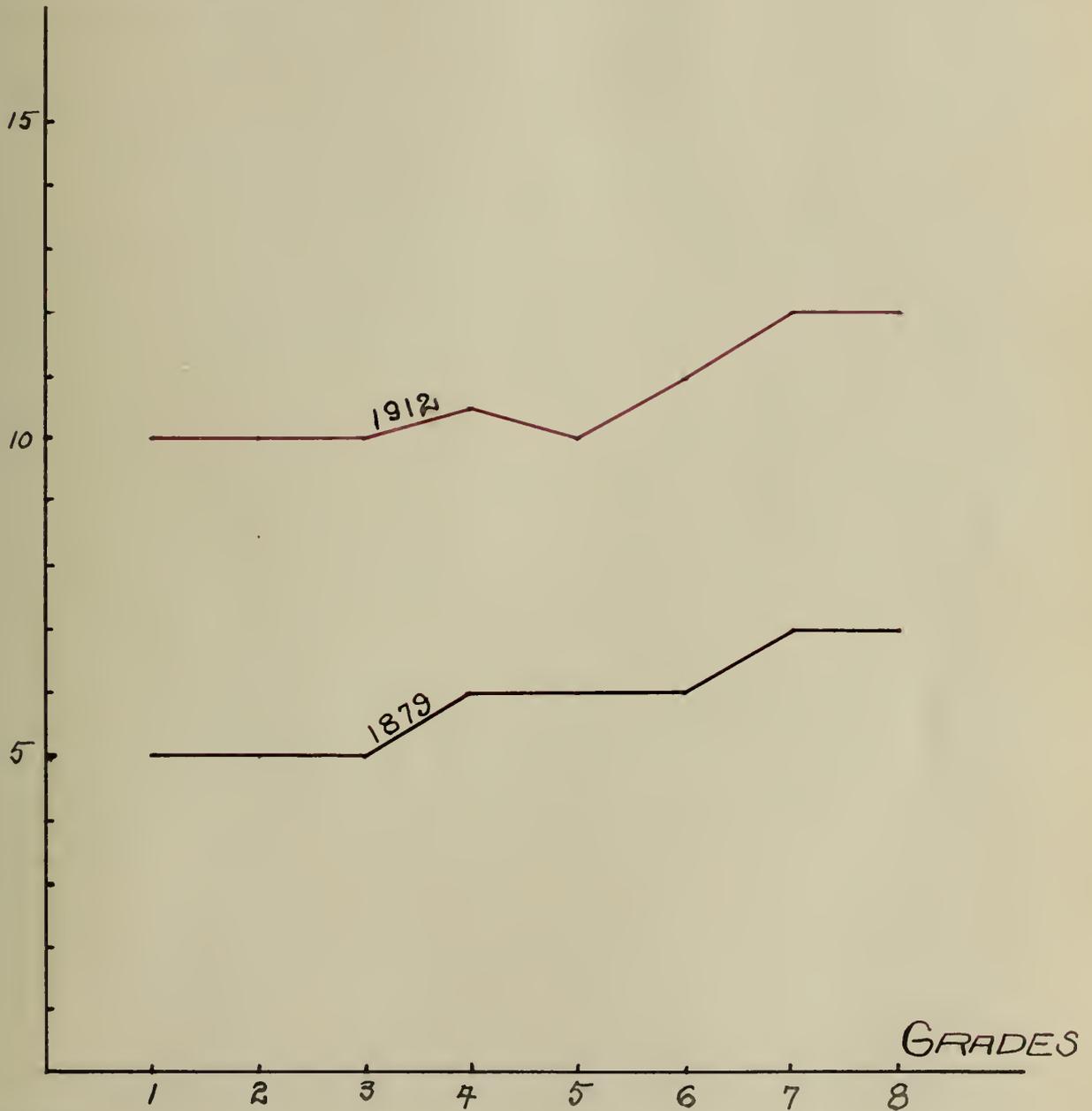


Fig.XII.

Course of Study.

Writing, one of the 3R's¹, has always been one of the fundamental subjects in the curriculum of the American elementary schools. In the early colonial schools, penmanship was thought unnecessary for girls, so instruction in this subject was confined wholly to boys. Since that time, however, birch bark has been replaced by writing paper; home made ink, by mineral writing fluids; and goose-quill, by gold and steel pens. Since that time, also, girls have been taught to write with the boys in all the schools. In recent years, the elementary curriculum has been greatly enriched. This enrichment is fairly well illustrated by the Urbana schools. For the number of subjects and place in the curriculum, see the following diagrams and Fig. XII. From Fig. XII., it is evident that a pupil now has to study about twice the number of different subjects as he did three decades ago. As a result, one would suppose that he could not study any one of the subjects as well now as then.

1. Wickersham, History of Education in Pennsylvania, p. 192.

Urbana Elementary Schools-Number of Subjects
and Place in the Curriculum for 1879.

Subjects	Gr. I	Gr. II	Gr. III	IV Grade	Gr. V	Gr. VI	Gr. VII	Gr. VIII
Reading	★	★	★	★	★	★	★	★
Spelling	★	★	★	★	★	★	★	★
Grammar							★	★
Lang. & Comp.	★	★	★	★	★	★	★	
Writing	★	★	★	★	★	★	★	★
Arithmetic	★	★	★	★	★	★	★	★
Geography				★	★	★	★	★
History							★	★
Civics								
Music								
Drawing	★	★	★	★	★	★	★	★
Man. Train.								
Cooking								
Sewing								
Phy. Train.								
Physiol. & Hyg.								
Nature St.								
Total	5	5	5	6	6	6	7	7

第一行 第一行 第一行 第一行 第一行 第一行

第二行 第二行 第二行 第二行 第二行 第二行

第三行 第三行 第三行 第三行 第三行 第三行

第四行 第四行 第四行 第四行 第四行 第四行

第五行 第五行 第五行 第五行 第五行 第五行

第六行 第六行 第六行 第六行 第六行 第六行

第七行 第七行 第七行 第七行 第七行 第七行

第八行 第八行 第八行 第八行 第八行 第八行

COMPARISON OF URBANA SCHOOLS IN 1879 AND 1911 AS TO TIME SPENT IN THE PRACTICE OF WRITING.

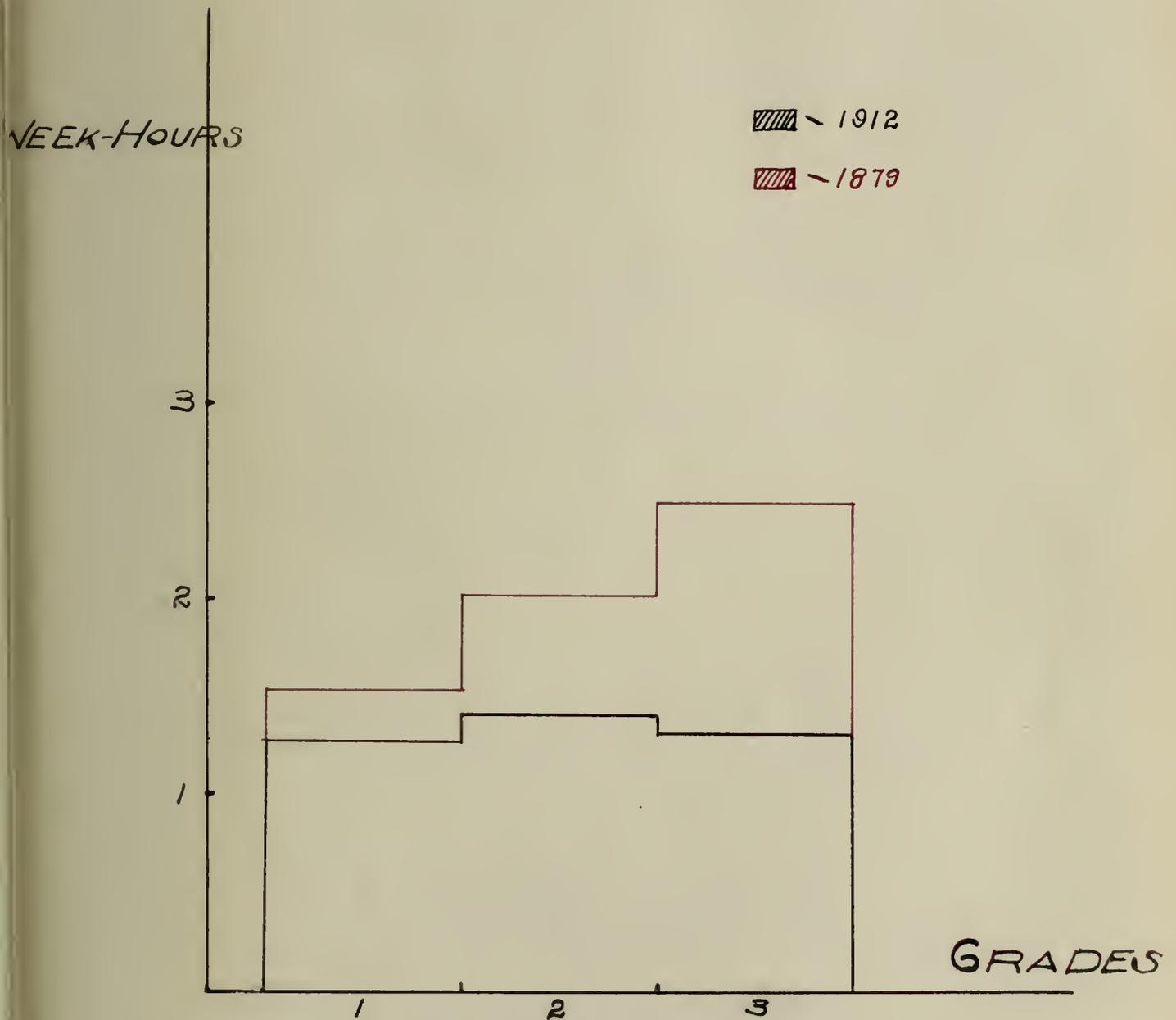


Fig. XX.

The Daily Practice of Penmanship.

The report book for 1879 gives the daily programs for the first three grades. The following data permits a comparison for the first three grades;

Urbana Schools, 1879.

Grade I.

Miss K. 22 minutes 5 days per week
 Miss P. 25 minutes 5 days per week
 Avg. for first grade, 1.53 week-hours

Grade II.

Miss V. 25 minutes 5 days per week
 Miss J. 25 minutes 5 days per week
 Avg. for second grade, 2.08 week-hours

Grade III.

Miss C. 30 minutes 5 days per week
 Avg. for third grade, 2.50 week-hours

Urbana Schools, 1911.

Grade I.

Miss L. 20 minutes 5 days per week
 Miss F. 20 minutes 4 days per week
 Miss B. 20 minutes 5 days per week
 Miss W. 20 minutes 5 days per week
 Avg. for first grade, 1.25 week-hours

Grade II.

Miss D. 15 minutes 5 days per week
 Miss K. 15 minutes 5 days per week
 Miss V. 20 minutes 5 days per week
 Avg. for second grade, 1.38 week-hours

Grade III.

Miss C. 15 minutes 4 days per week
 Miss L. 20 minutes 5 days per week
 Miss R. 10 minutes 5 days per week
 Miss V. 20 minutes 5 days per week
 Avg. for third grade, 1.29 week-hours

Note; For an explanation of the above data, see Fig. XX.

Quality and Method of Teaching Penmanship.

As to the Quality of teaching and the methods employed in teaching penmanship in 1879, we know but little. The report does indicate, however, that instruction from a manual in form of drills was given in grades four to eight. In the same schools at present, the penmanship is not supervised and the subject is taught, as in most schools, without special supervision; i. e., the pupils use copy books and have a definite period for practice each day.

Much has been said and written as to the teacher's influence on the child during its formative period. That such an influence exists can not be doubted, although its value can not be measured. We are led to conclude, therefore, that a teacher's quality of penmanship and habits of neatness would to a certain extent influence the quality of penmanship and habits of neatness of her pupils. As our data give samples of each teacher's writing, we shall use these as the only available means of determining the quality of the penmanship teaching for the two periods. Using Thorndike's standards for adult women and grading each sample as in case of the pupils in the investigation, the three judges before mentioned obtained the results found in the following tabulation:

DISTRIBUTION OF TEACHERS ~ AS TO QUALITY IN PENNSYLVANIA.

No. CASES

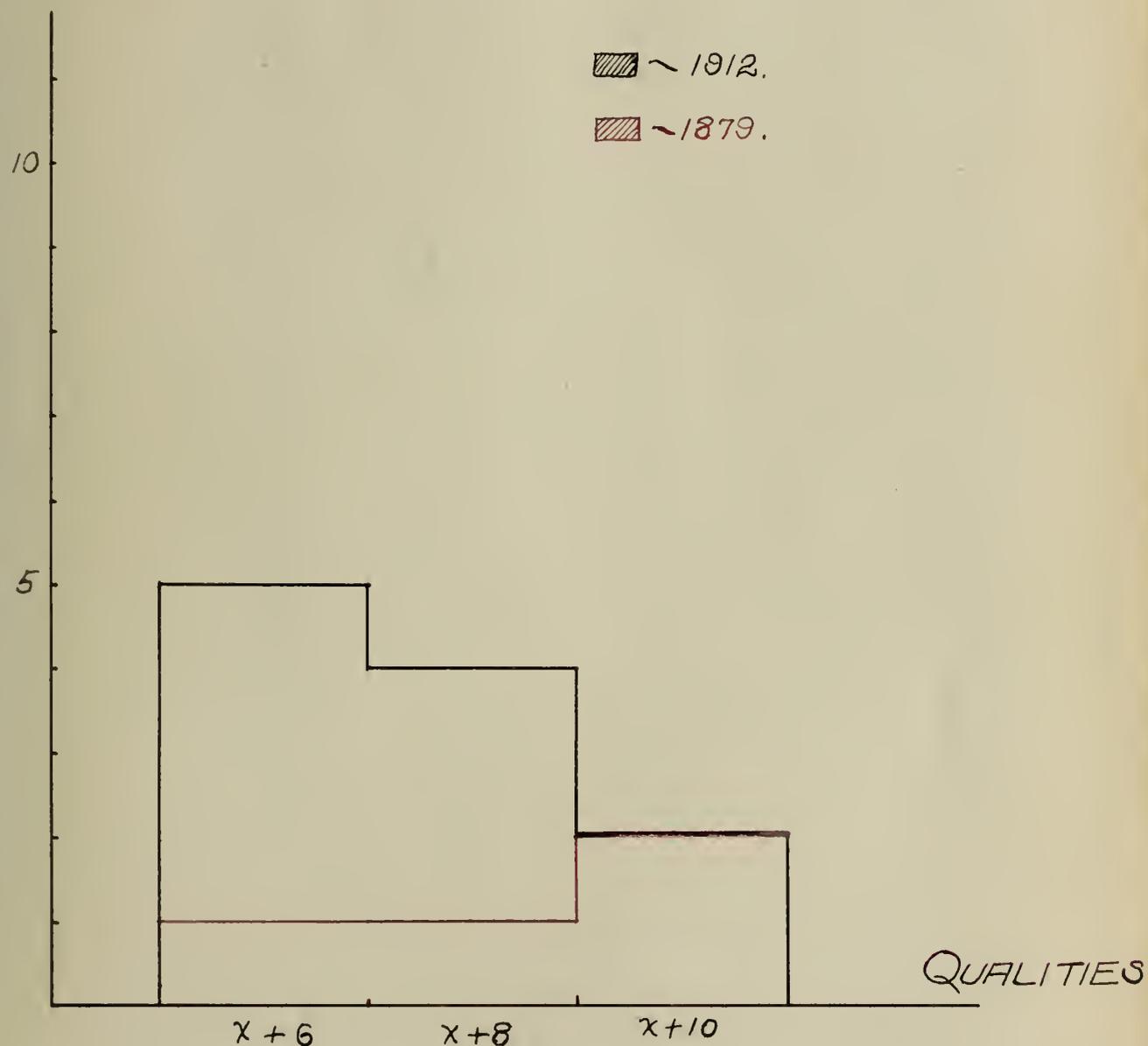


Fig. XIII. The curve for the year 1879 has its mode at quality X-10 and the curve for the year 1912, at quality X+6. As there are only six qualities in the scale for adult women, and as the curves show a difference of two qualities (in the modes), the results are greatly in favor of the teachers of 1879.

Quality of Penmanship of Elementary Teachers
of the Urbana Public Schools for 1879 and 1912.

Name of teacher	Year	S.J.B.	H,M,B,	W.S.M.	Avg.
Miss D	1879	x+10	x+6	x+8	x+8
Miss P	1879	x+10	x+8	x+10	x+10
Miss D	1879	x+8	x+6	x+6	x+6
Miss F	1879	x+10	x+10	x+10	x+10
Miss C	1912	x+10	x+10	x+10	x+10
Miss M	1912	x+6	x+6	x+10	x+6
Miss M	1912	x+8	x+6	x+8	x+8
Miss Y	1912	x+6	x+6	x+6	x+6
Miss F	1912	x+6	x+10	x+8	x+8
Miss F	1912	x+6	x+8	x+6	x+6
Miss W	1912	x+10	x+10	x+10	x+10
Miss H	1912	x+8	x+6	x+4	x+6
Miss P	1912	x+6	x+6	x+4	x+6
Miss J	1912	x+8	x+10	x+8	x+8
Miss D	1912	x+6	x+8	x+8	x+8

Systems of Writing.

The school report for the year 1879 states that Payson, Dunton, and Scribner's series of copy books were then in use in the Urbana schools. A tracing book for lead pencil work was begun in the fourth grade and was followed by books I, II, III, and IV in grades V, VI, VII, and VIII respectively. As the writer has never seen this series of copy books, he knows but little about them. However, the writing of the pupils and teachers of that period indicates that the old Spencerian slant was used, and that much emphasis was placed on writing neatly and making the capital letters well. The Berry system of copy books, which are now in use in the Urbana schools, was introduced four years ago. There are seven books in the series. The authors and publishers of this series emphasize the following aims:

Numbers I and II arouse the child's personal interest.

Numbers III and IV sustain this interest, and furnish suggestive drill work looking toward the perfection of form and the acquirement of grace and speed.

Numbers V, VI and VII develop muscular control and give children power to write well.

There is also a teacher's manual, which accompanies the Berry books.

Summary of the Factors Influencing the Penmanship
in 1879 and 1912.

In our investigation we find that the pupils in the four upper grades of the Urbana elementary schools are better writers, by one quality of the Thorndike scale, in 1912 than were the pupils in the same school 33 years ago. In trying to determine the reason for this we analyzed, in their order, the eight most probable causes (see page 27). With reference to (1), the length of the school year, we found that school is taught two months more at present than in 1879. As to (2), the age of pupils, we have seen (see Figures VI and X) that there is little or no advantage in case of either year. However (3), the number of pupils in a room, results greatly in favor of the schools of 1912. The course of study, (4), shows a decided increase in the number of studies from 1879 to 1912 (see Fig. XII), resulting in favor of the work of 1879 in so far as concentration upon penmanship is concerned. The amount of time given to the practice of penmanship, (5), results in favor of the schools of 1879 (see Fig. XX). The quality of teaching, (6), as determined by the quality and neatness of the teachers' penmanship, results in favor of the schools of 1879 (see Fig. XIII). From what are known of the methods employed in teaching the subject, (7), there seems to be little advantage on either side. As to (8), the system of penmanship in use, little can be stated with certainty in way of comparison. The frequency curve with its very prominent mode and small variability (See Fig. V) for the year 1912, would seem to indicate that the system of penmanship now in use is somewhat superior to the one used in 1879. With this last as a probable

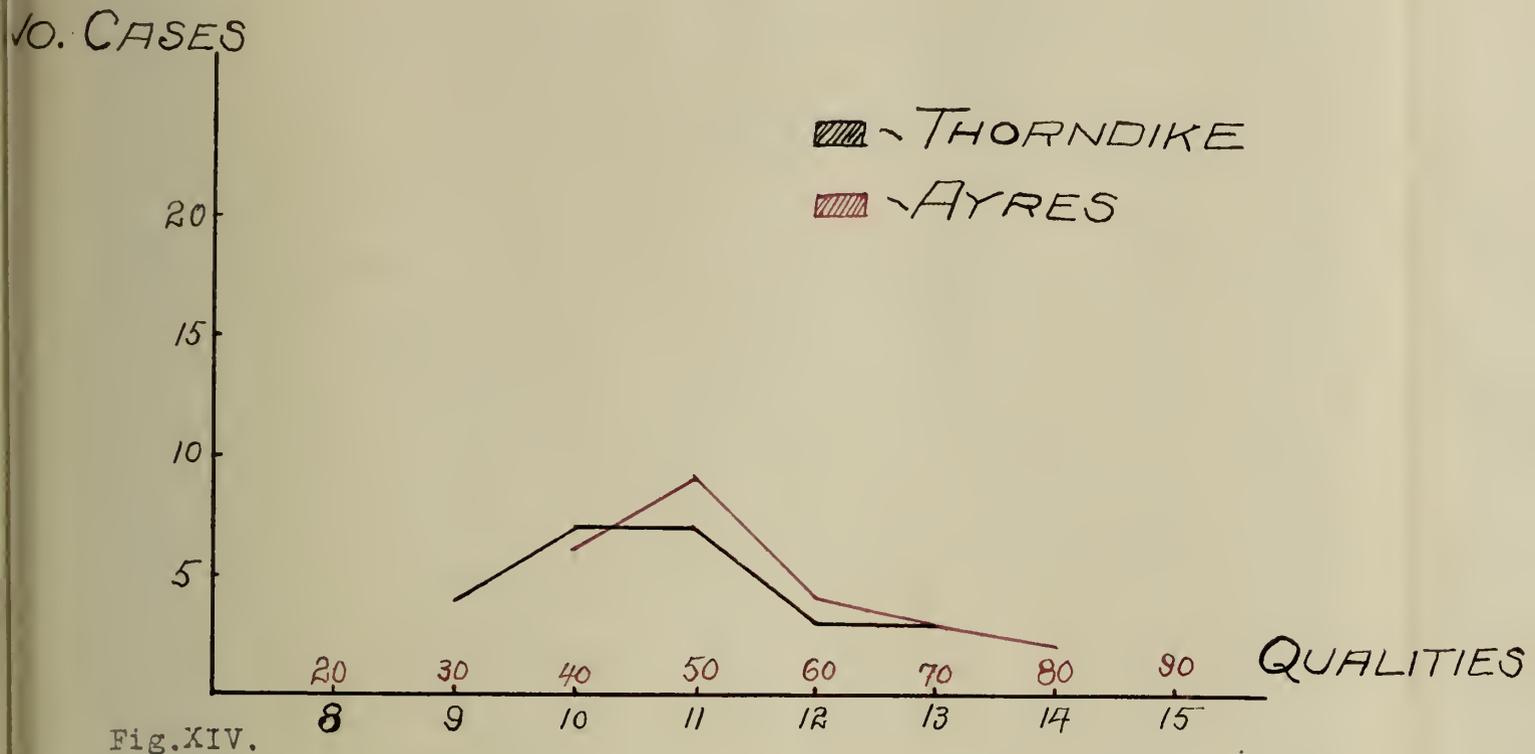
conclusion, we have causes (4), (5), and (6) in favor of the results of the year 1879 and (1), (3), and (8) in favor of those of 1912. Leaving aside the factor of attitudes, ideals, and perspectives, a factor which can not be measured, it would seem that one or all of the three causes in favor of the results of 1912 are of greater moment than the three causes in favor of the results of 1879-enough greater to obtain the results found.

Comparison of Thorndike and Ayres Scales.

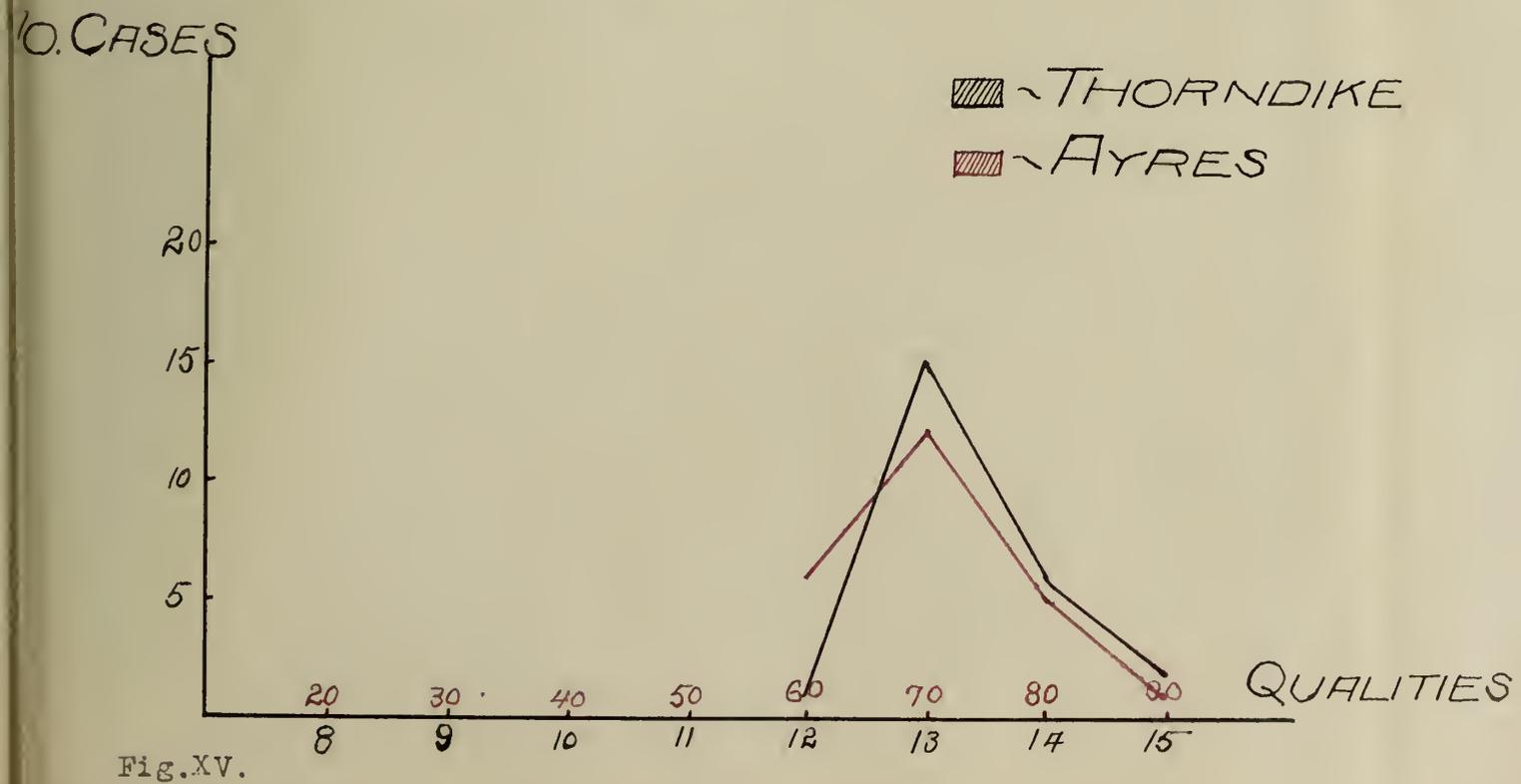
Since beginning this investigation another set of standards formulated by Dr. Leonard P. Ayres of the Russell Sage Foundation has been published. These standards are in general the same as the Thorndike standards. There are a few minor differences, however. Instead of having fifteen qualities numbered from 5 to 18, as in the Thorndike scale, there are eight qualities numbered from 20 to 90, each quality differing from the next one nearest it by 10. Besides these, the Ayres standards are printed on a long panel of heavy paper and graded in columns from left to right. In each of the columns there are three samples, vertical at the top, medial in the middle row, and the Spencerian slant in the lower row. To get some notion of the practical use of the two sets of standards, Dr. Bagley suggested that the writer grade a few sets of penmanship papers, using both sets of standards. Accordingly, four sets of papers were thus graded, two taken from the work of 1879 and two from that of 1912. The results of these gradings are found in Figures XIV to XVIII and the tables opposite these graphs. The qualities are plotted on the X-axis and the number of cases on the Y-axis. The frequency curves for the Thorndike standards are in black, and for the Ayres standards in red. The results obtained from the graphs are approximate only, as the two curves can not well be compared when they are plotted on the same axes and when the X-ordinate has a different value in each case. The comparison would have been more valid had the Ayres standards been used on the original

data(see Figures I to VI) and the two pairs of curves in each grade compared in pairs. However, approximate results are obtained by the above, and a close parallelism is seen (see Figures XIV to XVIII) between the curves.

COMPARISON OF THE THORNDIKE AND AYRES SCALES ~ GRADE 5, 1879.



GRADE 6, 1912.



Comparison of Thorndike and Ayres Scales—Data, Grade V, '79.

Name of pupil	Qualities	
	Thorndike	Ayres
Blisard, Wm.	10	50
Briggs, Nora	12	60
Dougan, Mollie	10	50
Elliott, Bettie	9	50
Fenderson, Ora	13	70
Grant, Mollie	12	50
Gerbing, Anna	13	80
Goodspeed, Anna	9	40
Heller, Opal	11	40
Houchin, Graham	11	70
Johnson, Belle	11	60
Johnson, Gertie	10	60
McLennan, Alex.	11	70
McLennan, Agnes	11	50
Martin, Eunice	13	80
Mapes, Freddie	9	40
Nichol, John	9	40
Prestine, Freddie	10	50
Randall, Hattie	10	50
Sim, Willie	12	60
Sell, Augusta	11	40
Weber, Alex.	10	40
Weber, Minnie	10	50
Webber, Grace	11	50

Penmanship in the Urbana Schools-Grade V, 1879.

Thorndike Scale		Ayres Scale	
Quality	Number Cases	Quality	Number Cases
16	0	90	0
15	0	80	2
14	0	70	3
13	3	60	4
12	3	50	9
11	7	40	6
10	7	30	0
9	4		

Grade VI, 1912.

Name of Pupil	Qualities	
	Thorndike	Ayres
Besore, Ardath	13	70
Cannour, May	14	80
Emch, Arnold	15	90
Dickerson, Esther	13	70
Freeman, Lela	13	70
Gerbing, Edna	12	70
Fryer, Clyde	13	60
Hawk, Russell	14	70
Hopkins, Helen	13	70
Harmon, Helen	14	80
Hullinger, Leota	13	70
Kirkpatrick, Elsie	13	60
Kennedy, Viola	13	70
Knipp, Pauline	14	70
Keegan, Catherine	13	60
Lovett, Arthur	13	70
Langhoff, Anita	13	80
Lincicome, Arthur	13	80
Lockhart, Nora	14	70
McGehee, Mahala	15	80
Miller, Ona	13	60
Newton, Lloyd	13	60
Stamey, Russell	13	60
Sommer, George	14	70

Penmanship in the Urbana Schools-Grade VI,1912.

Thorndike Scale		Ayres Scale	
Quality	Number Cases	Quality	Number Cases
16	0	90	1
15	2	80	5
14	6	70	12
13	15	60	6
12	1	50	0
11	0	40	6

Grade VII, 1879.

Name of Pupil	Qualities	
	Thorndike	Ayres
Bagley, Olive	12	50
Brown, Belle	15	90
Busey, Clara	14	18 80
Blackwell, Geor.	13	18 80
Chapman, Warren	12	50
Fugate, Minnie	12	80
Heislar, Josie	13	80
Lawrence, Kate	13	80
McClain, Mary	14	80
Parks, Flora	13	60
Rittenhouse, Mattie	15	90
Rogers, Alice	14	80
Reeves, Willie	14	80
Rea, Edward	13	60
Webber, Emma	12	70
Webber, Clarence	14	80

COMPARISON OF THE THORNDIKE AND AYRES SCALES - GRADE 7, 1879.

NO. CASES



Fig. XVI.

GRADE 8, 1912.

NO. CASES

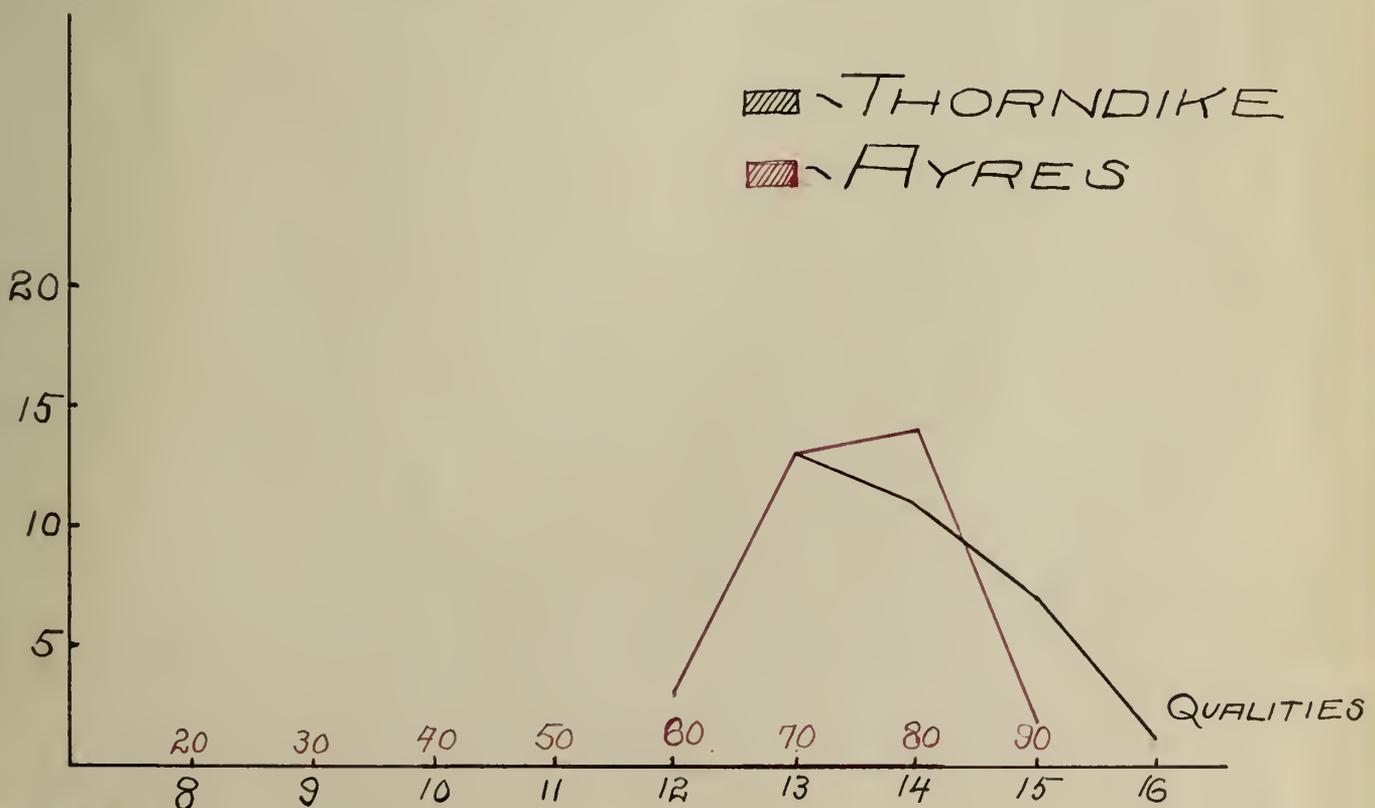


Fig. XVI.

Penmanship in the Urbana Schools-Grade VII.

Thorndike Scale		Ayres	
Quality	Number Cases	Quality	Number Cases.
16	0	90	2
15	2	80	9
14	5	70	1
13	5	60	2
12	4	50	2
11	0	40	0
10	0	30	0

Grade VIII, 1912.

Name of Pupil	Qualities	
	Thorndike Scale	Ayres Scale
Adler, Emily	14	70
Birdzell, Ruth	16	80
Britton, Nellie	13	80
Broadhurst, M.	15	90
Bean, Lucy	14	80
Crane, Bessie	15	80
Furst, Elsie	14	70
Greene, Ethel	15	70
Greeley, Hazel	13	80
Hormel, Hattie	13	60
Hendricks, Dora	14	60
Hill, Mabel	14	70
Kegley, Robert	13	70
Lincicome, Inez	14	80
Leming, Lois	13	70
Lawrence, Julia	15	80
Morgan, Herbert	14	80
Mills, Hazel	13	80
Martin, Bernice	13	70
McKelvey, Olive	13	70
Mosier, Henry	14	70
Nogle, Caroline	14	80
Rahe, Stella	14	80
Rea, Ruth	13	60
Rahe, Clinton	15	80
Scroggin, June	13	70

Grade VIII, 1912, Con:

Small, Tryphosa	13	70
Stamp, Juanita	14	80
Winklepleck, Clif.	13	70
Ward, Charlotte	15	80
Whitaker, Rovene	15	70
Woody, Gladys	13	90

COMPARISON OF THE THORNDIKE AND
 AYRES SCALES ~ COMBINING THE RE-
 SULTS OF THE FOUR GRADES.

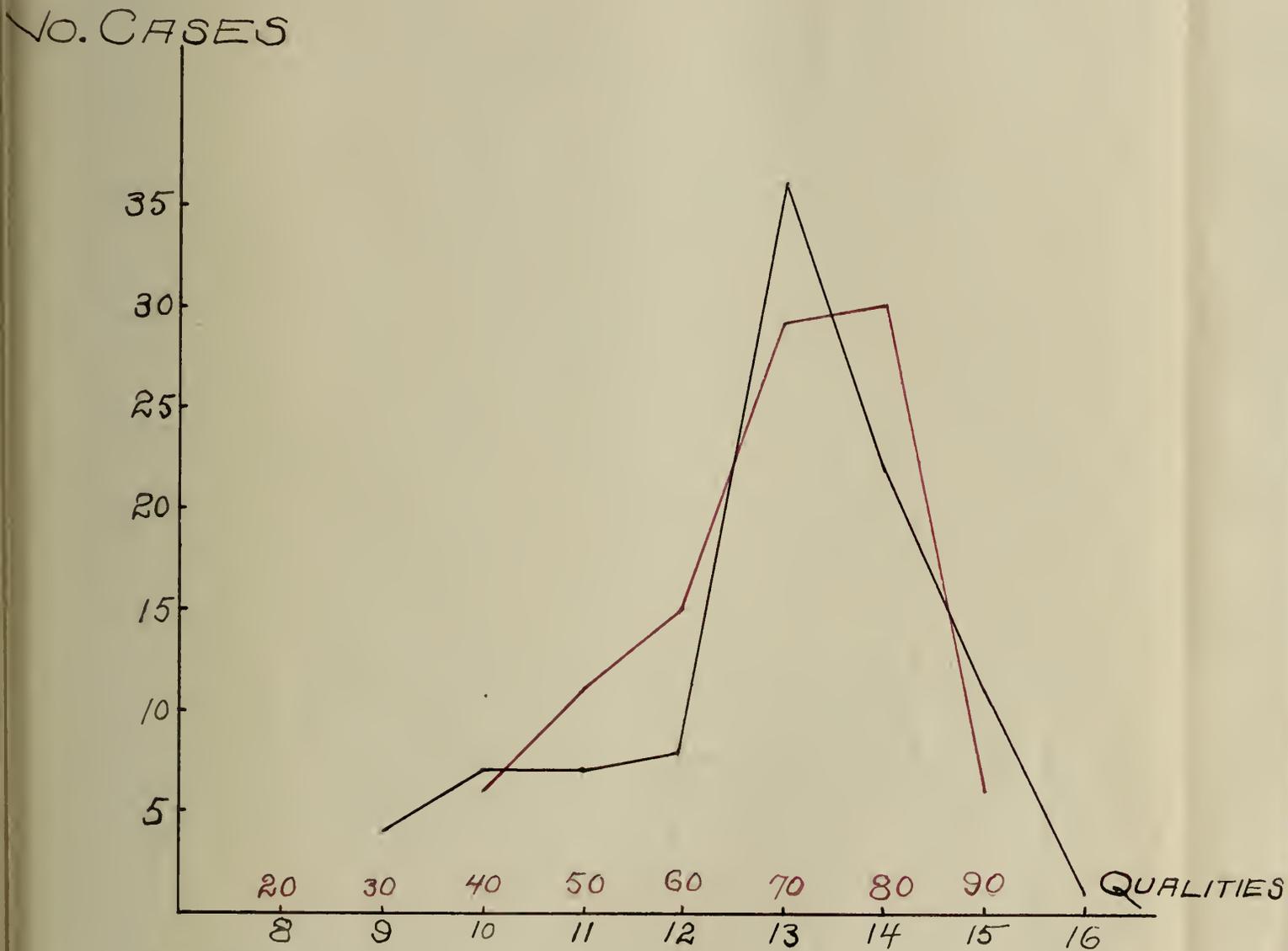


Fig. XVIII,

▨ THORNDIKE
 ▨ AYRES

Penmanship in the Urbana Schools, Grade VIII, 1912.

Thorndike Scale		Ayres Scale	
Quality	Number Cases	Quality	Number Cases
16	1	90	2
15	7	80	14
14	11	70	13
13	13	60	3
12	0	50	0
11	0	40	0

Penmanship in the Urbana Schools-Grades V to VIII.

Thorndike Scale		Ayres Scale	
Quality	Number Cases	Quality	Number Cases
16	1	90	6
15	1	80	30
14	22	70	29
13	36	60	15
12	8	50	11
11	7	40	6
10	7	30	0
9	4	20	0

While the graphs (Figures XIV to XVI) indicate that the Thorndike and Ayres scales give the same general results, a further word should be said concerning the two standards. In using the Ayres standards we found that after a little practice samples of penmanship can be graded with approximate accuracy without actually comparing the samples with the standards. As the writer did not have this experience when working with the Thorndike standards, he feels that that the Ayres standards could be more readily and successfully taught by the ordinary teacher than could the Thorndike standards. Then too, the numbers given to the qualities by Dr. Ayres were happily chosen, as they readily fit into the general system of marking and promoting pupils. In school work from 95 to 100 per cent is perfect work and 60 per cent or below is unsatisfactory. This would also hold true for writing when the Ayres standards are used. It is therefore probable that most superintendents and supervisors of school work will select the Ayres standards in preference to the Thorndike standards for general school work, and especially so long as the former can be secured for six cents in stamps.

RELATIVE NUMBER OF BOYS AND GIRLS
AS TO QUALITY IN PENMANSHIP - PER CENT
OF WHOLE NUMBER OF BOYS AND GIRLS IN
SCHOOL.

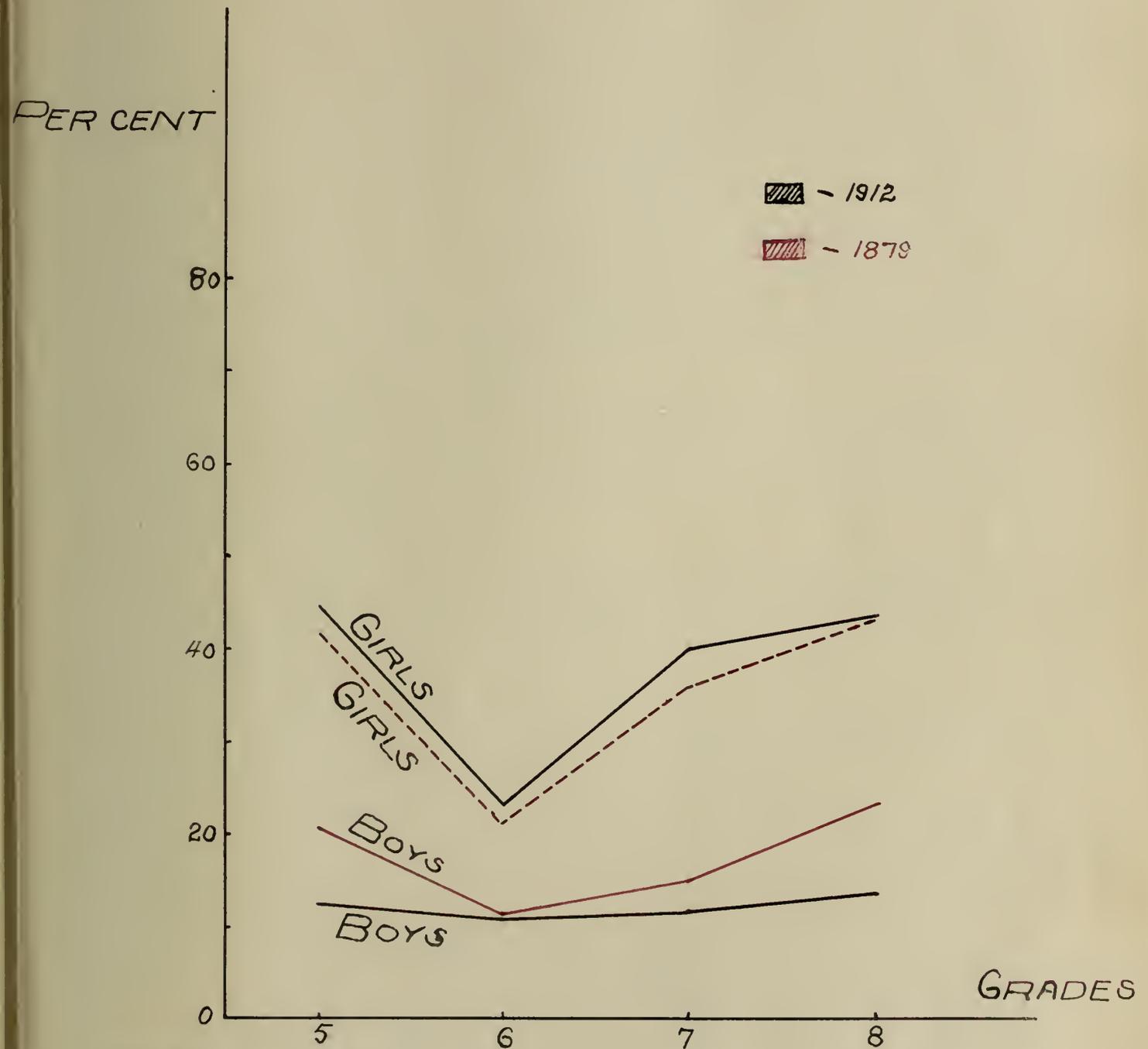


Fig. XXI.

Sex and Quality in Penmanship.

One item closely related to the investigation is the relation of accuracy and neatness in writing to sex. Gesell's investigations along this line are the latest and most reliable (See "Accuracy in Handwriting as Related to School Intelligence and Sex", American Journal of Psychology, Vol. XVII, 1908). He examined 12,600 specimens of penmanship of grade pupils in Worcester, Mass., classifying and tabulating them. His conclusions are as follows:

1. Boys as a rule show a greater tendency toward inco-ordinated writing as early as the first grade and up through the high school.

2. The sex differences in writing become marked about the age of ten, and are largely attributable to the mental factors.

3. From the fifth grade up through the high school, girls as a class write more accurately than boys.

To show that our results bear out conclusion (3) above, we have but to observe our data at the beginning of the thesis. By taking all the cases used in the four grades in each year and plotting the numbers, representing the boys and girls separately in per cent of the whole number of boys and girls, on the Y-axis and the number of the grade on the X-axis, we find that there are about twice as many girls as boys in the four grades in 1879 and about three times as many in 1912 (See Fig. 21). We have obtained similar results when we compare the

COMPARISON OF BOYS AND GIRLS AS TO QUALITY IN PENMANSHIP - PER CENT OF WHOLE NUMBER OF SAMPLES.

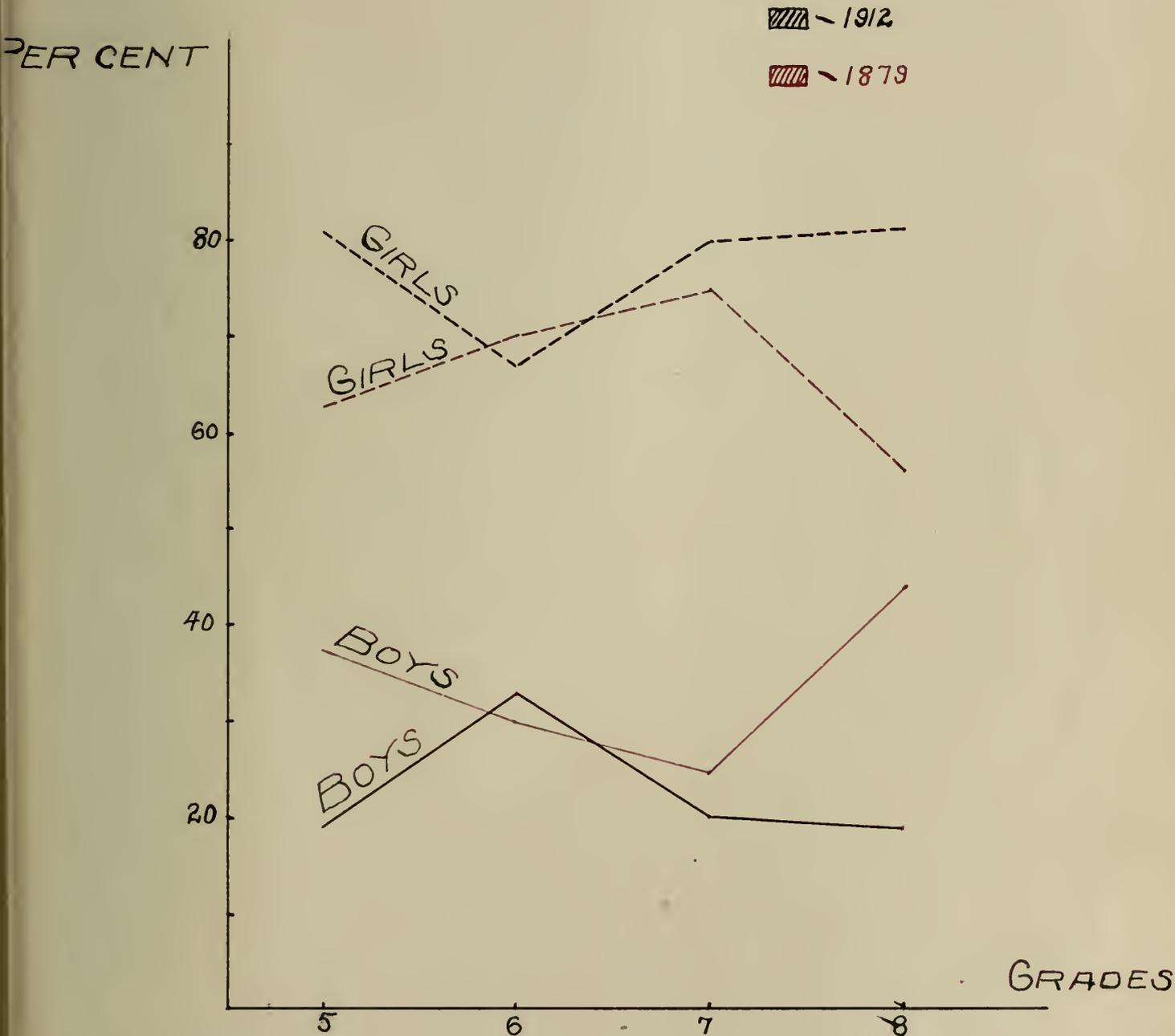


Fig. XXII.

numbers of the two sexes as shown by the samples in the thesis. By plotting the per cent on the Y-axis and the number of the grade on the X-axis, we again find about twice as many samples written by girls, in 1879, as by boys, and over three times as many girls as boys in 1912 (See Fig. XXII).

In teaching the sex differences should be kept in mind. As boys show a greater degree of incoordination in writing and girls are more painstaking and write with a lighter pressure, boys should be encouraged to be more accurate and careful, while girls need to be urged to attempt larger will impulses, and thus secure a larger, freer movement.

