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BOSTON PUBLIC SCHOOLS

PENMANSHIP

DETERMINING THE ACHIEVEMENT OF ELEMENTARY  
SCHOOL GRADUATES IN HANDWRITING

BULLETIN NO. IX. OF THE DEPARTMENT OF  
EDUCATIONAL INVESTIGATION AND MEASUREMENT



BOSTON  
PRINTING DEPARTMENT  
1916

Monograph

IN SCHOOL COMMITTEE, BOSTON, February 7, 1916.

*Ordered,* That five thousand (5,000) copies of a bulletin relative to a study of the quality of penmanship, to be prepared by the Department of Educational Investigation and Measurement, be printed as a school document.

Attest:

THORNTON D. APOLLONIO,  
*Secretary.*

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## INTRODUCTION.

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It is probable that there are more differences of opinion among teachers concerning the teaching of penmanship in the elementary schools and the quality of the results than there are concerning any other subject in the course of study. In view of this and as a means of contributing to the improvement of results in handwriting, the department has considered it desirable to find out, in a systematic way, the character of the present achievement of elementary school graduates in penmanship; this was the purpose of the study reported in this bulletin. The department believes that one of the best methods of securing improved results is by bringing to the attention of teachers an analysis of the merits and defects of the present handwriting of children.

In consultation with the late Assistant Superintendent White, who had charge of penmanship, plans for this study were made. On his advice and that of Miss Ellen S. Bloomfield the following committee was selected to assist the department:

HONORA T. O'DOWD, Master's Assistant, Hancock District, *Chairman*.

THOMAS J. BARRY, Submaster, Thomas N. Hart District.

MATILDA F. BIBBEY, Assistant, Hancock District.

EMMA J. IRVING, First Assistant in Charge, Emerson District.

EDWARD J. MULDOON, Submaster, Francis Parkman District.

EDGAR L. RAUB, Submaster, John A. Andrew District.

In its work the committee has profited by the counsel of Miss Bloomfield, and also of Assistant Superintendent A. L. Rafter, who now has charge of penmanship in the public schools.

This committee was appointed March 24, 1915, and in the course of its work has held eight meetings. Several of these meetings were wholly devoted to the irksome task of rating and classifying papers, and defining their merits and defects. Whatever value this report has is due largely to the work of this committee of enthusiastic, capable and effective teachers of penmanship.

This bulletin is divided into three rather distinct parts: Part I. is a description of the organization of this study and of the methods of carrying it on, prepared by Mr. Ballou; Part II. consists of a critical analysis of the merits and defects of the handwriting studied, written by Miss O'Dowd, chairman of the committee, assisted by the committee and particularly by Mr. Raub, who prepared Tables 7, 8, 9 and 10; and Part III. is a statement of the present status of penmanship in the city from the administrative point of view, prepared by Assistant Superintendent Rafter.

FRANK W. BALLOU,  
*Director.*

## DETERMINING THE ACHIEVEMENT OF ELEMENTARY SCHOOL GRADUATES IN HANDWRITING.

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The material constituting this bulletin has been organized under the following heads:

*Part I.*—The organization and methods of the study.

*Part II.*—A critical analysis of the merits and defects of the handwriting studied.

*Part III.*—The administrative status of penmanship in the city.

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### PART I.—THE ORGANIZATION AND METHODS OF THE STUDY.

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#### SOURCES OF HANDWRITING PAPERS.

On November 23, 1914, a test in accurate copying was given to 4,494 pupils in the first-year classes of fourteen of the fifteen high schools in Boston. In the test nothing was said to the pupils about their penmanship; hence, they did not know that the quality of their handwriting was to be considered. The handwriting, therefore, may be thought of as typical of that which will characterize the handwriting of these young people during their high school course and, to some extent at least, similar to that which they may be expected to write during life.

Although the test from which these specimens were secured was given to first-year high school pupils, their penmanship ability is the product of the instruction and training given them in the elementary schools and in this study has been considered as such.

#### METHOD OF RATING THE SPECIMENS.

Obviously, not all of the 4,494 papers written by pupils in the accurate copying test could be conveniently

rated by a small committee. Consequently, from the total number six hundred papers were selected at random. The papers from each high school had already been arranged in alphabetical order according to the names of the pupils, and the bundles from each school were arranged in like order. Approximately every eighth paper was taken from the bundles until the desired six hundred papers had been secured. The papers were then numbered from 1 to 600, inclusive, and throughout the study each paper was known by the number which it bore.

For the purpose of rating the quality of the handwriting the committee was divided into two subcommittees of three members each. The first three hundred papers were turned over to one subcommittee and the second three hundred papers to the other. Each one of the three members of the subcommittee rated independently each one of the three hundred papers, on a scale of 10-30-50-70-90 per cent, using the Ayres' scale for adult handwriting.\* The even tens on the Ayres' scale were disregarded. Any paper which could not be rated as good as specimen No. 30 in the Ayres' scale was rated 10. While some papers were rated 10, there was no paper rated 10 by two of the three members of either committee.

After each member of each subcommittee had independently rated each one of the three hundred papers, the whole committee met the director of the department in conference. Each member submitted his or her written report and the results were tabulated. The numbers of the specimens were arranged in ascending order, beginning with specimen No. 1. Opposite the number of each specimen were placed the preliminary ratings of each of the three members of the committee. Each specimen was finally given that rating which at least two of the three members agreed it should have. Where no two members agreed on a rating the paper was

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\* Ayres. A Scale for Measuring the Quality of Handwriting of Adults. Russell Sage Foundation.



given the middle rating. For example: If a specimen had been given preliminary ratings of 30-50-70, that specimen was given a final rating of 50 per cent.

#### COMPARISON OF RATINGS OF COMMITTEE MEMBERS.

The tabulation showed some interesting variations in judgment of committee members concerning the quality of individual papers. Of the first three hundred papers no two members of the committee agreed on the rating of ninety papers, and in the second three hundred papers no two of the members of the other committee agreed on the rating of twenty-four papers. In the rating of the first three hundred papers there was entire agreement among the three members of the committee in thirty-one cases, and on the second three hundred papers there was entire agreement among the three members of the committee in seventy-six cases. That there was less agreement among the three members of the committee who rated the first three hundred papers is due to the fact that one member of the committee rated all the papers relatively lower than the other two members, giving very few specimens a rating of 90 per cent, and rating ten papers as low as 10 per cent.

As has already been pointed out, each specimen was rated independently by three different examiners (committee members). The following table shows the proportion of each group of one hundred specimens given the different ratings by each examiner.

TABLE I.  
Ratings of the First Three Hundred Specimens.  
*Nos. 1 to 100.*

EXAMINER.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
A .....	20	48	30	2	0
B .....	11	41	35	13	0
C .....	4	17	39	30	10

*Nos. 101 to 200.*

EXAMINER.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
A .....	40	48	12	0	0
B .....	14	29	43	14	0
C .....	5	20	38	24	13

*Nos. 201 to 300.*

A .....	22	52	24	2	0
B .....	15	37	34	14	0
C .....	9	28	30	25	8

The above table is to be interpreted in the following manner: In rating the specimens numbered from 1 to 100, examiner A rated 20 of them 90 per cent, 48 of them 70 per cent, 30 of them 50 per cent, 2 of them 30 per cent and none of them 10 per cent. The number of specimens given each rating by examiners B and C is indicated in the same manner.

The specimens were rated by each examiner in groups of 100. The tabulation is presented above in that form, because it makes possible the comparison of the judgments of examiners rating the same specimens. To illustrate: Among the first 100 papers, examiner A found 20 specimens of handwriting considered to be of the quality represented by 90 per cent, while examiner C found only 4 specimens which could be thus classified. On the other hand, examiner C rated 10 specimens 10 per cent, while neither of the other two examiners found any papers to be rated as low as this. Further, examiner A found only two specimens among the first 100 which could be rated as low as 30 per cent; whereas examiner C found nearly one third of the hundred papers which were considered to be of

the value indicated by 30 per cent in the Ayres' scale. The remaining portions of Table 1 are to be interpreted in the same manner. What has been pointed out as characteristic of the variations in judgment of examiners A, B and C in rating the quality of the first 100 specimens is characteristic also of their judgment on the other 200 specimens.

TABLE 2.  
Ratings of the Second Three Hundred Specimens.  
*Nos. 301 to 400.*

EXAMINER.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
D .....	6	32	51	11	0
E .....	1	53	39	7	0
F .....	27	59	11	† 1	0

*Nos. 401 to 500.*

D .....	10	38	49	3	0
E .....	3	23	63	11	0
F .....	3	48	36	13	0

*Nos. 501 to 600.*

D .....	9	32	47	12	0
E .....	2	34	41	* 22	0
F .....	4	55	27	† 12	0

\* 1 omitted.

† 2 omitted.

The above table shows, in similar manner, how the second 300 specimens were rated by examiners D, E and F. The most marked contrast is shown in the case of specimens numbered 301-400. While examiner E found only 1 specimen which could be rated 90 per cent, examiner F found 27 such specimens. This table

shows that examiners D, E and F varied less in judgment concerning the quality of the handwriting of specimens 301-600 than did examiners A, B and C in rating the quality of the first 300 specimens. It is to be noted that examiners D, E and F did not find any papers which they rated lower than 30 per cent.

In order to show how consistent, or inconsistent, in judgment each examiner was in rating the three groups of papers which he or she rated, the following tables have been prepared.

**TABLE 3.**  
**Consistency of the Judgment of Each Examiner Rating Specimens**  
**Numbered 1-300.**

*Examiner A.*

SPECIMENS.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
Nos. 1 to 100.....	20	48	30	2	0
Nos. 101 to 200.....	40	48	12	0	0
Nos. 201 to 300.....	22	52	24	2	0
Totals.....	82	148	66	4	0
Per cent of all.....	27%	50%	22%	1%	0%

*Examiner B.*

SPECIMENS.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
Nos. 1 to 100.....	11	41	35	13	0
Nos. 101 to 200.....	14	29	43	14	0
Nos. 201 to 300.....	15	37	34	14	0
Totals.....	40	107	112	41	0
Per cent of all.....	13%	36%	37%	14%	0%

*Examiner C.*

SPECIMENS.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
Nos. 1 to 100.....	4	17	39	30	10
Nos. 101 to 200.....	5	20	38	24	13
Nos. 201 to 300.....	9	28	30	25	8
Totals.....	18	65	107	79	31
Per cent of all.....	6%	22%	36%	26%	10%

Table 3 shows that examiner A gave a rating of 90 per cent to 20 of the first hundred papers, to 40 of the second hundred papers, and to 22 of the third hundred. The same examiner gave 70 per cent to approximately the same number of papers in each hundred. Examiner A found only two papers among the first hundred to be rated as low as 30 per cent, none among the second hundred, and two among the third hundred. Assuming that the papers in each hundred were of the same quality, this table shows that examiner A rated the second hundred relatively higher than the first or third hundred.

Table 3 shows that examiner B gave no papers a rating of 10, and was very consistent in the number of papers given 30 per cent or 90 per cent. Examiner B, however, found a larger proportion of the second hundred papers to be given 50 per cent than of the other two groups, the reverse of what examiner A found.

Examiner C rated relatively fewer papers 90 per cent and more papers 10 per cent or 30 per cent than did either of the other two examiners.

At the foot of each table is given the total number of papers and the per cent of all papers given each rating. This per cent brings out the fact that examiner A rated all the papers relatively higher than either examiner

B or C, and that examiner C rated all the papers relatively lower than either of the other two examiners.

In view of the wide variations in judgment usually found in such work this table shows that, on the whole, the examiners were fairly consistent in their judgment of the quality of handwriting.

TABLE 4.

Consistency of the Judgment of Each Examiner Rating Specimens Numbered 301-600.

*Examiner D.*

SPECIMENS.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
Nos. 301 to 400.....	6	32	51	11	0
Nos. 401 to 500.....	10	38	49	3	0
Nos. 501 to 600.....	9	32	47	12	0
Totals.....	25	102	147	26	0
Per cent of all.....	8%	34%	49%	9%	0%

*Examiner E.*

SPECIMENS.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
Nos. 301 to 400.....	1	53	39	7	0
Nos. 401 to 500.....	3	23	63	11	0
Nos. 501 to 600.....	2	34	41	* 22	0
Totals.....	6	110	143	40	0
Per cent of all.....	2%	37%	48%	13%	0%

\* One omitted.

*Examiner F.*

SPECIMENS.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
Nos. 301 to 400 . . . . .	27	59	11	* 1	0
Nos. 401 to 500 . . . . .	3	48	36	13	0
Nos. 501 to 600 . . . . .	4	55	27	* 12	0
Totals . . . . .	34	162	74	26	0
Per cent of all. . . . .	12%	54%	25%	9%	0%

\* Two omitted

The above table shows the same facts for examiners D, E and F that table 3 showed for examiners A, B and C. It is to be noted that no examiner rated papers as low as 10 per cent. Examiners D, E and F show less variation in judgment than examiners A, B and C, largely because of the lower ratings of examiner C. It should be pointed out, however, that the distribution of ratings of examiner C much more nearly approximates to the theoretical normal distribution than that of any other examiner.

TABLE 5.

Summary Table Showing the Proportion of Papers Rated by Each Examiner Which Were Given the Ratings Indicated.

EXAMINER.	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
A. . . . .	27%	50%	2%	1%	0%
B. . . . .	13%	36%	37%	14%	0%
C. . . . .	6%	22%	36%	26%	10%
D. . . . .	8%	34%	49%	8%	0%
E. . . . .	2%	37%	48%	13%	0%
F. . . . .	12%	54%	25%	9%	0%

This table is made up of data already appearing in Tables 3 and 4, and is introduced merely to afford those interested an opportunity to make a direct comparison of the proportion of papers given each rating by the several examiners. The table shows that examiner A rated 27 per cent of the first three hundred specimens 90 per cent, examiner B 13 per cent of the same papers 90 per cent, examiner C only 6 per cent of the same papers 90 per cent, and so on.

#### SELECTION OF TYPICAL SPECIMENS OR SAMPLES.

On the basis of the preliminary ratings of examiners, the quality of handwriting of each specimen was given a final rating or evaluation, according to the consensus of the judgments of the examiners. From the final ratings of the specimens the following distribution resulted:

TABLE 6.  
Final Rating of Six Hundred Specimens.

	SCALE OF RATING.				
	90%.	70%.	50%.	30%.	10%.
Number of papers.....	51	240	253	56	0
Per cent of all.....	8.5%	40.0%	42.2%	9.3%	0%

The above table shows that of the six hundred papers 51, or 8.5 per cent, were rated 90 per cent, 240, or 40 per cent, were rated 70 per cent, 253, or 42.2 per cent, were rated 50 per cent, and 56, or 9.3 per cent, were rated 30 per cent. After each paper had been thus finally evaluated, and in order to illustrate the character of the handwriting which the committee considered typical of the various grades in the scale, it then became necessary to select some specimens from each of these four groups of papers which should be typical of the group. This was done in much the same manner as the specimens were originally rated. For example: Each member took the



51 specimens rated 90 per cent and selected therefrom several specimens which, in his or her judgment, most nearly typified the quality of handwriting of all the papers of that group. Each group of papers was handled in the same manner, after which each committee member submitted a memorandum indicating his or her selection of the typical papers from each group. Such papers were then reviewed in a general committee conference and agreement reached concerning those samples which best typified the group from which they were taken. Two papers were finally selected from each group, except the 30 per cent group, from which three papers were selected. These three papers were selected not because that group was proportionately larger than the others, but in order to illustrate three quite distinct kinds of poor handwriting to be found in that group.

#### THE SPECIMENS OR SAMPLES SELECTED.

The following pages contain facsimile reproductions of the specimens of handwriting which the committee selected as typical of the four groups of papers rated 90, 70, 50, and 30 per cent, respectively. At the head of each page is indicated the rating of the paper and also the proportion of the six hundred papers which were given this rating.

At the head of each specimen is given the original number of the specimen. These specimens form the basis of Miss O'Dowd's discussion of the quality of the handwriting which they typify. In Miss O'Dowd's report these specimens are referred to by the number.

## SAMPLE OF HANDWRITING RATED 90 PER CENT.

8.5 Per Cent of the 600 Specimens Given This Rating.

*Original Specimen No. 47.*

"In this story  
lieutenant, in a  
extreme irritat  
private soldier.  
calls for dismis  
Queen's service  
to do? He can no  
the soldier - not  
the redoubtable  
nor can he a pot  
private. Neithe  
ters drift Orther  
code of pride and  
"a servant of the  
is the insult.  
The way out of

## SAMPLE OF HANDWRITING RATED 90 PER CENT.

8.5 Per Cent of the 600 Specimens Given This Rating.

*Original Specimen No. 105.*

a young British  
moment of extreme  
is a private sol-  
one that calls for  
the Queen's  
is the officer to  
to send money to  
who happens to be  
Ostheris himself  
apologize to him  
either can he let  
Ostheris, too, has  
of pride and  
is "a servant  
;" but how is  
to be atoned for?

## SAMPLE OF HANDWRITING RATED 70 PER CENT.

40 Per Cent of the 600 Specimens Given This Rating.

*Original Specimen No. 254.*

Lieutenant C

"In this story a lieutenant, in a moment of irritation, strikes a man. The act is one that merits dismissal from the office. What is the office? It cannot send a man who happens to be a soldier himself - he can apologize to him, but he cannot let matters rest too, for his own cool honor; he too is a Queen;" but how is it atoned for? The wa

## SAMPLE OF HANDWRITING RATED 70 PER CENT.

40 Per Cent of the 600 Specimens Given This Rating.

*Original Specimen No. 589.*

"In this story  
Lieutenant, in a m  
irritation, strikes  
The act is one of  
Dismissal from  
What is the off  
not send man  
who happens  
table Ortheris  
he apologize to  
Neither can he  
Ortheris, too, h  
of pride and  
"a servant of th  
is the insult  
The way out of

## SAMPLE OF HANDWRITING RATED 50 PER CENT.

42.2 Per Cent of the 600 Specimens Given This Rating.

*Original Specimen No. 16.*

<sup>66</sup>In this story a young  
in a moment of extreme  
a private soldier. The  
for dismissal from it  
is the officer to do! &  
to the soldier - Who is  
redoubtable. On this is to  
apologize to him in  
he let matters do  
his own code of prior  
too is "a servant of  
is the insult to be  
out of this appearance  
is a beautiful scene  
lieutenant invites  
with him and a he

## SAMPLE OF HANDWRITING RATED 50 PER CENT.

42.2 Per Cent of the 600 Specimens Given This Rating.

*Original Specimen No. 55.*

"In this story a lieutenant, in a treach and irritate private soldier. A that calls for de Queen's service. to do? He cannot the soldier who he redoubtable Oother can he apologize Neither can he let Ootheris, too, has pride and honor; of the Queen;" but to be atoned for? apparently hoped

## SAMPLE OF HANDWRITING RATED 30 PER CENT.

9.3 Per Cent of the 600 Specimens Given This Rating.

*Original Specimen No. 50.*

"In this story a young Bre  
moment of extreme vivacity  
soldier. The act is one that  
from the Queen's service. I  
He cannot send money to the  
to be the redoubtable Orth  
he apologize to him in per  
let matters drift. Or  
cockle prick and hono  
of the Queen"; but how  
for? The way out of this a  
muddle is a beautifi  
all. The lieutenant in  
shooting with him,  
alone, asks him "to ta  
you, sir!" says Othereis.



## SAMPLE OF HANDWRITING RATED 30 PER CENT.

9.3 Per Cent of the 600 Specimens Given This Rating.

Original Specimen No. 371.

" In this story a go  
 of extreme irritation, strike  
 that calls for demand from  
 the officers to do? He  
 who happens to be the  
 can be apologise to him, in  
 drift. Othello, too, has he  
 too is "a servant of the Queen  
 atoned for? The way  
 is a beautifully simple  
 Othello to go shooting  
 asks him "to take off  
 Othello. The two men fight  
 beaten. Then the lieutenants  
 and officers and private  
 that fight is the moral

## SAMPLE OF HANDWRITING RATED 30 PER CENT.

9.3 Per Cent of the 600 Specimens Given This Rating.

*Original Specimen No. 520.*

"In this story a young British  
 moment of extreme irritation  
 soldier. The act is one  
 from the Queen's service  
 do? He cannot send  
 who happens to be the re-  
 himself --- nor can he  
 private. Neither can  
 either, too, has his  
 honor; he too is "a  
 but how is the insult  
 way out of this affair  
 is a beautifully simple  
 lieutenant invites  
 with him, and when  
 him "to take off his coat

PART II.— A CRITICAL ANALYSIS OF THE  
MERITS AND DEFECTS OF THE  
HANDWRITING STUDIED.

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Legibility is the first and most necessary requisite of penmanship, therefore the committee first proceeded to judge the papers from that standpoint. Each of the six hundred papers was examined and passed on by three persons, and the papers were finally grouped according to these judgments into 90 per cent, 70 per cent, 50 per cent and 30 per cent papers. There were no papers below 30 per cent.

Each group was again examined by every member of the committee to select types representative of each group. By the process of elimination, the number in each group was reduced to eight or ten. This small group was then subjected to a thorough and careful study, and what was considered the characteristic type of each group is presented elsewhere in this bulletin, and will form the basis of our analysis.

It must be remembered that these papers were judged from the standpoint of legibility. The committee could not form any judgment of speed, or of position of pupils while writing. A system of penmanship has been compulsory in the Boston public schools for some years, and as the writers of these papers were elementary school graduates, naturally these papers may be considered the product of that system.

The qualities emphasized in the study of these papers were:

1. Uniformity, as applied to form, size, spacing and slant.
2. Character of the lines.
3. Character of the letter forms.

While uniformity of form, size, spacing and slant is of high importance, nevertheless it is not the most important element of good writing. Some of these

papers are, for instance, uniformly bad. However, there can be no good writing without uniformity in the above respects. The foundation of good writing must be conformity to some established system in form, size, spacing and slant, and to these must be added regularity in their use. The best of the specimens studied are good because they conform to recognized standards of form; the poorest ones are poor, first, because they follow no recognized standards, and second, because they lack uniformity.

#### UNIFORMITY OF FORM.

Uniformity of form and good form characterize to a large degree the 90 per cent papers, the deviation from such being relatively slight. Some letters, however, are carelessly made. In No. 47\* the *s* in the word *Queen's*, the *r* in lines 9 and 10, and the *T* in the last line are not well made. In No. 105 the *s* throughout the paper is poorly made, also the letters *h* and *t*. Generally speaking, however, the form is round, open and legible, showing easy, free movement.

In the 70 per cent papers we find slightly less uniformity of form. These papers show good movement, but carelessness in forming both capitals and small letters. In No. 254 capitals *T* in line 4, *W* in line 6, and *Q* in line 14 are poorly made; the small *s* throughout the paper, the *p* in lines 9 and 11, the *h* wherever it occurs, the final *w* in line 14, are examples of careless habits in letter forming. In No. 589 careless habits are shown most frequently again in the letter *s* throughout the paper, the letter *f* in lines 6, 13 and 16, the varied *a* in lines 2, 3, 4, 5, 7 and 8, the *r* throughout the paper, and the *h* in the last line.

The 50 per cent papers present in themselves a uniformity of form, but in a less degree than the types previously noticed. The letter forms are poor. In No. 16 notice capitals *I*, *T*, *W*, *O*; the *f* in lines 2, 5 and 14; the final *e* in lines 3, 7, 8, 9 and 10; the *l* in lines 4 and 14; the *d* in lines 7 and 10; and the *n* in lines 13 and

\* The numbers throughout this discussion refer to the original number of the handwriting specimens found in pages 16 to 24 of this bulletin.

15. In No. 55 the capital *I*, the *r* in lines 3, 4 and 6, the *h* in lines 8, 9 and 10, the *t* in lines 5, 7, 11 and 14, and the *s* in lines 4 and 8 are poorly made.

Lack of uniformity characterizes the 30 per cent papers; in fact, a great variety of very poor form is found in both capitals and small letters. In No. 50 notice specially the poor loop letters *y*, *g*, *f*, and the *d*'s like *cl*. In No. 371 the *t*'s, the final letters of words, the peculiar capital *Q* in *Queen*, should be pointed out. In No. 520 the variety of formation is found in every line. These papers show no acquaintance with proper letter forms, and there is absolutely no indication of proper training in penmanship. They can be read, and that is about all that can be said for them.

The following table presents some statistical information on the uniformity of letters in the various specimens under consideration.

TABLE 7.  
Uniformity of Form.

A.	B.	C.	D.	E.	F.
RATING OF SPECIMEN.	Original Number of Specimen.	LETTERS.		Per Cent of Variations.	Letters Most Frequently Made Wrong.
		Total Number.	Variations from Usual Form.		
90 per cent...	47	199	9	5	s r t
90 per cent...	105	199	10	5	n s t h
70 per cent...	254	222	15	7	s h t o
70 per cent...	589	192	17	9	a e s t o h
50 per cent...	16	253	25	10	e n s t
50 per cent...	55	218	22	10	r s u t h
30 per cent...	50	295	{ See } { Note 1 }	{ 20 } { to } { 25 }	
30 per cent...	371	306			
30 per cent...	520	280			

NOTE 1.—There is so much variation in the 30 per cent papers that a standard form could not be found by which to compare the character of form throughout the specimens.

\* Approximately.

Table 7 is to be interpreted in the following manner: The specimen bearing the original No. 47 has in it a total of 199 letters. Only 9 of these letters vary materially from the approved forms. The 5 per cent of variation is computed from the figures in columns C and D. In column F are indicated the letters most frequently made incorrectly. The other data in Table 7 are to be interpreted in the same manner.

The letter forms in each paper were compared with a standard form found within that paper. This accounts for the fact that the per cent of variation indicated in the table is not larger than it is. The standard of criticism to which the papers have been subjected has not been especially exacting. The per cent of variation at best is only an approximation.

The above table shows that the increase of variations from the approved letter forms is in inverse relation to the rating of the specimens. The better papers naturally show little variation from the standard form; whereas the 30 per cent papers show such a lack of form as to make it impossible to do more than indicate an approximate variation.

#### UNIFORMITY OF SIZE.

In the 90 per cent papers the small letters are larger than the approved forms, but not too large for common use, and the uniformity of size is noticeably good. Slight variation from this uniformity may be seen in a few letters in No. 47, such as the *r* in line 3, and the *ie* in the word *soldier*, which are smaller, and the *x* in line 3, which is larger than the approved forms. In No. 105 the uniformity of size is nearly as good.

In the 70 per cent papers somewhat less uniformity of size is found. In No. 254, the word *dismissal*, line 6, and the word *has* in line 13 are examples of lack of proper size. In No. 589 less uniformity is shown than in No. 254; *e. g.*, the letters *an* in the word *lieutenant* are smaller than the remaining letters of the word; the letters in the word *from* in line 5, *happens* in line 8, *servant* in line 14, are smaller, and the letters in the words *story* and *insult* are larger than the approved size.

The 50 per cent papers show a considerable degree of uniformity of size, though somewhat less than the previous group. In No. 16 the word *story*, line 1, presents a uniformity of size, the word *dismissal*, line 4, a uniformity of another size, and the word *redoubtable* a variety of sizes. In No. 55 there is a gradation of size from large to small in words *lieutenant*, line 2, and *Neither*, line 11.

In the 30 per cent papers the form is so poor and varied that it is hard to find much uniformity of size, although it is much more evident in No. 371 than in Nos. 50 or 520. In No. 50 the word *alone*, line 15, is perhaps as good an illustration as can be found in the entire paper. In No. 371 we find considerable uniformity of size throughout the paper; notice specially lines 4 and 9. Throughout the specimen there is a general tendency on the part of the writer to change from larger letters at the beginning to smaller letters at the end of the word. In No. 520 the word *Queen's* is a good example of uniform size; almost every other word exemplified lack of uniformity.

TABLE 8.  
Uniformity of Size.

A.	B.	C.	D.	E.	F.	G.
RATING OF SPECIMEN.	Original Number of Specimen.	LETTERS.			Per Cent of Variations.	Line Taken as Standard of Size.
		Total Number.	Smaller Than Standard.	Larger Than Standard.		
90 per cent. . . .	47	199	14	3	9	Line 6
90 per cent. . . .	105	199	16	13	15	Line 1
70 per cent. . . .	254	222	12	14	12	Line 3
70 per cent. . . .	589	192	27	15	22	Line 2
50 per cent. . . .	16	253	38	6	17	Line 3
50 per cent. . . .	55	218	37	5	19	Line 4
30 per cent. . . .	50	295	52	14	22	Line 13
30 per cent. . . .	371	306	33	12	15	Line 3
30 per cent. . . .	520	280	28	49	27	Line 2

The data in Table 8 are to be interpreted as follows: The paper bearing the original No. 47 and rated 90 per cent contains 199 letters. Fourteen of these letters are considered smaller than the standard, and three of them larger. The 9 per cent of variation indicated in column F is the result of a computation based on the figures in columns C, D and E.

The standard by which the letters in specimen No. 47 were judged is line 6. The method of procedure was to select a line that could be called standard in size for that particular specimen and to compare the other letters in the specimen with it. It will be seen, therefore, that the variations are really variations within each specimen under consideration, and not variations from an ideal standard or variations from the approved letter forms.

While the increase in variation in size of letters from the best to the poorest specimens is noticeable, it is not large. A closer analysis would undoubtedly increase this difference, and would probably result in differentiating the types more sharply. However, closer analysis would probably not change the order of excellence in the specimens.

#### UNIFORMITY IN SPACING.

The 90 per cent papers are examples of good spacing between words, between sentences and between the parts of letters. No. 47 is uniform throughout with an occasional spreading (see *ut* in *lieutenant*, line 2), and a slight crowding as in *ser* in the word *servant*, line 14. In No. 105 the word *Queen's* is an example of too great spacing between *n* and *s*.

In the 70 per cent papers is found irregularity in spacing; the length of the connective between letters is too long in some places and too short in others. For too long connective, see *cannot*, line 8, in No. 254, and *send*, line 7, and *pride*, line 13, in No. 589. In No. 254 there are too short connectives between *m* and *s* in the word *himself* in line 10; and also in No. 589 between *d* and *i* in *dismissal*, line 5. The spacing between words is quite uniform in No. 254, but slightly more varied in No. 589.



In the 50 per cent papers the spacing between words and sentences is regular. In No. 16 the spacing between letters is uneven, as, for example, *your*, line 1, and *Ortheris*, line 7; but the spacing between parts of letters is good, except the letter *h* throughout. In No. 55 the spacing between letters is irregular; for example, see words *redoubtable* and *apologize*.

In the 30 per cent papers is found no established habit of spacing, hence there is little uniformity between letters or between words. There is too much crowding of letters and words; and spacing between parts of letters is varied and irregular. Some attention is given to spacing between sentences in No. 371, which is good; but in No. 520 it is too great and is irregular.

TABLE 9.

Uniformity of Spacing, Showing the Number of Letters in a Line.

RATING OF SPECIMEN.	Original Number of Specimen.	NUMBER OF LINE.															
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11!	12.	13.	14.	15.	16.
90 per cent...	47	10	13	13	14	13	13	11	11	14	11	13	14	13	13	11	11
90 per cent...	105	13	13	13	15	9	14	12	13	16	14	14	14	10	12	8	11
70 per cent...	254	11	12	15	17	15	16	15	12	14	15	14	15	14	13	13	14
70 per cent...	589	11	14	17	11	13	12	10	10	13	13	12	12	10	12	11	11
50 per cent...	16	16	16	18	16	16	15	19	16	15	15	15	15	16	15	17	13
50 per cent...	55	12	13	13	14	14	13	12	14	15	14	15	14	13	13	13	16
30 per cent...	50	20	23	21	20	22	22	20	17	18	16	19	17	18	15	16	17
30 per cent...	371	14	24	22	16	18	21	19	21	16	17	22	17	22	19	20	20
30 per cent...	520	19	23	18	20	14	19	15	17	18	14	17	18	18	19	14	19

Table 9 was prepared to show the degree of uniformity in letter spacing. The table shows that in specimen No. 47 there are 10 letters in the first line, 13 letters in the second line, 13 letters in the third line, 14 letters in the fourth line, and so on.

A glance at the number of letters in each line will show, in a general way, the degree of variation in spacing. For example: The spacing is fairly uniform in specimen No. 47, ranging as it does from 10 to 14 letters per line, with 13 letters as the most common number found in each line. Contrast with that the variation found in specimen No. 371, where the range in number of letters per line is from 14 to 24, with little uniformity in number of letters per line. Graphs drawn to compare the spacing of the eight papers (omitting paper No. 50) show that specimens No. 47, 105 and 55 may be called regular in their spacing; that specimens No. 254, 589 and 16 are irregular in their spacing; and that specimens No. 371 and 520 are particularly irregular. There is a marked contrast between the 90 per cent papers and the 30 per cent papers. However, although specimen No. 55 is a 50 per cent paper, it is one of the three papers showing the most regularity of spacing. No. 50 cannot be grouped with the other specimens because the lines are incomplete.

#### UNIFORMITY OF SLANT.

Because of the variations in length of arms, and other physical conditions, different pupils may develop individual slants of letters in writing; therefore, the angle of slant may vary from 25 degrees to 35 degrees and yet be satisfactory. The uniformity depends largely on the correct position of the writer.

The 90 per cent papers show fairly even and desirable slant.

In the 70 per cent papers there is some irregularity. In No. 254 there is a great deal of uniformity, yet in words *too*, line 13, and *honor*, line 14, the writing is almost vertical. In No. 589 see *p* and *l* in the word *apologize*, line 10, and word *pride*, line 13, for varied slant.

The 50 per cent papers present a contrast in slant. No. 16 shows a great deal of uniformity though inclined to be excessive; some variations occur, viz., final *l* in word *dismissal*, line 4, also the word *invites*, line 15.

No. 55 is more irregular in slant than No. 16; there is a variety of slant in the words *private* and *soldier*, line 4, in the word *redoubtable*, line 9, and the word *Queen*, line 14.

In No. 371 of the 30 per cent papers there is great uniformity of slant throughout, an occasional letter like *z*, line 6, being pulled very much to the left. In No. 50 the slant is irregular, rather more inclined to vertical. In No. 520 there is considerable uniformity, but some irregularity; see *happens*, line 6, *how*, line 11, and *cannot*, line 5.

TABLE 10.  
Uniformity of Slant.

A.	B.	C.	D.	E.	F.
RATING OF SPECIMEN.	Original Number of Specimen.	Total Letters.	Incorrectly Slanted.	Per Cent of Variations.	Standard Slant of Paper.
90 per cent. . . . .	47	199	10	5	30°
90 per cent. . . . .	105	199	4	2	25°
70 per cent. . . . .	254	222	33	15	20°
70 per cent. . . . .	589	192	36	19	25°
50 per cent. . . . .	16	253	46	18	40°
50 per cent. . . . .	55	218	71	32	32°
30 per cent. . . . .	* 50	295	90	31	15°
30 per cent. . . . .	371	306	9	3	35°
30 per cent. . . . .	† 520	280	62	22	25°

\* Occasionally "backhand."

† Occasionally vertical.

Table 10 is to be interpreted as follows: Specimen No. 47 has a total of 199 letters with 10 of them showing incorrect slant. This represents a variation of 5 per cent. As in preceding tables, the standard for each specimen is found within the specimen itself. The standard slant of letter in specimen No. 47 is 30 degrees, and the per cent of variation is based on the number of

letters that deviate to an appreciable degree from this standard. The data on the other specimens are to be interpreted in the same manner.

It is to be noted that as one advances from the better to the poorer papers there is an increase of variation. However, paper No. 371, which is a 30 per cent paper, is an exception to this general statement. This paper shows only a few letters that deviate from the standard of 35 degrees represented in this specimen. Inasmuch as uniformity of slant is one of the most important elements of legibility, the facts in this table are of particular importance.

#### CHARACTER OF LINES.

In the 90 per cent papers the lines in No. 47 show a light, firm stroke and are smooth and even. In No. 105 they are slightly heavier, but even and firm.

In No. 254 of the 70 per cent papers, line 7 shows a light, even stroke, but the other lines are uneven and irregular. No. 589 shows fairly even lines.

Of the 50 per cent papers, in No. 16 is found a good, light stroke with smooth, even lines throughout. In No. 55 is found some degree of irregularity; even lines in most places, and uneven strokes in other places. See word *redoubtable*, line 9.

In the 30 per cent papers, the lines in No. 50 show a lack of firmness and a degree of uncertainty throughout the paper. It can scarcely be called tremulous, yet it borders upon it.

No. 371 shows a firmer stroke inclined to heaviness on the downstroke. There are many uneven lines, as line 4 with light strokes, and line 8 with heavy strokes, and the word *happens* with both light and heavy strokes.

In No. 520 the heavy, uneven lines predominate and show clearly finger movement.

#### CHARACTER OF LETTER FORMS.

The 90 per cent papers are of the approved type. The letters are well constructed; the distinction between

turns and angles is clear; initial, connective and final strokes are well made; and the proportions of letters are well kept.

Though the 70 per cent papers are also of the approved type, yet both capitals and small letters are poorly constructed, *e. g.*, in No. 254, see capitals *I*, line 2; *T*, line 5, and *W*, line 7; in No. 589, see capitals *T*, line 4; *W*, line 6, and *O*, line 8. For poorly constructed small letters in No. 254, see letter *c*, line 7; letter *p*, line 9, and the letter *h* throughout the paper; in No. 589, see letter *f*, line 6; letter *a*, line 8; letter *w*, line 16. The connective stroke is sometimes too long, as in word *cannot*, line 8, in No. 254. Proportions are also varied.

The 50 per cent papers show also the approved type, but poor construction of letters throughout. The letters are uneven in size and the proportions are poor. The connectives are uneven in length; see the word *apparently*, line 16, in No. 47. The final strokes are poor, or missing; see the final *e* all through both papers.

The 30 per cent papers were a study in themselves, and in them are found every variety of original form and poor construction. They show no acquaintance with approved forms except perhaps the capital *O* in No. 371.

In No. 50 not one letter is correctly formed; height and width are not regarded; no attention is paid to slant; *T* and *Y* are very peculiar; also left-handed lower loop in *f*; and *d* is like *cl*. Initial and final strokes are omitted in many letters.

In No. 371 the type is somewhat toward the approved form, but the construction is poor. This paper offends against letter forms more than against the other points. The capital *I* resembles *cl* because initial and final strokes are made in reverse order; the *d*, in lines 3, 9 and 15, is not closed; the *p*, lines 5, 6 and 15, is not looped below the line; poor loops or no loops are found in the *f*; *x* is peculiar in line 2; *a* is sometimes made like *o*, as in words *dismal*, line 3, and *can*, line 6; peculiar construction of the letter *v* is found in the word *servant*, line 8, and *w* in the word *two*, line 13; introductory oval is

wrong in capitals *T* and *W*; and the capital *Q* has the printed form in line 8. The initial and final strokes are omitted, and the letters are crowded, and the proportions are poor.

No. 520 is not illegible, but shows no attentive study of approved forms of capitals or small letters; *e. g.*, notice capitals *I*, *B*, *T*, *O*; the left curve in lower loop of the *f*, lines 2 and 4; the *a* opened at top in word *has*, line 9, or made like *o* in words *cannot*, line 5, *appare* (ntly), line 12; *m* and *n* are angular at the top; the long crossing in letter *t*; the peculiar formation of letter *p*, lines 6 and 8. Throughout this paper the initial strokes are omitted; the connectives are better, but often lawless; there is no distinction between turns and angles; the heights of the letters are variable and the width irregular; the downstrokes are shaded; the letters are crowded and sometimes are not written down to the line. Spacing and proportion are entirely ignored.

The 90 per cent types of these papers show what can be accomplished by steady, systematic training. The 30 per cent papers, the other extreme, show the result of the absence of such training.

### PART III.—THE ADMINISTRATIVE STATUS OF PENMANSHIP IN THE CITY.

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Everything seems to strengthen the hope that the penmanship of the pupils in the Boston schools will soon attain the position that reason and experience would establish as desirable and necessary. Penmanship in the schools has always been fair, rising at times in some schools to excellent, but before the general introduction of the muscular movement it was comparatively slow, uneven and unacceptable as a business handwriting. When a few years ago the School Committee adopted the present system as the only method to be taught throughout the city, a correct educational principle was established which is daily demonstrating the wisdom of the action of the committee.

From many so-called systems, from extreme individuality, from independent, unauthorized methods, there has issued a single, well formulated, reasonable system, the result of experience and of social and business demands.

The *sine qua non* in successful teaching assumes adequate knowledge of the subject to be taught, and a complete preparation for her work on the part of the teacher. Prior to the authorization of the present system, teachers in general were not properly fitted to teach penmanship. A few individuals in every school, and in rare instances the teachers of an entire school, were skillful in teaching penmanship, but the subject was as a whole poorly taught.

The essential feature of the present system is the recognition of the familiar observation that the source must be the highest point in a stream. Teachers must be much better penmen than their pupils if satisfactory results are to be expected. To those who have inspected

the writing of the teachers of Boston during the past decade, the improvement noticeable during the last five years has been gratifying in the extreme.

Slovenly, uneven blackboard work of variable size and slant is disappearing and is now, indeed, happily rare. Thousands of papers in promotional examinations from half the teachers of the city display speed, freedom of movement, uniformity of slant, correct formation and easy legibility.

The task imposed on the grade teachers by the adoption of muscular movement writing was not light nor of easy acquisition. Lifelong habits often had to be broken and a complete change made in the style, character and appearance of an individual's handwriting. Finger movement gave way to the arm movement, backward slant and vertical were converted into the forward slant. No single comparable requirement had ever before been asked from Boston teachers and that 1,979 teachers out of a total of 2,054 have been certificated to teach the authorized system may be considered a praiseworthy achievement.

This fact alone guarantees the future status of penmanship in the Boston schools. In addition to the preparation which the teachers in permanent service have made, the future teachers just graduated from the Normal School have this year set a record; every member of the class of 1916 of the three-year course holds a certificate in penmanship and several of the college graduates, students of the one-year course, have qualified.

The year just closed has marked a distinct advance in the penmanship of the pupils; many fine writers have been graduated and there is promise of even better work next year. The foundation has been well laid for a more finished product.

The most gratifying features of the year's work have been the enthusiasm, the skillful supervision and the coöperation of teachers and the determined, sustained work of the pupils, all resulting in a "Boston movement"



in penmanship. The material incentives to good work that have been held out to the pupils for some time have been changed. In order that the incentives, too, might represent visibly the "Boston movement," a "Boston button," especially designed, showing the seal of the city, is now presented to all pupils who have had 25 practice drills accepted. Likewise a special "Boston pin," displaying in colors the seal of the city, is given to pupils having 100 drills accepted. The crown of the movement is a penmanship certificate, a well executed lithograph containing also the city seal. This certificate is awarded to pupils who have had accepted 172 drills. A written page demonstrating the pupil's real power and finish must accompany the 172 accepted drills before a certificate of penmanship is awarded; in other words, the supreme test is ability to write rather than to perform drills.

Whenever material incentives for proficiency in any subject are given as awards, there exists always the fear that pupils will work rather for the rewards than for improved results. There are evidences that our pupils are not entirely free from this criticism, but whatever the motive be, increased progress is clearly the result of the year's work.

Until more objective standards in penmanship are produced, judgments as to the value of specific specimens will vary widely, each judge reflecting in his estimate his own subjective standard. In the hope of a greater uniformity of standards among the teachers of a district and ultimately among the districts themselves, a district director of penmanship has been appointed in each district who has, under his principal, complete supervision over the subject in his entire district. He accepts or rejects the drills from the individual pupils, thus establishing a standard and unifying the district judgment thereon; he arranges for the transportation of drill papers; for the distribution and record of buttons, pins and certificates; he also represents his district in

penmanship conferences. Subject to the approval of his principal, he arranges meetings at which Mr. Nolan or Miss Bloomfield gives typical lessons and demonstrations.

With 97 per cent of the grade teachers certified as qualified to teach penmanship in the district, directors unifying and improving the quality of the products throughout the districts, with enthusiasm on the part of both teachers and pupils in the work, with a prompt and regular service for the transportation of drills, with this responsive organization perfecting itself month by month, penmanship has come into its own and has re-established itself in the minds of the pupils as one of the three R's worth while.

An exhibition of penmanship early in the next school year has been arranged at which it is hoped that a comparison, side by side, of the best work done by elementary pupils in 1910 and by those of 1916 will appear to the advantage of the latter. Specimens of writing done in September and repeated in June from every grade room above the third will reveal not alone the best writing of the several rooms, but also the greatest improvement within the year.

From a study of the number of Boston certificates, pins and buttons issued during the current year, the question may well be asked whether or not an undue amount of time has been devoted to the subject of penmanship. It can be stated with certainty that only the allotted time has been taken from the school periods, but so enthusiastic have the teachers and pupils been that, without doubt, much time has been employed on penmanship before, between and after the regular sessions. Nothing but the finest teaching and supervision on the part of teachers and an unusual response from the pupils could result in the remarkable number of awards made during the past year ending June 30. There have been awarded 2,759 Boston certificates, 8,407 pins and 21,642 buttons.

The above results are encouraging both in themselves and by comparison with similar results obtained since

the introduction of the present muscular movement system. During the entire seven years immediately preceding the current year, the total number of pins earned throughout the city was 1,546, and 4,825 certificates were issued. An increasingly large percentage of pupils are habitually using muscular movement in all their written work. The inculcation of this habit has been a very slow process, but the time spent on movement has paid. When grade teachers once learned that form in the early grades is second in importance to movement the core of the system was reached. The one perfectly obvious obstacle to better general penmanship is too great insistence on the part of many teachers to spend an undue amount of time on drills rather than on a more immediate adaptation of drills to writing. Most teachers have learned that when a pupil can make fairly well, not perfectly, the simplest exercise in the method book he is ready to write the muscular movement, and when he can make fairly well a straight line exercise or a good direct oval he is ready to write words instead of practising straight lines or ovals. It is a dissipation of time to insist on making ovals or other forms when pupils can make them reasonably well. Speed, ease, endurance and legibility are the great goals.

## SUMMARY.

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Among the matters of special interest brought out in this study the following should be especially noted.

1. The typical variation in the judgments of the members of the committee concerning the quality of specimens of handwriting indicates the need of objective standards by which to judge the results of school work in such subjects as penmanship. Every pupil's promotion from grade to grade depends on the grade which the teacher gives his work in the various subjects. It is important, therefore, that there should be well defined objective standards by which the teacher may determine the quality of a pupil's achievement. (See pages 5-14.)

2. This study shows in objective form the present achievement in handwriting in the elementary schools at the end of the school year 1913-14. In due time a similar study can be made to ascertain what improvement, if any, has been made. (See pages 15-24.)

3. This bulletin contains a comprehensive, detailed and critical analysis of the merits and defects of the specimens of handwriting studied. Particularly, this bulletin provides each teacher with concrete illustrations of the faults in the present achievement in handwriting. The section of the bulletin where these merits and defects are discussed should be of special interest to all teachers, because a knowledge on the part of the teacher of the present defects in the educational results achieved in any subject is a prerequisite to satisfactory improvement. (See pages 25-36.)

4. This study contains the first published statement from Mr. Rafter concerning the present status of penmanship in the city and of his methods for securing improvement. (See pages 37-41.)

5. This study shows that 97 per cent of the teachers in the elementary schools of Boston have complied with the regulations of the School Committee which require them to obtain certificates of qualification to teach the approved system of penmanship. (See page 40.)

6. This study shows that during the school year ending June 30, 1916, there were awarded 2,759 certificates, 8,407 pins and 21,642 buttons. This is a remarkable record when one compares it with the record during the entire seven years immediately preceding, during which time the total number of pins earned throughout the city was only 1,546, and the total number of certificates issued was only 4,825. (See page 41.)



## ANNOUNCEMENT.

Bulletins published by the department are distributed by the Secretary of the School Committee, who will, so far as the supply on hand permits, fill mail applications for copies when such requests are accompanied by the price indicated.

- No. I. Provisional Minimum and Supplementary Lists of Spelling Words for Pupils in Grades I. to VIII.  
School Document No. 8. 1914. *Out of Print.*
- No. II. Provisional Minimum Standards in Addition, Subtraction, Multiplication and Division for Pupils in Grades IV. to VIII.  
School Document No. 9. 1914. Price, 7 cents.
- No. III. Educational Standards and Educational Measurement.  
School Document No. 10. 1914. Price, 7 cents.
- No. IV. Spelling. Determining the Degree of Difficulty of Spelling Words.  
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- No. VIII. Report on High School Organization and Expenditures, 1916.  
Printed for local distribution only.
- No. IX. Penmanship. Determining the Achievement of Elementary School Graduates in Handwriting.  
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