

THE TEACHING OF

HANDWRITING

by

Arlie Glenn Capps, B. S. in Ed.

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THE TEACHING
OF
HANDWRITING

A. PROBLEM.

The problem of this investigation is to study the uses of diagnosis and corrective measures in the teaching of handwriting.

Out of the main problem will grow some four or five auxiliary problems.

B. INTRODUCTION.

I. Origin of the Problem.

The problem grew out of the writer's interest in, and study of, the applications of scientific measurements to the school products. The chief activities in this new field, which has had a phenomenal growth in the last ten years, have been in devising scales, establishing norms of performance, and in using these in surveying school systems.

Gray¹ lists and briefly describes thirty-five

1. The Elementary School Journal, Sept. 1916, pp.24-34.

standard tests and scales. These tests are devised for use from the lowest grade up to and including the high school. Gray's list is now incomplete for the output is continual.

Along with the derivation of these scales and tests has been the establishment of norms of performance of school children on whom these scales and tests were tried.

Following closely in the wake of the derivation of scales and tests, and the establishing of norms, came the increasing activity of school surveyors. The scales, tests and norms made possible the surveys. One of the chief objectives in the surveys was to measure the educational product, and, by comparison to standards, determine the efficiency of teaching.

Looking over the reports of the Commissioner of Education for the years 1914, 1915, and 1916, one finds the following number of surveys for the respective dates: 26, 21, and 76.¹

The foregoing activities are of much importance in developing a technique and a large body of scientific data. Such activities are no doubt the foundation stones of scientific education. So

1. Report of Commissioner of Education, 1914, vol. 1, ch. xxlv, pp. 514-562; 1915, vol. 1, ch. xviii, and 1916, vol. 1, ch. xxi, pp. 353-371.

far, most of the energy has been given to measuring the educational output. The next great step will be to bring the scientific technique and data into the classroom. That is, if this great wave of enthusiasm for scientific methods in education is to be of lasting value, it must work itself into methods of teaching. It is one thing to measure the product of the schoolroom teaching and quite another thing to tell the teacher just how to get the results that are called for as an outcome of the measuring of his past efforts. To put the issue in the form of a question, it is this: How can the teacher, in his daily work, use the scientific methods, e.g., its technique, data and devices, as aids in improving his methods of teaching? With this question in mind the present study was undertaken.

II. Descriptions.

1. General Description of the Schools and Teachers.

The data for this study were secured in the public schools of Columbia, Mo. The work done in these schools is perhaps on a par with, or a little above, the average for public schools in the cities of Missouri that have about the same

population. There is no reason to believe, so far as the writer knows, that the teachers in the elementary schools of Columbia are not as intelligent and conscientious as those of the average city.

2. Description of the Lee School.

The teaching of handwriting by the writer was done in the Lee School, sixth grade. The Lee School is situated in one of the best residential sections of the city. The children come from the better class of homes.

3. Description of the Sixth Grade, Lee School.

The sixth grade in the Lee School has an enrollment of 44 pupils. According to the tests given by the superintendent, the pupils of this grade rank near the top in ability.

4. Description of the Writing History of the Sixth Grade Pupils.

Of the pupils in the sixth grade, Lee School, 38 had attended town or city schools exclusively. Twenty of the pupils had received instruction and drill in penmanship five or more years, seventeen had not received instruction and drill in penmanship during three or more years of their attendance in school. Five of the seventeen

had attended the University Elementary School 4 years or more before coming to the Lee School. In the Elementary School all their handwriting instruction was incidental.

On the whole, the pupils in the sixth grade were willing and enthusiastic workers.

5. Description of the Regular Teacher.

The regular teacher of this sixth grade received her education in the South. She holds a certificate to teach from a southern state normal school. On this certificate, she was granted a license to teach in Missouri for three years. She seems to be a good teacher in most respects. She is weak in discipline, and does not always get the pupils to do what she asks them to do. She was not able to follow up very consistently and insistently the penmanship work presented by the writer during the fifteen or twenty minutes that he spent with the class each day. She had some good qualities that should be mentioned here. She wrote an excellent hand at all times when the pupils could see her handwriting. She wrote the same system that the pupils were being taught. Further, she was heartily in favor of all that the writer tried to do in the class work and carried out his instructions to the best of her ability.

III. Length of Time Study Was Continued.

1. Beginning and Ending Dates.

The study and teaching of the class began Oct. 9, 1916 and was continued until April 13, 1917. The classroom teaching by the writer was done five days in the week. The period for penmanship was from 11:20 to 11:40 A. M.

2. Disturbances.

a. Work Done for Walker. -- Once a month a handwriting period was given to preparing a set of papers for H. C. Walker, author of the series of penmanship manuals used in the Columbia Public Schools. On the average, one period a week was devoted to drill in preparation for the foregoing papers.

b. Absences of the Writer. -- The writer was absent from the class three days when he was assisting in the Boone County Rural School Survey. He was absent three days when he was called to teach Abner Jones's classes in the University of Missouri. He was absent four days on account of his attendance of the National Educational Association. On two or three days, unavoidable circumstances kept the writer from teaching the classes.

IV. Logical Organization.

The methods of teaching will be developed in

Chapter I, Methods of Teaching; Chapter II, Methods of Correcting Errors in Letter Forms; Chapter III, Class Correctives for the Errors in Letter Forms; and Chapter IV, Individual Correctives. Then follows Chapter V, Appreciation of Handwriting; Chapter VI, Data Pertaining to the Sixth Grade of the Lee School; and Chapter VII, Auxiliary Problems.

C H A P T E R I

METHODS OF TEACHING

General Method

Section A

I. Introductory Statement.

The methods of teaching presented in this study were worked out to fit the conditions as the writer found them in the Lee School. No radical changes in organization were made. In fact no changes except excusing about one half of the sixth grade class from practice on two days of the week. The work also fitted into the scheme of instruction used in the Columbia Schools.

II. Organization of Classes.

1. Basis of Organization. -- The pupils of the room were grouped into two sections. The basis of division was quality as measured by the Thorndike Scale and common troubles in handwriting. The pupils who were poor in quality and seemed to need the same instruction in remedies for their errors were placed in the section called thruout this study, the Special Class. All other pupils in the room were placed in what is known in this study as the Advanced Class.

2. Program of the Advanced Class. -- The Advanced Class received instruction on Monday, Wednesday and Friday of each week. On Tuesdays and Thursdays this class did other than penmanship work. These days were used by the students as they wished.

3. Program of the Special Class. -- The Special Class received instruction on each day of the school week. On Monday, Wednesday, and Friday the two classes worked together. The two classes usually did the same work on these days.

4. Reorganization of Special Class. -- The Special Class was reorganized three times. The reorganization followed the monthly tests in December, January, and March. When the class was reorganized in December, three students were placed into the Advanced Class, two because of a gain of more than 0.7 of a quality on the Thorndike Scale, and one to try the effect on him because he was consistently making a lower score in quality. The pupils were told that they could get into the Advanced Class thereafter if they wrote quality 10 or better in the monthly tests, provided their regular teacher did not complain about the written work handed in by them. On this basis, the class was reorganized on the later tests.

Special Methods

Section B

I. Outline of Lesson Plans for Correcting Errors.

1. Analysis and tabulation of the errors in the

letter-forms by the writer.

2. Illustration of the commonest errors in the letter-forms.
3. Pupils compare illustrated errors to the correct forms found in their penmanship manuals.
4. Giving of corrective work to the pupils.

II. Method of Correcting Errors.

1. Preliminary Work by the Writer. -- Before taking up the errors with the pupils, the writer took the monthly test for October 9 and studied the handwriting to detect and list the chief errors. A study was first made of the general errors that pupils might make. The outline followed was that suggested by Freeman.¹ The following outline was used:

- a. Alinement.
- b. Spacing.
- c. Slant.
- d. Quality of Line.
- e. Letter Form.

As the papers were gone over and these five points studied, a check mark was placed after each point in which the paper indicated gross error. For alinement, a rule was used to draw a straight line above and below the

1. Freeman, F. N.: The Teaching of Handwriting, Chapter V, pp. 118-150.

small letters in the middle sentence written on each page. If the sentence indicated gross failure to follow the line, a check was placed against the pupil. For slant, lines were drawn thru a few of the letters in the middle sentence. If these letters were grossly in error as to slant, a check was placed against the paper in the column headed "Slant". Spacing, quality, and letter form were guessed off after studying the middle sentence.

Although the method of study was not very exact, it gave a clue to the chief errors.

Table I.

Showing frequency of errors made by class.

Errors in	Frequency	Total Number Pupils in Class
Alinement	38	
Spacing	24	
Letter-Form	38	4 4
Slant	28	
Quality of Line	25	

Table I means that, by the method of diagnosis used, 38 pupils showed errors in alinement, 24 pupils in spacing, etc. This quantitative analysis indicates where stress should be laid in teaching this sixth grade. Accordingly alinement and the forms of the letters should receive major

consideration.

2. Methods of Correcting Faulty Alinement.

(1) Class Methods.

On the basis of the foregoing diagnosis, the pupils' alinement needed some corrective work.

Two methods of presenting alinement to the pupils were used. First, a few sentences were written on the blackboard illustrating errors in alinement. The sentences were placed on the blackboard by the writer. The pupils were asked to turn to a page of handwriting in Walker's Manual of Penmanship. Here it was pointed out what is meant by alinement. Then the pupils were asked to criticize the sentences placed on the blackboard. A number of pupils were called on to place a check mark under a letter or word that was out of alinement. This work took about one-half of the period. The pupils were set to copying some of the sentences in their Manual. They were asked to make special effort to keep the letters, words and sentences on the line. The pupils having

done this for about five minutes, or as long as the remaining time in the period permitted, they were asked to criticize their work from the standpoint of alinement. In their written work, within and outside the writing period, they were asked to give special attention for a few days to getting correct alinement.

A second method of dealing with the subject of alinement was used. During the practice in sentence writing, the class was asked to stop writing and study their alinement. They were asked to take a rule and run a straight line just touching the top of the one space letters. Then they were asked to count the number of letters that failed just to touch the upper line drawn and the lower line, the one on the paper. Pupils were asked to report orally as soon as the letters were counted, the number that were out of alinement. Some few days later the same method was used, except the pupils exchanged papers.

Thus the problem of keeping on the line was raised. Then the correctives listed below were given to the pupils by placing them on the board. Each corrective was illustrated and carefully explained.

Having given the correctives, the pupils were asked to copy some sentences from Walker's Manual No. 2. After the copying was completed, the pupils were asked to look over their work for errors in alinement. They reported their difficulties to the class.

2. Incidental Method or Suggestion.

During the drill work and sentences exercises, the pupils'

errors in alinement were pointed out to them by a suggestion thrown into the counting in some such manners as this: "One," "two," "three," "watch alinement," "six," "seven," etc. In the case of drill on ovals and push-pull movements, it was often suggested, along with the counting, that the pupils make the drills touch the lines.

Since alinement errors were quite prevalent in the handwriting of the pupils, the pupils were often asked to state the means of securing proper alinement before they began to work on drills, words, and sentences. In this way the subject of alinement was refreshed in their minds.

3. Individual Method.

During the counting for the drills and directing the exercises, the individual pupil's work was studied while passing by the desks. When an outstanding error in alinement was noticed, the pupil was given a suggestion in the form of a corrective that would suit his case. The suggestions were given in a low tone, thus not disturbing other pupils in their work. In this manner it was possible to give some individual instruction to a majority of the pupils in the class each day.

Several of the pupils in the Special Class were set the problem of correcting the alinement of their writing. Each case was carefully diagnosed and the proper corrective given to the pupil or he was helped to discover the remedy

himself. An example or two will indicate what was done. Upon diagnosis it was found that one pupil moved neither his paper nor his arm when writing across the page, thus causing him to write below the line at the right end. In his case, the difficulty was talked over with him and he was asked to suggest a remedy, but he failed. Then he was shown how easily the difficulty could be remedied by not moving his arm but by slipping the paper to the left two or three times while writing once across the page.

Another pupil wrote too high off the line at the right side of the line, so he was told the proper angle to place his paper.

4. Correctives.

- a. Forearm movement will tend along a straight line.
- b. Slide the paper two or three times toward the left with the left hand during the writing of each sentence across the page.
- c. The pupils were shown the relation of the angle of the paper to the position of the forearm. The paper is placed at such an angle that, when the forearm revolves on the pivotal muscle near the elbow, the pen point, beginning on the right side of the paper and revolving to the left side of the paper, will end on the same line on which it started.

It should be noted that these correctives were given

to the class as a whole, but that special cases were diagnosed when it came to individual treatment. The special difficulty was noted and the proper corrective assigned. See page .

3. Methods of Correcting Poor Spacing.

(1) Raising the Problem.

In the analysis of the errors of the pupils, errors in spacing were not as numerous as some others. Hence not as much attention was given to this subject as to the others.

The problem of correct spacing was raised by the writer placing on the blackboard some sentences which illustrated poor spacing of words and letters. The errors were somewhat exaggerated, so that the pupils could easily detect them. The errors illustrated were words crowded and too far apart, letters crowded and too far apart. When these illustrations were written on the blackboard, the pupils were asked to study and criticize them. The pupils readily found the errors in most cases. As they were found and given by the pupils, they were listed on the blackboard. The pupils were now asked the reasons why they thought the list was really one of errors. The pupils

suggested the reasons without much difficulty.

This study was followed up by having the pupils copy a page of sentences from the Walker Manual of Penmanship. When the copying was done, the pupils were asked to look over their work to see if they had made any of the errors listed on the blackboard. They reported their findings in class. Later, pupils were asked to exchange papers and the errors in spacing were checked and reported.

Another means of getting the pupils to understand correct spacing was to have them compare their page of handwriting to a page in Walker's Manual No. 2. They used rulers to measure the exact spacing in the Manual, then the spacing on their page of writing. Pupils were asked to report their findings.

(2) Correctives.

These suggestions were given to remedy the various faults in spacing:

(a) If the spacing is too wide, do not move the pen so rapidly to the right.

(b) If the spacing is too narrow, the pen moves too slowly to the right.

4. Methods of Correcting

Faulty Quality of Lines.

(1) Class Methods.

Two kinds of class methods were used in the correcting of faulty quality of line. They were general lesson on quality of line and incidental suggestions.

(a) -- General Lesson on Quality of Line. The analysis of the gross errors of the pupils, mentioned under the head of "Preliminary Work by the Writer," indicated that quality of line was one of the difficulties which needed some attention. The question of quality of line was raised by placing on the board the sentence, "A quick brown fox jumps over the lazy dog". Special care was taken to have good quality of line. The pupils were asked to criticize the sentence, pointing out the bad features first and next the good ones. The pupils enjoyed the criticism of the bad points. Then they discussed the good points. Soon their suggestions of good points were exhausted. They were urged to study the work more closely, because there was one especially important feature that had not been mentioned by them so far. A great deal of guessing followed. The writer urged them to compare the sentence on the board with the sentences in Walker's Manual. Finally they gave up. Another sentence was placed on the board. This time poor

quality of line was exaggerated. After some study, several of the pupils suggested that something was wrong with the line. By some assistance the pupils were able to discover the three defective qualities of line, too heavy, too thin and irregular or zig-zag line. These were listed on the board for the pupils.

This lesson required one period. From this time on, the instruction in quality of line was incidental.

(b) -- Incidental Suggestions. In the lessons on formal drill work in ovals and push-pull movements, the suggestion to lighten the touch was given frequently. Especially when it was discovered that the lines were too heavy and the ink tended to run together. This observation was made as the writer walked alongside the pupils' desks and studied their work. The suggestion to lighten line was given in the same rhythmic beat as the counting. When it was found that the pupils were writing at a speed above standard for their grade and pressure was brought to bear to get the pupils to slow up, it was found in a study of the work that the lines tended to become more irregular. Also when stress was placed on correct letter-forms the pupils' work began to show heavy, irregular lines. Then the incidental suggestions were used more freely in the drill work.

When the pupils were preparing some exercises in the way of sentences and words, it was suggested to the pupils that the work be done with a fair degree of speed in order

that the lines would be more likely to be smooth. It was also suggested that those who usually have lines too thin should use some of the correctives that would fit their case and those with lines too heavy should do likewise. In the foregoing manner, the quality of line was often brought to the attention of the class as a whole.

(2) Individual Methods.

The individual method was the chief means of handling the quality of line. While the pupils were doing their drills, their work was carefully observed by passing along by each pupil's desk once or twice during the period. When it was discovered that a pupil was getting an incorrect quality of line, he was given a suggestion to use one of the correctives that seemed suited to his case. The suggestion was given along with the count or between counts. An effort was made not to disturb the other pupils in their work. In this manner, perhaps one-half of the class received individual instruction each day.

Another part of the individual method was to have the pupils write some of their word and sentence exercises, giving special attention to the quality of line. For example, the pupils were asked to solve the problem of faulty line quality during this period. They were told

that the answer could be found by comparing their sentences and words with the same sentences and words in their manuals. When ample time for comparison had elapsed, the pupils were asked to discuss orally their answers, i.e., their sentences and words in comparison with the same in the manuals. Quality of line was the part of the answer in which they were interested this period.

The individual method was the chief one used with the members of the Special Class. When the quality of line was in error enough to require special attention on the part of a pupil, he was given the correctives which, on diagnosis of his handwriting, seemed proper. When cured of the defect, he was given some other work.

(3) Correctives.

The diagnosis of the individual errors and of the class errors in quality of line seemed to require the correctives listed below. Just as a physician diagnoses each case and gives a prescription which his science tells him to give, so each pupil's case was diagnosed and a corrective given to remedy his error.

If one corrective failed to give results, his case was gone over again and another corrective prescribed.

- A. For Too Heavy Lines.
 - (a) Press lightly with the forefinger.
 - (b) Use a finer pen point.
 - (c) Use a penholder of larger diameter.
 - (d) Dip the pen point lightly into the ink.
 - (e) Raise the penholder a little more to the vertical.
 - (f) Turn the eyelet of the pen more to one side.

- B. For Thin Lines.
 - (a) Lower the upper end of penholder.
 - (b) Turn the eyelet of the pen straight up.
 - (c) Get a better quality of ink.
 - (d) Use a little more pressure on the index finger with the muscles of the forearm.
 - (e) Get a coarser pen point.

- C. For Irregular or Zig-zag Lines.
 - (a) Write faster.
 - (b) Practice more movement drills.
 - (c) Grip the pen more lightly.
 - (d) Lateral movement too slow.
 - (e) Get a more comfortable position.
 - (f) Give more attention to movement and less to form for a few days.

5. Methods of Correcting Faulty Slant.

(1) Class Methods.

Three kinds of class methods were used in correcting faulty slant. They were general lessons on slant, lessons on special letters, and incidental suggestions.

(a) -- General Lessons on Slant. In the analysis mentioned in a foregoing statement, it was found that slant gave the pupils much difficulty. The question of slant was raised by the writer placing on the blackboard illustrations of extreme slant, medial slant, irregular slant, and backhand. The pupils were asked to study the illustrations from the standpoint of slant. Such questions as these were asked: Which can be read the easiest? Which looks the best? Compare some of your handwriting to the illustrations. Which slant on the blackboard is most like your writing? Then the illustration of irregular slant was taken up more in detail. The pupils were asked why this slant was objectionable. Among the answers were these two: Because the handwriting does not look so well, and because the letters may overlap and make the handwriting less legible. After more discussion the class generally agreed that these were the chief objections to irregular slant.

One of the pupils wanted to know how to tell when the letters were out of uniform slant. The writer asked for suggestions from the pupils, but they failed to point out the best method so it was given by the writer. They were shown that, when lines one space in height were drawn through the down strokes of the letters, if the lines were not parallel, the letters were not of uniform slant.

(b) -- Lesson on Slant of Special Letters. In the writer's analysis of the difficulties the pupils had in making the letters, he found that the loop letters gave much trouble in that they were frequently out of slant. Not only this, but the pupils often complained that they could not get the loop letters to take the correct slant. Therefore, a lesson was planned in which the push-pull movement was used in correcting the irregular slant of the loop letters, especially the lower loop letters. The lesson follows:

The writer placed a few lower loop letters on the blackboard, f, g, p, q, y, etc. They were written out of slant. The pupils were asked to criticize these letters. It did not take long for the pupils to point out that the lower loops were out of proper slant, as judged by the slant used in Walker's Manual. When this was done, the pupils were asked if they could suggest an exercise or drill that would tend to give one the habit of making these letters with the correct slant. After the failure of the

pupils to do this, the writer suggested the push-pull movement along the lower loop after the beginning strokes were made and just before bringing up the lower loop. This was illustrated on the blackboard. Then the pupils were given the letter "j" to drill on in the same manner. After about four minutes drill on this letter, the pupils were asked to criticize their work. Following this, the pupils were shown by illustrations on the board how the same drill could be used for all the loop letters.

(c) -- Incidental Suggestions. While the pupils were doing the formal drill work, the writer along with the counting, inserted suggestions about the slant. For example, while counting for the ovals, the suggestion "correct slant" was given in the same rhythm as the count. The suggestions to give proper slant was given in most lessons on sentence and word writing. About four minutes were taken at the end of one practice lesson on copying the Elementary Card for the pupils to make a special study of the slant of their writing in comparison with the copy on the card. The pupils were asked to count the number of letters in their work that were off slant and report orally to the class. The pupils were also asked to report the letters most off slant.

(2) Individual Method.

The individual method was used quite extensively in

the teaching of correct slant. In the drill work, the writer would usually count and at the same time keep moving alongside the desks of the pupils. In this way he could observe the work of the pupils and drop any suggestions that might be needed by the individual pupils. The suggestions were given in an undertone along with the count or between the counts. Thus in the case of slant the pupils received individual instructions that they needed. In this way the whole class was gone over each day. When slant was not proper it could be corrected at the time that the pupils needed the correction.

In the pupils' study of their own difficulties, they discovered that their letters were out of slant. So they were given the appropriate corrections.

The members of the Special Class were assigned correctives for slant, if their work upon analysis needed them.

(3) Correctives.

The use of each corrective was determined by its need as indicated by the analysis of the difficulties of the class as a whole, and of the individuals. In the class methods and in the individual method, the following correctives were used:

A. For Vertical Slant.

- (a) Move the writing arm nearer the body.

- (b) Move the fingers of the writing hand farther away from the pen point, i.e. up the penholder.
 - (c) Guide the stroke by the muscles of the forearm instead of by the index finger.
 - (d) Give the paper more slant to the left of the perpendicular to the center of the body.
 - (e) When the paper is in the correct position, make all down strokes toward the center of the body.
 - (f) Hold the penholder at a greater angle from the vertical to the paper.¹
- B. For Extreme Slant.
- (a) Move the writing arm farther away from the body.
 - (b) Guide the down strokes more with the thumb.
 - (c) Move the fingers nearer the pen point.
 - (d) Place the paper at a less angle to the perpendicular to the center of the body.
 - (e) Turn the back of the hand more to the right from straight up.
 - (f) Hold the pen so that it will rest nearer the first joint of index finger.¹

1. Cf., Freeman: The Teaching of Handwriting, p. 72.

C. Irregular Slant.

- (a) Bring all down strokes toward the center of the body.
- (b) Keep pen pointing over right shoulder.
- (c) Keep arm pivot stationary and move the paper two or three times with the left hand in writing across the page.
- (d) Check up work occasionally by the use of straight lines drawn through the down strokes of the letters.

Note:- Pupils who wrote a good vertical hand were not compelled to change to the medial slant. Uniformity of slant was given chief consideration.

C H A P T E R I I.

METHODS OF CORRECTING ERRORS

IN LETTER FORMS

Before taking up with the pupils a given letter, the errors in the form of this letter were carefully analyzed and the commonest errors noted for presentation to the class. The analysis was made from one of the monthly tests of the pupils in handwriting. The results of the analysis will be shown in a following chapter.

The methods for correcting errors in the form of letters may be placed under three general divisions -- class methods, incidental suggestion, and individual methods. The lines between these three methods are rather loosely drawn, i.e. the methods are not mutually exclusive.

(1) Class Methods.

(a) -- General Class Method. On the basis of the analyses mentioned in the first paragraph above, the commonest errors of a given letter were illustrated on the blackboard at the beginning of the class period. The pupils were told that the illustrated errors were found in their

monthly tests in penmanship. They were then asked to open their writing manuals to the letter under consideration. The pupils were requested to study the letter errors on the blackboard and compare them to the correct form of the letter in their manuals. After the pupils had made this study for two or three minutes, they were asked to criticize the illustrations on the blackboard. By turns, six or eight pupils were asked to go to the board and tell the class exactly where each illustration was in error. Each pupil discussed one error. Then the pupil was asked to make the letter on the board, avoiding the error pointed out by him. If he could not avoid this error, other pupils were given an opportunity to show how to write the letter correctly. In this manner the commonest errors of a given letter were brought before the class. The raising of the problem with the pupils in this manner usually required one period.

One of two courses was now pursued. The pupils were given either correctives and drill on them, or they were asked to do some copy work from their manuals. In the latter case the pupils were directed to make a special effort to avoid the commonest errors pointed out for the given letter.

Let us suppose the correctives were introduced first. In this case, a corrective was taken up to remedy one defect of the letter. For example, the letter "g" has the

loop off slant. The "g" was made with a push-pull movement along the right side of the loop before it was brought up. This drill was executed to the count of "one" for the oval and "two," "three," "four," "five," "six," for the push-pull and "up" for the finishing stroke of the loop. Three or four minutes were given to this drill. Then the pupils were asked to study their exercises in comparison with the correct copy of the letter in their manuals. Slant was the element criticized. The pupils reported to the class the number of times their exercises had the correct slant. Perhaps ten of the pupils were given an opportunity to report.

This drill work was followed, either in the latter part of the period or at the next period, by having the pupils write words or sentences which contained the letter a number of times. It was the rule to follow the exercises with criticisms of the results by the pupils.

In case the correctives did not follow directly the study and criticism of the illustrated errors, the following plan was used. The pupils were given a copy either in their manuals or on the blackboard. The pupils were directed to give special attention to the letter criticized. They were to make this letter exactly like the copy. After four or five minutes of this work, the pupils were asked to stop writing and go back over each occurrence of the given letter and compare it to the correct form in their

manuals. They were to check each error in the form of the letter. When the pupils had completed this work, they were asked to report their findings to the class. If time permitted, the pupils rewrote the copy.

(b) -- Some Modifications of General Class Method.

1. Blackboard Work. Instead of having all the writing done with ink, three or four times during the time the class was taught by the writer the pupils were given an opportunity to write on the blackboard. Ten or twelve were allowed to go to the board and do their practicing. These were usually the pupils whose defects were the most stubborn in correcting. The other members of the class did their work as usual on paper. After some five or six minutes of such drill, the work was interrupted and the members of the class who were at the seats were asked to criticise the work on the board. The criticism consisted of four parts as follows:

- (1) Indicate the good qualities.
- (2) Indicate the defective qualities.
- (3) Write correctly on the board the defective parts.
- (4) Tell how to avoid defects when using pen and ink.

Each pupil who criticized the work at the board used the foregoing outline. This work required all of one period and at that it was not possible to discuss the handwriting

of each pupil who wrote on the board.

2. Problem Attitude. After raising the problem of correcting the errors in a given letter, the pupils were shown how they were working on a problem the same as when they were solving problems in arithmetic. The analogy was made clear to the pupils. One example will be developed to make clear the idea.

Having the problem raised, for instance that of correcting the gross errors in a given letter, the pupils were asked to look upon the work as they would a problem in arithmetic. Some such leading questions as these were asked: In solving problems in arithmetic, what do you have? Answer, "We have the problem stating the conditions as so many apples at such a price a bushel to find the cost or answer." How does this compare to the problem in penmanship? Answer, "We have the conditions, i.e. a given letter with so many errors to be corrected. The answer to the problem will be the correct form as found in Walker's Manual of Penmanship. We look in the manual to find the answer to the handwriting problem the same as we look in the back of the arithmetic to find the answer to our problems in arithmetic."

The next thing was to set the pupils to solving the problem of correcting the letter. After they had worked five or six minutes, they were asked to report to the class how many answers they had correct as compared to the letter

in their manuals. To vary the procedure at this point, they were asked to exchange work and check up the answers. The number of correct answers was reported to the class. Often the pupils told one another how to solve the answer correctly, i.e. get the letter right according to the copy. The pupils told one another what was wrong with their answers.

3. Correct Letter-Form Habit. After the pupils had been working on the correcting of the errors in letter-forms for three months, the rules of habit formation were given to them as an aid in getting better results and holding them.

The pupils were told that writing a letter correctly was a matter of habit. This is, when they once formed the habit of writing the letter correctly, they would have no trouble with it at later times.

The following rules were written on the board for the pupils to study and memorize:

- (1) Make up your mind that you are going to write the letter correctly.
- (2) Give close attention to the letter.
- (3) Practice the letter regularly.
- (4) Do not break over your good resolution and make the letter incorrectly a few times.

When these rules were written on the board, each one

was explained fully either by the writer or by some pupil who thought he had the correct idea. The rules were now gone over three or four times by asking the pupils to read them to the class.

At the beginning of the next two or three periods, the rules were called for in order that they might be brought to the minds of the pupils again. Then one of the letter errors previously discussed was given and the pupils were asked how to apply the rules in this case.

The lesson for February 8, 1917 will give one of the applications and modifications of the foregoing discussion. The lesson as planned was as follows:

- (1) Review the rules of habit formation.
- (2) Have the pupils help make a list of the important habits to be formed in writing.
 - (a) Muscular movement in all writing.
 - (b) Forming the letters correctly each time.
 - (c) Sitting erect with feet flat on floor.
- (3) Work on the habit today of writing the letter "w" correctly. Before beginning on the letter, make one row of one space direct ovals to limber up your arm.
- (4) Practice in columns the words on the Elementary Card having "w" in them.
- (5) After the pupils have worked awhile, have

some of the pupils tell their difficulties.

(6) Finish the period by working on these words.

(2) Incidental Suggestions.

Not much need be said here about the method of using incidental suggestion. The method has been given in the discussion of methods of correcting alinement, spacing, slant, and quality of line. One illustration will show the application to the method of correcting errors in the form of letters.

During the analysis of the difficulties it was found that the letter "f" was usually out of slant. When the pupils were writing words that contained this letter, they were reminded that the letter "f" was a difficult one to make with the correct slant.

At various times like this, the most common errors of the letters giving the class the most trouble were pointed out to the class.

(3) Individual Method.

The individual method was used most extensively with

the Special Class. In fact it was the method for this class on Tuesdays and Thursdays, the days on which the Advanced Class was not practicing penmanship. However, this method will be discussed under the headings of (a) Application of the Individual Method to the Special Class, (b) Application of the Individual Method to the Advanced Class, and (c) Application of the Individual Method to the Whole Class.

(a) Application of the Individual Method
to the Special Class.

I. General Individual Method.

(1) Preliminary Diagnosis.

As soon as the Special Class was organized, the handwriting of the pupils was analyzed by the writer and the errors in letter-forms tabulated for each pupil in the class. Thus for each member of the Special Class was a list of the letters which gave him the most difficulty. Along with each letter was written an illustration of the error or errors needing special attention. For each pupil in the Special Class, there was a folder containing his daily work and a list of his errors. Each day's work was carefully gone over before the next recitation and the results of the work studied for suggestions of what to do for the pupil in the case of each error. A careful diag-

nosis of the pupil's writing habits was made and the results of the diagnosis tabulated. On the basis of these diagnoses the corrective measures for each pupil were made out and listed along with the diagnoses.

(2) Presentation to the Class.

Having made the preliminary diagnoses and evolved some correctives, the next step was to place each pupil's case before him. The following procedure was used.

Each pupil was asked to write down the letter that was read after his name. When this was done, the pupils were asked to begin a study of the letters that had been given to them. They could begin the work by looking thru some of their former writing and finding out how they wrote the letter. Then they were to compare the letter to the correct copy of it to be found in their manuals. When making this comparison, they were to note the chief errors they made in writing the letter.

While the pupils as a class were doing the work stated above, the writer had one pupil at a time come to his desk. When the pupil came to the desk he brought some of his handwriting along for study and discussion. In an informal way the error in letter-form which had been read to the pupil was discussed with him. He was assisted in seeing that he had difficulty in making the letter. He was asked to suggest how he could remedy the defect. If

he failed to suggest a corrective, he was told one. In this manner each member of the Special Class received individual instruction once in every two or three periods.

The pupils were told that as soon as they thought they had cured the difficulty, they should bring it to the writer for inspection. If their work passed inspection, they would receive another assignment. The pupils were told also that as soon as they had cured all the diseases of their handwriting, or a goodly portion of them, they would be considered as candidates for promotion to the Advanced Class. The final decision on their cases rested on their ability to reach a given standard in the monthly tests and in their daily written work. These standards have been discussed under "Organization of the Special Class."

(b) -- Some Modifications of the Individual Method.
To vary the method outlined in the preceding sections and at the same time give the pupils training in criticism of handwriting plus whatever assistance they could get from each other, some modifications of the individual method were used.

(1) Board Work.

The pupils of about one-half of the Special Class were permitted to do their special work on the blackboard. The other half of the class worked at the seats as usual.

When the pupils at the board had worked about five minutes, they were asked to stop working. Each pupil's work at the board was studied for one or two minutes by all the members of the Special Class. The pupils at the seats compared the letters on the board to the same letters in the manual. Then some pupil was called on to indicate the good points in a pupil's work on the board, then the bad points were discussed. The pupil criticizing the work was asked to go to the board and show just how to avoid the bad points. In a similar manner all of the work on the board was gone over. The criticism and assistance took a whole period after the first five minutes of work by those sent to the board.

(a) Criticism of Classmate's Work. Another variation of the individual method as outlined in the beginning, was to have the pupils work about half the period on their special defects. Then they exchanged papers. The pupils checked errors in the work by comparing the letters to the same letters in their manuals. Two or three minutes were given to this work. Then the oral criticism was called for. Each critic was asked to offer suggestions of correctives that would keep the owner of the work from making the error again.

(2) Selection of Own Letter-Error.

After the pupils had received considerable training

in detecting errors and offering correctives, they were asked to select some letter that they found gave them difficulty in making. The pupils spent the period practicing on the letter selected. Their manuals furnished the correct form and the drill work.

(b) Application of the Individual Method
to the Advanced Class.

Some use of the individual method was made in handling the Advanced Class. However, most that was done in this line will be discussed under the heading, Application of the Individual Method to Whole Class.

(1) Errors Listed by Writer.

The work of the Advanced Class was carefully diagnosed and three or four of the commonest errors made by each pupil was listed. These were worked up by the pupils in the same manner as the Special Class worked up the same kind of errors. See the topic, Presenting to Class, under Applications of the Individual Method to Special Class.

(2) Errors Chosen by Pupils.

Three or four times the members of the Advanced Class

were asked to select a small letter that gave them difficulty in making and prepare a page of exercises in which the letter chosen was found. The pupils were advised to consult Walker's Manual No. 2 for appropriate exercises. The pupils were to do this work outside the class period and hand it in at the beginning of the next period for handwriting.

(c) Application of the Individual Method
to the Whole Class.

The method of diagnosis and corrective measures was extended to the Whole Class. By Whole Class is meant the class when both sections were working together on Mondays, Wednesdays, and Fridays.

(1) -- Criticism of Work of Classmates. After working on some letter according to the plan presented under the heading, General Class Method, the pupils exchanged papers and studied the work of their classmates. Walker's Manual gave the correct copy of the letter. Errors and means of improvement were noted. Several pupils were given an opportunity to discuss the papers they had studied. The good and the bad features were called for in each case. If time permitted in the period, the papers were returned to the owners and they were asked to rewrite

the work in the light of the criticisms that had been made of it.

Another plan was used which was a slight variation of the preceding one. The pupils were asked to write two copies of the sentence: "A quick brown fox jumps over the lazy dog"-- one copy at the top of the page and one at the bottom. The pupils placed their numbers just above both sentences. Then each pupil checked the errors in letter-form that he made in the first sentence and gave the second sentence to his neighbor, who checked the errors in letter-form in the sentence received. Then the second sentence was returned to the owners. The number of checks was counted for each sentence and the two reported orally to the class by about one-half the members. Where there was disagreement some discussion was allowed.

The writer tabulated the results of the above work for one lesson and found that on the average each pupil found 10.8 mistakes in his work, while he found 13.5 mistakes in his neighbor's work. These results were given to the class with the suggestions that they might be a little more critical of their neighbor's work than of their own.

(2) -- Individual Criticism by the Writer. While the Whole Class was working on Mondays, Wednesdays, and Fridays, the writer spent a great deal of his time giving individual criticism and assistance. When a letter was

seen to be in bad form, the pupil was asked to look it up in his manual. Perhaps a suggestion was given to the pupil by illustration on the blackboard or on his paper. In this way the pupils received a great deal of help in making the letters.

(3) -- Manuals of Penmanship Made by Pupils. In the Manuals of Penmanship which were made by the pupils, chief stress was laid on the correct forms of the small letters of the alphabet and the more common errors of the letters which had been studied earlier in the school term.

See the description of these manuals on page 107 of this study.

One section of the manuals was given to the errors the pupils made in writing the small letters in their everyday writing. Each pupil selected his own errors and followed the errors by correctives.

C H A P T E R I I I.

CLASS CORRECTIVES FOR THE ERRORS

IN THE FORM OF THE SMALL LETTERS

The class correctives for the errors in the form of the small letters will not be discussed in alphabetical order, but in the order of time that they were presented to the class.

In giving the correctives, there will be some repetition of the material presented in the discussion of methods of teaching.

(1) For the Small Letter l .

Eight or ten large-sized small l's illustrating the most common errors that the children made in the monthly tests were placed on the board. Each illustration was discussed by, and with, the pupils, using these points as an outline: (a) height; (b) cross; (c) loop; (d) stroke, the first up, the down, and the second up; and (e) the line. The number of errors for each point was told to the pupils.

Following the preceding discussion, the pupils were

drilled on the right ovals, not quite one space in height, just touching one another. The writer counted ten in rhythmic style for each oval.

With the l in Walker's Manual as a copy, the pupils practiced the letter to the count of "one" for each "l". At the close of the period the pupils were asked to practice as outside work the l's for five minutes. They were asked to criticize their writing carefully to find out their difficulties in making the letter l.

The latter half of the next writing period the pupils were asked to take special pains in making the l's in the following words, which were dictated to the class:


large	lot	pole	rule
lamb	lure	bell	while
let	lye	fill	quickly
line	ball	pull	trifle
slay	able	pearl	glue

The first half of the next period was used in the following manner: The children practiced to count two lines of right ovals, the height of the l's, just touching. Then they wrote two lines of l's to the count of "one" for each l. This work was a review of the letter l and a preparation for the letter b.

(2) For the Small Letter b.

The small letter b followed the letter l. A few

b's and a few l's were placed on the board and the pupils were asked to discuss the similarity of the two letters. The pupils then studied the copy in their manuals and compared it to the illustrated errors on the blackboard. The illustrations were of the most common errors, i.e. the mouth too wide, the top pointed, and the cross too low. Most study was placed on exactly how to form the mouth and the joiner.

In order to get the arms limbered up and the right swinging motion established, the pupils were asked to make two lines of the push-pull movement, alternated with right ovals. Both drills to be of the height of the letter b. The count was ten for the ovals and six for the push-pull. Ex. , etc. The pupils opened their manuals to the correct copy of the letter b and used it for reference as they made the letter b to the count of "one," "two," -- "one" for the upstroke and "two" to finish.

One period only was given to separate drill on the letter b.

(3) For the Small Letter h.

The pupils compared the illustrated errors of the letter h, which were placed on the board, with the correct copy in their manuals. The commonest errors placed on the board were: the cross too high, the hump too pointed, and

the joiner too pointed. Special emphasis was placed on these errors, by asking the pupils to look for them in some of their handwriting which happened to be at the time on the blackboard.

At the beginning of the next period, the pupils practiced two lines of ovals and push-pull movement as illustrated for the letter b. Then the pupils were asked to name the commonest errors of the letter h as given in the preceding period. The pupils were asked to suggest the count for the letter, which they readily did.

About ten minutes were used in counting "one", "two" for the letter, while the pupils wrote it.

Then the pupils were asked to try out their skill in making the letter in the following words:

high	hum	earth
horse	church	laugh
hat	three	which
heat	push	shoe

These words were selected so that the letter h would be practiced in some of its more difficult combinations. The pupils were told this and they were challenged to try their hand at getting each letter correct in the places where the commonest errors were illustrated.

Another lesson was used in drilling on the letter h.

(1) The pupils made two rows of the push-pull movement inside the right ovals which were just touching.

The ovals were two-thirds of a space in height.

(2) Two lines of the part of the h without the hump. Example:

(3) Two lines of h's to count of 1, 2.

(4) Two lines of the, the, the, etc.

(5) Wrote the sentence: The hat hit him hard.

(4) For the Small Letters.

At this stage in the series of lessons the pupils were assigned a lesson to do outside of class. They were asked to bring in the next day a paper showing the small letters that are made alike. The letters made most alike were to be placed on the same line. For example a e o, i u w, etc.

The next period, four or five of the pupils were asked to read their lists. After some discussion of these lists, the writer placed the list below on the board.¹

(1) l, b, h, k.

(2) j, g, y, z, f.

(3) a, e, o, c.

(4) n, m, v, x.

(5) i, u, w.

(6) t, d, p, q.

(7) r, s.

1. Cf. Freeman: The Teaching of Handwriting, pp. 106-7-8.

The pupils were asked to give the reasons for letters being alike; if they failed, which they usually did not, they were told the reasons for the letters being alike. Then the pupils were given the drills below which may be used when practicing each one of the letters.

Use for the letters in corresponding lines above:

- (1) The direct oval one space in height.
- (2) The reverse oval one space in height.
- (3) The direct oval one space in height
and then the height of the one space
small letters.
- (4) The reverse oval one space in height
followed by ovals the height of the
letters in 4.
- (5) The same as (4) except use the direct oval.
- (6) The push-pull movement.
- (7) No special drill for r and s; drill on
the letters themselves.

The pupils were asked to write down the alphabet as given to them with the corresponding drill for each letter. It was suggested that they try out using these drills before practicing on the letter.

(5) For the Small Letter k.

The letter k was taken up by placing eight or ten k's

on the blackboard, taking special care to illustrate the commonest errors, which are: tie too low, joiner too low, cross too low, hump too narrow, and loop too small. These illustrations were discussed in comparison with the correct copy found in Walker's Manual.

Drill work on the letter was next taken up. The pupils wrote the letter k to the count of "one", "two". This was continued for about two minutes. Then the pupils were shown exactly the way the letter should be made. They were asked to note carefully the movement of the crayon when the letter was being made. Special pains were taken to indicate just how the hump should be made.

The next period the pupils were told that they might do some preliminary drill work before taking up their work on the letter k.

The following drill work was given:

(1) Two lines of direct ovals, one space in height, just touching each other, to the count of "1", "2", "3", "4", "5", "6", for each oval.

(2) Practice two lines of the letter k with the hump left off: as, *k k k k* etc. "One" was counted for each part-letter.

Then the pupils used the remainder of the period in making the k's to the count of "one", "two".

The next period the following lesson was given:

(1) Two lines of two-thirds space direct ovals with

the push-pull movement on the inside, thus:

OOOOO etc.

The count was "1", "2", "3", "4", "5", "6", for the ovals and "1", "2", "3", "4", "5" for the push-pull movement.

(2) Two lines of l, l, l, to the count of "one" for each part-letter.

(3) Two lines of k's to the count of "1", "2".

(4) Two lines of kite, kite, etc., six to the line.

(6) For the Small Letters h and k.

One lesson consisted of work on the two letters h and k. The lesson follows.

(1) One row of one space direct ovals with the push-pull movement inside.

(2) One row of the expanded push-pull movement with the four h's minus the hump.

llllllllll etc.

(3) One row of the expanded push-pull movement followed by four h's.

llllllllll etc.

(4) One row of the expanded push-pull movement followed by four k's.

kkkkkkkk etc.

(5) The pupils wrote these sentences: "The black hat hit him hard," and "See how long and hard he works".

(7) For the Small Letter a.

A few small a's illustrating the commonest errors made by the pupils were placed on the blackboard. The commonest errors were: the first down stroke looped and the top open. Having discussed these, the pupils looked for some of them in their own handwriting and reported their findings.

The remainder of the period was given to the following drill: The one space right oval followed by two small a's -- one at the top and one at the bottom of the ovals. Ten was counted for the ovals and "one" for each a.



The next lesson, with the exception of the first three minutes, was given to formal drill on the letter a.

(1) The lesson opened with the same drill movement with which the preceding lesson closed.

(2) One line of the small a's to the count of "1", "2".

(3) One line of connected a's, four in a set.



The count was "1", "2", "3", "4"; "1", "2", "3", "4" etc., i.e. "one" for each a.

(4) The remainder of the period was devoted to the same drill work.

(8) For the Small Letter c.

It was found that the pupils did not make the small letter c as Walker had it made in his manual, therefore the following lessons were given.

The first lesson was as follows:

(1) Exercise 77, p. 10, Walker's Manual was the guide and copy for the pupils.

(2) The pupils made the motions while the writer indicated them. When he said "Up", the pupils made the up-stroke; when he said "Down", they made the down hook; and when he said "Oval", they made the oval part of the c, i.e. the back. These directions were followed for a half page.

(3) The pupils were told to draw the parts if they had trouble with them.

The next lesson follows.

(1) To get the pupils' arms loosened up, they were asked to make one row of continuous direct ovals, one space in height.

(2) One row of c's according to directions used in preceding lesson.

(3) One row of the c's joined, four in a set.

(4) The pupils wrote, unaided, the word "acme" as an exercise for the letter c.

(9) For the Lower Loop Letters.

(1) The lower loop letters were placed on the board and the pupils were asked to indicate the movement used in making the lower loops of all except the letter q. They decided that the reverse oval was the chief movement, especially the one giving the most trouble.

(2) The next step was to develop the idea of how long the lower loops should be. This was done by having the pupils measure the length of the lower loops and then the length of the upper loops. The conclusion was reached that the lower loop should not be quite as long as the upper loop.

(3) To carry this idea into practice, two rows of small j's were made. Before making these two rows, the pupils ran lines with their rulers, two-thirds of the distance between the base line and the next line below. The loop of the j was just to touch the line run by pupils.

The plan below was the one used for the next lesson.

(1) The pupils practiced one row of one space reverse ovals, just touching one another.

(2) The class was asked questions on the points developed in the foregoing lesson.

(3) The pupils finished the period by practicing Exercise 83 in Walker's Manual. This was an exercise on the

small letter j. The class worked to "Up-loop", directed by the writer.

(10) For the Small Letter r.

The last half of one period was used in a study of the small letter r.

(1) A few r's were placed on the board illustrating the commonest errors. These were used:



(2) The pupils were asked to detect the difficulty of each letter, which they readily did.

(3) The pupils turned to Exercise 100, Walker's Manual, and described the errors illustrated by comparisons with the correct copy. The correct form of the top part was studied by the pupils, and illustrated by them and the writer on the board.

The next lesson was given to review and practice of the letter r. The errors illustrated in the preceding lesson were replaced on the board and the children pointed out the errors again. However, this time some correct r's were placed among the errors and the pupils had to select the ones in error.

(4) The remainder of the period was given to the

practice of Exercise 100, Walker's Manual, which is an exercise for the small r.

"The count is given for each upward stroke thus: "one", "two", "three", "four", "five", "six". The upward strokes are well curved. Write four groups on a line and fill about five lines per minute.¹

 etc.

The next lesson the pupils did the same practice work as outlined under (4) above. Then they were asked to write in three or less lines the difficulty each one had in making the letter r. Eight or ten of these were read by the pupils.

Then the pupils were asked to write the word "error" according to the copy on page 17 of Walker's Manual.







(11) For the Small Letter y.

The letter y was introduced similarly to the preceding letters. Illustrations were placed on the board showing the commonest errors and the pupils were asked to detect them.

From this work, the following table was made out and

1. Walker: Penmanship Manual 2 , Exercise 100.

written on the board:

(1)	First part sharp --		31
(2)	Loop too large ----		18
(3)	Cross too low -----		26
(4)	Loop slants too far under to the left -----		19
(5)	Mouth too wide ----		15
(6)	Ending fails to come up -----		16

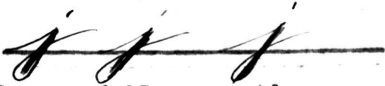
The pupils were told that the figures to the right stood for the number of pupils who made the illustrated errors.

The pupils were asked to practice one row of reverse ovals to get the "feel" of the finishing stroke of the y. Then the pupils opened their manuals at page 22 and used Exercise 121, which consists of y's, as a model for making the letters. The remainder of the period was used by having the pupils make the y's to the count of "one" for each y.

The next period was begun by having the pupils loosen up their arms by making one row of reverse ovals to count of ten for each oval. Then the pupils spent one-half of the period in writing "my" with the word in their manuals as a copy. The other half of the period was given to writing the word "your" according to the copy in their manuals.

Some few days elapsed before the following drill on the letter y was given. The commonest errors were replaced on the board for the pupils to criticize by way of review. The pupils used as a correct copy a few small y's placed on the board by the writer. The pupils were asked to try making the y's at the rate of one a second. "One" was said every second so the pupils could time their work. The pupils were told that this was about the speed that they should ordinarily use.


(12) For Correcting the Slant
of the
Lower Loop Letters.

The lower loop letters were placed on the board. They illustrated the various kinds of off-slant for the lower loop letters. The pupils were asked to criticize the letters and to suggest remedies if possible. One suggested the push-pull movement along the down stroke of the loop, thus:  etc. The pupils were asked to work for awhile on the small letter "j", using the push-pull movement as suggested.

The counting was as follows: "One" for the first up-stroke, "two", "three", "four", "five", "six", for the push-pull the entire length of the loop, and "up" for the

finishing stroke. About half the period was used in this drill.





Then the pupils were shown how the push-pull would work for p, g, y, q, f, and z.

A second suggestion was made in a later lesson about correcting the errors, loop too large and loop out of slant. The pupils were shown how to form the letters without the loop, i.e. instead of the loop use a good, firm down stroke; thus, , etc.

(13) For the Small Letter f.

As usual, a few small f's were placed on the board and the pupils asked to criticize them.

These were the errors illustrated:

- (1) Extreme slant to right for the upper loop and to the left for the lower loop. Ex. .
- (2) Mouth above line, thus .
- (3) Mouth open on the back, .
- (4) Back curved, .

The pupils were asked to suggest a drill that would cure (1) and (4). They were not able to do this, so they were given the following drill work. They were to make the f to the count of "one" for the first up-stroke; "two"

"three", "four", "five", "six" for the closed push-pull movement the entire length of the letter, thus, and "up" for the finishing strokes.

For error (2), the pupils were asked to center their attention on the base line when making the finishing up-stroke of the lower loop.

(14) For the Small Letter w.

The small letter w was handled slightly different from the preceding letters. The first lesson the pupils were asked to write, as well as they could, the sentence; "We will work well today". Then they were directed to study their sentences carefully to see if they could find some one letter on which all of them could profitably practice. After the pupils had looked over their work carefully, it was suggested that they study the letter w. By a vote they decided that the w was the letter most commonly in error. The writer placed carefully on the board some w's for a copy. Without further direction the pupils worked on the copy to the close of the period. The pupils were told that they would work on the letter w the next period.

At the beginning of the next period, the pupils were asked to write again as well as they could the sentence, .

"We will work well today". Then they were directed to study their small w's and compare them with the w's in their manuals. The pupils were told to ask themselves these questions: "What is the trouble with my w's?" "How can I remedy it?" A few of the pupils were asked to tell what they had found. In the light of this work, the pupils were told to use the remainder of the period in practicing the letter w.

The next period the pupils worked on the w with the "problem" attitude which has been fully explained in another place.

C H A P T E R I V.

INDIVIDUAL CORRECTIVES

The individual correctives will be presented under the number of each pupil. For example, the correctives for pupil No. 2 will be given after each error listed under Pupil No. 2. Under the heading will be presented some other material than the errors in the form of the letters. Such material will be spacing, alinement, etc.

The record of the pupil in the monthly tests, as determined by the final grading, is given. "Q" stands for Thorndike quality. "S" stands for speed in letters a minute.

Pupil No. 2.

1. Small letters too large.

The correctives used were: Have pupil measure the height of the letters in the manual. Measure the height of the letters she made. Rule off the correct height on paper and write within the ruled line and the base line. Study the writing of some samples written by pupils who

write the letters about the correct height.

2. Too much space
between the words.

Measure copy in manual for the correct space. Copy from manual sentences, special emphasis being placed on spacing. Move arm less rapidly to the right.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.9	9.1	10.1		10.3	11.5
S	69	58	52		65	73

The pupil was taken out of the special class on December 12.

Pupil No. 4.

1. Vertical Writing

For a month the experiment was tried of changing to slant, but the results were so miserable that the pupil

was advised to go back to vertical.

2. Poor Alinement.

Pupil advised to move paper two or three times while writing across the page.

3. Spidery Lines.

These were probably due to the effort to write slant instead of vertical. More pressure of index finger advised. Mostly cured when pupil returned to vertical.

4. Endings Do Not Come Up.

Pupil asked to copy and to write sentences giving special emphasis on bringing the endings to the height of the one space letters.

5. Errors in Letter Form.

(1) g open at top and looped, lower loop too wide and too long.

For the open top the pupil was shown that the oval was the same as the small a. Practice given in correcting this point by having the pupil concentrate on the closing of the top while writing the g in words and sentences. For the lower loop the pupil measured the exact length of the

lower loop in a correct copy, drew a line below the base line where loop should end and practiced the g with this difficulty in mind. Advised to use a stem instead of a loop.

(2) s rounded at the top and looped at the base. Correct copy compared ~~to~~^{with} pupil's form of letter, and errors pointed out. Pupil asked to correct rounded top first, and then asked to correct looped base.

(3) d stem not retraced.

Push-pull movement along stem to cure difficulty.

(4) f extreme slant, lower loop too large.

Study correct copy. Use more vertical slant when writing the letter; this used for extreme slant. Asked to leave off loop and to use stem instead.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.7	9.2	9.8	9.4	9.4	11.0
S	72	72	53	91	68	66

Pupil No. 7.

1. Movement wild.

Oval and push-pull movement used to get control of muscles of forearm.

2. Endings fail to come up.

Study of copy to find correct height of endings. Practice copy using special pains to bring up ending to the height of the one space letters.

3. Errors in Letter Form.

(1) r top rounded. Study form of r in copy.

Retrace small r. Draw half page of r's. Write them more rapidly after the drawing. Keep the correction of this error in mind for one week when writing.

(2) g open at top, lower loop too large and fails to come up. g compared to a for correct top. Lower loop replaced by stem to remedy last two errors.

(3) f lower loop short, does not close at the base line. Correct length of lower loop found by measurement and line run at proper distance below the base line for practice work. The corrective for the second point was to have the pupil study correct form and practice the letter according to copy with special emphasis on the correct copy

at the point where he made error.

(4) d oval looped and stem not retraced. Correct form studied and concentration on correct form of oval for one or two lessons. Practice letter with push-pull movement along stem.

(5) v ending goes down letter instead of leaving letter at top. Error pointed out and correct copy studied. Practice with this error in mind.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.9	9.5	9.5	9.5	9.8	10.1
s	81	65	58	86	83	84

Pupil No. 8.

1. One space letters too large.

Correct size of letters found by measuring copy in manual. Line used for top of one space letters for three days. Pupil asked to keep this point before him in written work in other classes.

Pupil put into Advanced class in December.

	Oct.	Nov.	Dec.	Jan.	March	April
Q	9.6	9.3	9.6	9.3	10.2	10.8
S	74	72	58	78	73	78

Pupil No. 14.

1. Letters too small and crowded in words.

Use a line drawn the correct height for the small letters for two days. Pupil compare his writing to work in manual. For the second error the pupil was asked to practice o's, a's, and c's, joining them and placing them one inch apart. Move arm more rapidly to right.

2. Poor movement due to too much finger movement.

Drilled for week at beginning of period on forearm movement in writing sentences. Emphasis placed on this point at this time.

3. Endings fail to come up.

Compare own writing to copy. Sentence writing with

special emphasis on bringing endings up to the height of the one space letters.

4. Lower loops slide under words.

Lower loop changed to stem and push-pull movement used to get correct slant. This movement was used with the letters and as a special drill.

5. Errors in letter form.

(1) f extreme slant to the right. Correct slant brought out by running lines thru the downstrokes of other letters in words containing f. Push-pull movement used with f.

(2) t stem too short and cross not horizontal.

The correct height found by measurement of height of t in manual. Line drawn for the correct height and used on a half page for one period. For the second error, all that was done was to show the pupil the error by comparing his letter to those in the manual and showing him how the swinging of the arm to the right on the pivot at the elbow would get the correct line.

(3) r not pointed at top. Pupil asked to visualize the correct shape and practice it with correct copy before him. Retrace an enlarged r, then make the letter smaller and smaller until correct size is reached.

(4) s looped at base. Errors corrected by drill on s with correct copy before pupil.

In general, pupil asked to decrease speed after October test.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.5	8.5	8.8	9.5	8.9	
S	81	65	54	65	83	

Pupil No. 16.

1. Vertical difficulty.

Tried for two months to break this up by insisting on medial slant, but the experiment came out disastrously for the pupil's writing. The pupil was advised to return to the vertical slant.

2. Uncertain movement.

Emphasis placed on drill on the push-pull movement and ovals for two weeks, at the beginning of each

period. About two minutes each period were used for this work.

3. Loop letters have broken backs.

Drill on loop with special attention to a straight line for the back. The push-pull movement used with the letters having loops. Advised to use stem instead of loop where possible.

4. Endings fail to come up.

Same corrective as used for preceding pupils.

5. Upper and lower loops too large.

Study of copy to get correct size. Practice with copy before the pupil. Advised to omit loops where possible.

6. Errors in letter forms.

(1) and (2) b and f backs broken.

See error number (3) above.

(3) r pointed top. Pupil retraced enlarged copy. Asked to keep point in mind for week when writing for other class work.

(4) t cross too long, too high up on letter,

and not horizontal. Correct form found by study of copy. An exercise for t found in manual used. It was simply drill in writing the letter t.

(5) s rounded top and looped base. Study and practice of correct copy only corrective used.

In general, the pupil was asked to slow down on speed.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	9.4	9.6	8.5	9.5	8.9	9.7
S	90	85	67	91	94	97

Pupil No. 17.

1. Words crowded.

Correct spacing found by study and measurement of copy. More rapid movement to the right. Drill work on copy and other class work, with this error in mind.

2. Alinement down at right side.

Pupil told to move paper two or three times with

left hand when writing across the page.

3. Endings fail to come up.

See corrective work for this in discussion of errors of preceding pupils.

4. Lower loops
too long and too large.

Line used at correct distance below base line for a week. Correct size brought to the mind of the pupil by study of copy and visualization of the correct form.

5. Loop letters have
extreme slant.

Correct form studied. Push-pull movement used with loop letters.

6. Errors in letter form.

(1) t too tall and not crossed horizontally.

Line run for correct height. Height of t compared to height of other letters. Drill on t, separate and in words. Pupil shown that direct movement of hand to right on elbow pivot will give horizontal cross.

(2) r rounded.

Drill from correct copy of r found in manual.
Enlarged r retraced and letter gradually reduced to correct size.

(3) d looped at stem.

Push-pull to give ability to retrace. Use with and without letter.

(4) f no top loop.

Correct form studied from copy. Drill on letter for two days, in words and separate.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.3	9.0		10.3	10.1	10.3
S	79	84		80	91	93

Pupil No. 21.

1. Words crowded.

Sentence writing with arm moving more rapidly to the right. Correct spacing found by measurement of

copy.

2. Endings fail to come up.

Separate work in sentence writing with the special point in mind of bringing endings to the height of the one space letters.

3. Alinement poor.

Pupil asked to use forearm movement and shown how it tends to put letters on the line.

4. Movement nervous.

Pupil asked to write and to practice drills more rapidly. Ovals and push-pull movement for two minutes at the beginning of each period for about three weeks.

5. Lower loops
under words.

Correct form studied and copied with this point in mind. Push-pull used with letters.

6. Errors in letter form.

(1) g not closed and lower loop under.

Drill on the letter at speed of about sixty a

minute, copy before pupil. Drill on g with push-pull along loop. Advised to replace loop with stem if he could not handle otherwise.

(2) t cross too short and too high.

Correct copy studied to find length of cross and the height it should be placed. Drill on writing words containing t with special emphasis on the cross.

(3) s rounded at top and looped at bottom.

Error pointed out and simple drill on the letter, in and outside words.

After December test, pupil was advised to write more rapidly.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
q	7.6	9.1	9.0	9.4	9.7	9.6
s	84	55	45	73	73	91

Pupil No. 23.

1. One space letters too large.

Correct height and size of letters found by

measuring copy in manual. Line used to guide height for four lessons.

2. Alinement low at right side.

Pupil told to move paper two or three times when writing across the page.

3. Endings fail to come up.

See suggestions to preceding pupils.

4. Wrote too rapidly at first.

Grade standard in speed given to the pupil and he was told that quality would come up if speed was decreased. This was done after the November test.

5. Errors in letter form.

(1) t looped and cross too long.

For the first error the pupil was asked to study the correct copy and drill on it. Also used push-pull movement to get pupil in habit of retracing line. Correct length of cross found by measurement and pupil asked to watch the cross each time when making it.

(2) f upper loop missing, lower loop too long and too large, and letter has extreme slant.

Visualize correct upper loop and practice without copy. Used for upper loop missing. Correct length of lower loop found by measurement of copy in manual and line used for the lower limits of the letter. Advised to omit lower loop and replace it by a stem. The corrective for extreme slant was the use of the push-pull movement with the letter in drill work.

(3) r rounded top.

See suggestions to other pupils who had the same difficulty.

(4) g loop too long, too large and fails to come up.

Advised to use stem instead of loop.

(5) a looped at the top.

Correct form studied and visualized. Drill on the letter by use of copy.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	9.6	9.1	9.5	11.4	10.3	10.2
S	73	90	63	65	70	78

Pupil No. 24.

1. One space letters
too large and rounded.

For the first error the pupil measured the height of the letters in the manual and used a penciled line above the base line as a guide for the correct height. The pupil was shown the writing of other pupils whose letters were of the correct height. The second error called for the correcting of a rolling movement of the arm while writing. The pupil was drilled on the push-pull movement, closed and expanded.

2. Words crowded.

Measurement of correct spacing in manual. More rapid movement of hand to right.

3. Endings fail to come up.

See suggestions to preceding pupils.

4. Lower loops too large.

Use stem instead of loop. Study of loop in correct copy in manual.

5. Vertical difficulty.

Pointed out to the pupil. Copy exercises in manual. Drop upper part of penholder lower. Use of forearm movement.

6. Errors in letter form.

(1) a looped at top.

Error pointed out. Used copy in manual.

(2) s looped at base.

The pupil was told that the rolling movement was the cause of the loop. Correct copy worked on as a drill.

(3) t does not retrace.

Push-pull movement and study of correct copy.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.3	8.6	8.5	10.2	8.6	10.9
S	79	72	72	70	58	82

Pupil No. 25.

1. Alinement poor.

The pupil was told that the poor alinement was due

to finger movement and improper placing of the paper. Ovals and push-pull movement were used to aid in gaining use of forearm movement. The pupil was asked to read in his manual the description of the correct placing of the paper in relation to the arm and the body.

2. Line too heavy.

It was discovered that the pupil held his index finger far down on the pen point. Thus he used too much pressure. This error was taken up with the pupil and he was told the best way to hold the pen which was to keep the index finger on the cork -- neither higher nor lower. The attention of the pupil was called to this error in holding his pen a great many times, but it is doubtful if the pupil broke up the habit.

3. One space letters
too large and too tall.

See suggestions to preceding pupils who had the same difficulty.

4. Endings failed to come up.

See suggestions to preceding pupils who had the same difficulty.

5. Errors in letter form.

(1) g extreme slant and the crossing fails to come on the base line.

For the extreme slant, the push-pull movement was used, and words and sentences containing the letter were written. It was also suggested to the pupil that he omit the loop and put in its place the stem.

(2) f lacks loops and has extreme slant.

The upper loop was considered essential to the letter, so the pupil studied the copy and drilled himself in the correct form. That is, the problem was put up to the pupil as his for solution.

(3) t cross too high and not horizontal.

For the correct height the pupil was directed to measure the height of the cross in his manual and place the cross the same height in his work. For the second error the pupil was shown that the cross would be horizontal if he would make it with a quick forearm movement to the right.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	9.6	9.7	9.0	8.1	9.4	9.4
S	92	97	85	74	95	91

Pupil No. 26.

1. Extreme slant.

The extreme slant with this pupil seemed from observation to be due to excessive use of a sort of push-pull movement in his regular writing. That is, the pupil did not have enough rolling movement when writing. Accordingly, the pupil was set to work on ovals and such letters as a, o, c, and e. He was given sentence work to copy from the manual.

2. Words crowded.

In the case of this pupil, the apparent crowding of the words was due mostly to the use of extreme slant in the upper loop letters at the end of words. This gave the page the appearance of being crowded. Therefore, the pupil was shown that the spacing would be perhaps correct when he was able to get the slant nearer the medial slant.

3. One space letters too high.

Correct height found by measurement of copy in manual. Line ruled off above base line at correct height and copy written in. Special attention given to height of one space letters for four or five days.

4. Lower loops fail to come up.

Called the pupil's attention to the error. He was shown that the difficulty could be avoided by using a stem instead of a loop, or by bringing the ending up.

5. Errors in letter form.

(1) g lacks oval shape at top, lower loop fails to come up and lower loop too large.

For the first error, practice was given in making the letter, with special emphasis on the oval shape of the top. The next two errors were taken care of in (4) above.

(2) e lacks loop.

This was doubtless due to the push-pull motion used in writing. So it was partly taken care of in the correctives for the other errors. The error was called to the attention of the pupil. He was given three drill lessons on the letter e. These lessons consisted of writing the letter separate, together, in words, and in sentences.

(3) t too slanting.

(4) f too slanting and a tendency to lack the loop.

The errors of t and f were taken care of in the preceding corrective work for this pupil, since the errors were those of slant.

(5) z upper part incorrectly made.

The pupil was asked to study the correct form found

in the manual and in a copy placed on the board. The pupil was shown how the movement was made. Two half periods given to drill on the letter.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	9.3	8.7	9.0	8.6	8.6	9.3
S	90	90	79	83	74	85

Pupil No. 27.

1. Uncontrolled movement.

At the beginning of each lesson for a month, the pupil was given drills in ovals, push-pull movement, and in making the a's, o's, e's, and c's. Three to five minutes of this work was given each period.

2. Words crowded.

Faster movement to the right advised. Correct spacing found by measurement of copy. Drill on sentence writing with the curing of this defect as the objective.

3. Letters too small.

Correct height found by measurement and handled the same as with preceding pupils who had the same error.

4. Endings failed to come up.

Handled as in preceding cases.

5. Errors in letter form.

Very little if any given to this pupil, except what he was drilled on in the Whole Class periods.

RECORD						
	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.0	8.4	8.3	8.9	8.7	8.9
S	79	73	64	71	78	65

Pupil No. 28.

1. Words crowded.

See preceding methods used for the correction of this error.

2. Poor alinement.

3. One space letters too tall.

Numbers 2 and 3 were overcome by correctives used in other cases of the same defect.

4. Spidery, or thin, lines.

Pupil advised to press more heavily on the pen. Turn the eye of the pen point straight up. Drop the upper end of penholder lower.

5. Uncontrolled movement.

This was a very difficult case to adjust. Very

little progress was made. Correctives used were: drill on ovals, push-pull movement, and rapid drill on words.

6. Errors in letter form.

(1) j made like the corresponding capital.

Pupil shown the difference by illustration on blackboard. Pupil copied small j's from the blackboard and from the manual.

(2) t cross too long.

Same correctives as used with other pupils.

(3) b mouth too large.

Study of copy in manual, and illustrations of the pupil's error and of the correct forms on the blackboard. Drill on the letter in words, sentences, and separately. The correct form of the mouth being the problem to solve.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.9	8.9	8.8	8.8	9.2	10.1
S	71	74	80	73	75	68

Pupil No. 29.

In this pupil's case, his errors were about the same as those of other pupils. The same correctives were used in all errors where no mention of a corrective is made.

1. Words crowded.
2. Alinement poor.
3. Uncertain and spidery movement.
4. Endings fail to come up.
5. Loops have extreme slant.
6. Errors in letter forms.
 - (1) j made like capital.
 - (2) t cross too high up on stem and too long.
 - (3) d stem not retraced.
 - (4) f too many waves at beginning.

Pupil shown how to use straight line to remedy this defect.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.7	8.6	8.8	9.2	8.7	9.9
S	79	72	63	68	67	69

Pupil No. 30.

1. Vertical difficulty.

All that was done in this pupil's case of vertical difficulty was to point out to her that her writing showed signs of being vertical at times which, when mixed in with slant, marred the beauty of her handwriting.

2. Endings failed to come up.

Pupil was shown that it was a habit to leave off endings and that it would be an easy habit to learn to put on the endings. Her problem was to form the habit of putting on the endings. This she did by watching this point in all her writing for one week.

3. Lower loops too long
and fail to go up.

Pointing out the error to the pupil with the suggestion that she remedy it, was all that was done.

4. Letters in words
often fail to be joined.

Same method as in No. 3.

5. Uncontrolled movement.

Used ovals and push-pull movement.

6. Errors in letter form.

(1) g open at top and loop failed to come up.

See preceding correctives for this error.

(2) d open too wide at base.

Error pointed out and correcting of error set as problem. Pupil did sentence work with this problem before her.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	9.7	8.6	8.8	9.9	10.6	10.6
S	63	58	63	78	68	73

Pupil No. 34.

1. Movement too rolling.

Drill on push-pull movement.

2. Words crowded.

Move hand more rapidly to the right. Measure correct spacing in manual.

3. Endings fail to come up.

See former suggestions for this error.

4. One space letters too high,
large and rounded.

Due to rolling motion of forearm. Hence use of push-pull/^{movement} along with the letters. Study correct form of letters and copying of them. Much writing with, and without, copy.

5. Errors in letter form.

(1) t cross too high.

(2) j lacks dot.

(3) f wrong form.

See former suggestions for these errors.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	8.7	9.5	9.3	9.6	8.5	10.1
s	61	57	47	73	57	58

Pupil No. 35.

1. Letters too small.

Study and measurement of copy in manual. Use of guide lines for three or four drill days.

2. Loop letters extreme slant.

Use of lines drawn through the down stroke of other letters and of the loop letters to make the error stand out. Push-pull movement with letters. Set the correction of this error as a problem to be worked out in other writing.

3. Vertical tendency in one space letters.

Nothing done but point out the error and its effect on the appearance of the pupil's handwriting.

4. Errors in letter form.

(1) f extreme slant.

(2) t extreme slant.

These two errors come under error No. 2 above. Some separate drill given on them. Copy used.

(3) j lacks approaching line and dot.

Error pointed out and drill on letter given.

This pupil was taken out of the special class in December.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q	7.7	8.7	9.9	10.7	10.0	10.3
S	58	67	54	71	66	74

Pupil No. 42.

1. No idea of forearm movement.

Drill on position of body, hand, paper, pen, etc. given. This was of the purely formal type which may be found in any manual.

Pupil set to work on the ovals and push-pull movement. Kept at this for the most part of each period.

2. One space letters too large.

Error pointed out to pupil and he was asked to

study copy in the manual. Writing of one or two sentences each day following the drill work mentioned above.

3. Endings fail to come up.

Pupil shown this error and he was asked to try to correct it.

4. Loops too large.

Formal drill in copying loop letters.

5. Errors in letter form.

All the letters poorly formed. Little attention given to this except in the following letters.

(1) j used capital.

Pupil shown the difference between the two and given an exercise in Walker's Manual to write up. This exercise was making of small j's.

(2) f lower loop turned the wrong way.

Error pointed out to the pupil by illustration on the blackboard. Two drill periods given to this letter. The first one was copying of the letter f with manual before pupil. The second one was writing of words containing the letter.

RECORD

	Oct.	Nov.	Dec.	Jan.	March	April
Q		8.0	7.8	8.6	9.0	8.6
S		63	74	96	78	91

Concluding Statement.

Very little work has been done in the way of diagnosis of individual errors and the use of corrective for the errors. Therefore, the writer had the double task of diagnosis and developing of correctives. The diagnosis preceded the correctives. More time was given to the former. However, more or at least an equal amount should be given to developing the correctives.

C H A P T E R V

APPRECIATION OF HANDWRITING

1. Introductory Statement

One of the problems of this study was to get the pupils to appreciate good handwriting. The diagnoses of the difficulties of the pupils as a class and of the individual pupils might be quite searching and the corrective measures, or specifics, might be highly efficient; but, unless the pupils appreciate the objectives of the foregoing efforts -- good handwriting in this case -- the labors will be lost.

2. Methods of Developing¹

Appreciation of Values

The following systematic treatment of the develop-

-
1. Outlined from lecture notes taken in a course in Seminary in Theory of Teaching conducted by Dr. W. W. Charters, second semester 1915-16 in the University of Missouri.

ment of appreciation will give the essential principles underlying the specifics for securing appreciation, which will be described under the caption, Specifics for Securing Appreciation.

(1) Determine the functions of the object about to be appreciated, in this case good penmanship. The intrinsic function of good penmanship was placed before the pupils, e.g. when they were asked to list the reasons for being a good penman. The indirect function was resorted to in the use of grades, admission to the Advanced Class, etc.

(2) The values possessed by the pupils were deduced from experience with children of the age of those in the sixth grade. Appreciation is an individual affair and has to work into the system of values possessed by the individual. His values have been built up thru the discipline of natural consequences, thru suggestion, or thru problematic situations.

(3) Must Become Dissatisfied with Present Values.

The pupil, which one wishes to appreciate a given thing, must become dissatisfied with his present values of it. This dissatisfaction may be brought about by the following means:

(a) Reflection, which may be self-reflection or by information which comes from others. Criticism by

the use of scales of the pupil's penmanship, or criticism of his work by his classmates are cases in point.

(b) The discipline of natural consequences helps to create dissatisfaction. For example, if the pupil writes poorly, he makes a low grade or fails to stay in the Advanced Class.

(c) Suggestion is another means of creating dissatisfaction. The suggestion that the pupil should write well may come direct or it may come indirect in that the other pupils who write well secure praise.

(4) Present Object as Means of Control. In case the pupil is dissatisfied with his poor penmanship, he is given work in penmanship that will give him the desired control, e.g. the correctives.

(5) New Method of Control Produces Satisfaction. It is absolutely essential that the new method of control given to the pupil produces satisfaction. This may be brought about by praise, grades that please him, showing him how much better his penmanship now is, or granting him the privilege of entering the Advanced Class.

Summary. In order that the principles underlying appreciation which run thru the preceding methodological statement, a summarizing sentence will be given. Therefore, the principles on which appreciation is based are those of suggestion, natural consequences, and the problematic situation.

II. Specifics for Securing Appreciation

In the knowledge of the writer, Dr. W. W. Charters, Dean of the School of Education of the University of Missouri, first used the word "specifics" in a pedagogical sense. The Century Dictionary and Cyclopedia gives this definition of the word: "Something adapted or expected to produce a specific effect; that which is, or is supposed to be, capable of infallibly bringing about a desired result." In a medical sense the word means, "any medicine specially fitted to cure or prevent some particular disease."¹

Hence, the word "specifics" is a particularly apt one when the diagnostic and corrective method is used in teaching.

1. Appreciation of Other Pupils' Handwriting.

Having written to the publishers of the Palmer Method of Handwriting for some literature on the Palmer

1. New Standard Dictionary.

Method, they sent a great many samples of penmanship written by pupils thruout the grades using this method. The samples submitted were of high class and came from various cities in the United States and Canada. Each sample contained the name of the pupil writing it, his address, age, and usually his grade. The sentences written contained some penmanship mottos, or they were in the form of a letter.

Some few days before bringing to class these samples, the pupils were told that the writer had in his possession samples of handwriting from children in various parts of the United States and Canada. The pupils were told that one day soon they would have an opportunity to see and study these specimens of handwriting. It was incidentally mentioned several times, perhaps each day for three days, that these samples were forthcoming. The pupils were told that they would have a chance to see some real writing as it came from the pens of students of their age and grade. In some such manner as just indicated, a great deal of interest was awakened in these samples. When the "red letter" day¹ arrived, the specimens were distributed among the pupils. Each pupil received one or two samples. But before giving out the samples, the pupils were told how to study the handwriting. They were told to read over the sample, to pick out the good points of the handwriting. After doing

1. Hayward: The Lesson in Appreciation.

this, they were to look for errors in the form of the letters. When the pupils had studied the samples for one or two minutes, several pupils were called on to criticize the sample they had, pointing out the good qualities first, then the bad ones. Six or eight pupils were called on to express their criticisms. This started a more critical study. Four or five were called on to read aloud their specimens. Then a series of exchanging samples was begun. In this way each pupil had an opportunity to study and read seven or eight different samples. The samples were now collected by the writer and the first period for appreciation was over.

This material for securing appreciation was followed the next day by other material for the same purpose. On this day the samples were again distributed to the pupils. The pupils were now told to copy the handwriting specimens -- not only to copy but do better if possible than the pupil who wrote the copy originally. When the work of copying was finished, the pupils were told to exchange copies and original specimens. Then the pupils were told to study both with a view to deciding which was the better. They/^{were} to be able to give reasons for their decisions. The remaining five minutes of the period were devoted to the rendering of decisions and to explaining the reasons for their judgments. In only a few cases did they decide that their own classmates did better work.

The period was closed by collecting original specimens and copies.

2. Use of Manuals.

Some time later, another type of appreciation lesson was given. In the course of this study, the writer had collected twenty-five or thirty manuals of penmanship from various publishers. When the day arrived for the appreciation lesson, the pupils were each given a manual to turn thru and study rather leisurely. Not much was said by the writer about what should be looked for in the manuals. Perhaps this suggestion was given: "Notice the form in which the exercises are put up. See how nice the smooth lines appear. Notice the height of the small letters. They are all the same height, i.e. those requiring the same space-height. Observe the regular slant."

The pupils exchanged books three or four times. The writer answered questions that were asked by the pupils. The pupils suggested some of the most attractive exercises that they saw.

3. Listing the Reasons
for Good Handwriting.

Material for another type of appreciation lesson was introduced by work that follows.

Each pupil was asked to bring to class a list of as many reasons as he could think of why one should write neatly, legibly and rapidly. During the first part of the class period, about ten pupils were called on to read aloud their lists. Then one of the best writers was asked to make a list of the reasons. This was begun by having one pupil read his list and the one at the blackboard copy the list. Other reasons were given and written on the blackboard until the pupils' lists were exhausted. Then the remaining few minutes in the period were given to an informal discussion as to which reasons were the most important.

One or two samples of the papers that the pupils turned in may be of some interest.

Submitted by a girl.

1. To be a good business woman.
2. So people can read my writing.
3. To be able to write good.
4. To use in the future.
5. To write rapidly.
6. So boys can get a good position.

Submitted by a boy.

1. To be a good business man.
2. So people can read it.

3. So one can write rapidly.
4. So you can write well
5. So boys can get a good position.

4. Use of Fancy Exercises.

One of the means of getting children to appreciate the formal drills and exercises, and indirectly handwriting was to give one or two lessons on the fancy exercises.

The children were told that they would no doubt be interested in seeing made and in making some fancy work with pen and ink. The pupils were then shown a few samples of such work, which was found in two or three of the writing manuals. Among these samples were fans, watches and chains, lamps, Charley Chaplain, etc. These appealed very much to the children. They were shown how to go about to make one of them -- a fan.

The pupils were shown the method of beginning the fan by blackboard illustrations. Lines were drawn first to get the spread of the fan; then the pupils were shown how to begin the ovals at the handle of the fan and proceed outward.

Thus point by point the pupils were assisted in getting their fans started. The pupils were asked to finish their work by the following period. When the fans

were completed, ten of the best were displayed on the wall for a few days.

At a later period the pupils were given an opportunity to devote the time to working up some of the fancy exercises mentioned in the third paragraph above.

5. Uses of the Handwriting

of the Teacher and of the Writer.

As stated in another connection, the regular teacher's handwriting on the blackboard was a good model. Her hand was trained in the same slant that was being taught to the pupils. Her work on the board was often referred to as a model that the pupil would do well to copy. The pupils had suggested to them often that if they were as good penmen as their teacher, they could justly be excused from further drill in penmanship. Often when the correct form of a letter was under consideration with the pupils, they were asked to observe the way their teacher made it in her writing on the board.

Then, too, the very fact that their teacher was a good penman had its silent influence in getting the pupils to appreciate good handwriting.

The writer wrote his best hand on the board as an example for the pupils. Three or four times incidentally

the pupils were told that, if their handwriting was equivalent to the examples set by the writer, they would not need much formal work on handwriting. Then, too, the pupils were told how the writer of his own accord learned to write as well as he does.

In the effort to get the pupils to take more care in writing their names, the writer showed each pupil at odd times during the year how to write his name in a neat, business-like way.

These things were done to get the pupils to appreciate good handwriting.

6. Penmanship Manuals

Made by Pupils.

(a) Raising the Problem. The idea of making a penmanship manual was presented to the children in the following informal way, which required one period.

Some fifteen or twenty penmanship manuals were distributed to the pupils at the beginning of the class period. Two pupils sat in each seat thus making it possible to place one manual to each desk. The pupils were asked to look thru the manuals to find some exercises or drills that they would like to make. The pupils spent about seven minutes turning thru the manuals, looking at

the exercises, and discussing them with their seatmates. The writer suggested to the pupils that they could make a manual of penmanship of their own if they cared to. It was further suggested that, since they had been doing penmanship work of a different nature from that of any of the manuals they were looking over, it might be a good idea for them to make a manual. The idea was launched now. The remainder of the period was spent by the pupils in looking over the manuals for suggestions for their manuals.

(b) Suggestions for the Manuals. At the beginning of the next period for handwriting, the following suggestions were given to the pupils merely as a starting point for their work. They would thus get some idea of what might go into their manuals.

(1) Work up an artistic and appropriate cover design and cover for your manuals. All of the work is to be done with pen and ink.

(2) Might describe the correct position of the body, feet, hands, paper, etc.

(3) Work up a few fancy drills; as, watch and chain, fan, and lamp, etc.

(4) Work up the small letters that give you difficulty, by describing the difficulty, telling how to remedy it, etc. Look thru the manuals and copy as many drills and exercises as you think necessary to remedy the defect.

(5) In the same way, work up some of the capitals.

- (6) Make out a monthly record of your speed and quality.
- (7) Tell how to form the habit of good handwriting.
- (8) List the uses of good penmanship.

The foregoing were given to the pupils merely as suggestions.

The pupils were to present for inspection their work every day or two. In this way a short conference was held with each pupil about his work in the course of two or three days.

The pupils worked with apparently good interest on their manuals for about ten days. The class work was closed before all had finished and the few who had not finished did the remainder of their work outside of class.

7. Use of Displays.

Once a week during the months of October, November, and December, one of the sets of daily lessons was gone over carefully and the ten best papers were placed on display in the classroom. The method of judging was the comparative one, i.e. each paper was compared with every other paper in the set. The kind of work put on display was varied from week to week. One week a set of exercises

consisting of words and sentences was used; the next week a set of exercises consisting of ovals, push-pull movements, and letter drills was selected for display.

8. Use of Handwriting Teams.

As a means of eliciting appreciation of handwriting, though in an indirect way, use was made of competing handwriting teams.

One day of the first week of February, the writer took a few minutes to tell the pupils how they could have some fun out of contesting teams in handwriting in the same way they have sport out of contesting basketball teams. (Basketball was chosen because the pupils were quite enthusiastic at that time about the game. They had been playing with some success against other grade teams in the city.) Care was taken to make the comparison between basketball and competing teams in handwriting quite detailed. For example, as they have captains in basketball they could have captains in handwriting teams. Also, the captains in the basketball teams drill their respective teams and they could do the same in handwriting teams. Further, just as there are scores in basketball, so there are scores in handwriting, which are made possible by the use of the Thorndike scale. The spirit seemed to be

catching. However, nothing more was said until Friday, when the pupils were told that they might choose by ballot on the following Monday four captains. On Monday this was done and the captains, by turns chose members for their teams until all in the room were on teams.

Then the rules governing the contest, which had been prepared by the writer, were read to the pupils. The essential points were these:

- (1) Length of time of contest, two minutes.
- (2) Write as well and as rapidly as can a short sentence selected by the writer.
- (3) The writer will conduct the contest.
- (4) The team making the most gain in speed and quality over their record in the monthly test will be the winner.

The remainder of this period was taken up by the writer's reading to the class, more particularly to the captains, the score in speed and quality that each member of the teams made in the last monthly test. The captains then figured the averages for their teams and this was placed on the blackboard. Then the pupils were told that the captains of each team would decide what each member of their teams should practice on at the next period.

At the next period for the whole class, the pupils were given a short sentence to write twice. Then the captains collected the papers from the members of their respective teams. They took about two minutes to go over the papers to check a word or letter that was most in error

and needed drill. The papers were then returned and the pupils spent the remainder of the period practicing their checked errors. In case the error was a letter, which it usually was, Walker's Manual gave the correct copy. The writer assisted individuals to do their drills. However, most of the work was left to the pupils, because there was danger of too much interference deadening the spirit of the game.

After the captains had drilled their teams in the foregoing manner for a week, the captains were asked to grade the work of their teams by the Thorndike scale. To get samples of the pupils' handwriting, a two minute test was given on a short sentence. The captains were asked to grade by the Thorndike scale each paper written by the pupils of their respective teams and to get the speed for each pupil. Then the averages for each team were to be calculated. When this was done, the results were written on the blackboard. It may be noted that the averages found by having the captains use the Thorndike scale were very close to the averages found by graders who graded the monthly test papers. Five-tenths of a step would cover the difference.

The monthly test and the contest came on the same date. One test served both purposes. The grading of the papers was done by the graders who had been grading the monthly test papers. The pupils were very anxious to

learn the rating of each team, and as quickly as the papers were graded the results were announced by writing the average for each team on the blackboard. When the initial standing of the teams and the contest ratings were compared, the winning team was announced. Whereupon, the cheering reminded one of a real athletic contest.

The following table gives the standing of the teams at the time of the monthly test preceding the contest, and the scores at the close of the contest in March.

TABLE NO. II

Team Scores.

TEAM NO. 1.				TEAM NO. 2.					
Pupil's				Pupil's					
No.	Jan.	March		No.	Jan.	March			
	Q	S	Q	S	Q	S	Q	S	
9	11.5	52	11.9	57	3	10.8	91	10.4	71
5	10.8	73	10.2	70	20	9.9	78	10.7	67
10	9.6	91	9.6	91	15	10.3	91	9.9	100
6	12.6	44	11.3	39	36	9.9	83	9.6	84
24	10.6	70	9.0	58	18	10.7	70	10.4	91
17	10.8	80	10.3	91	13	11.2	96	10.5	96
23	11.3	65	10.7	70	22	11.0	68	10.7	78
14	10.1	65	9.3	83	8	10.1	78	10.8	73
43	11.7	86			42	9.2	96	9.1	78
11			10.6	74	34	11.0	73	9.1	57
					44	7.7	48		
TOTAL	99	626	92.9	653	TOTAL	111.8	872	101.2	695
AVERAGE	11.0	69.5	10.3	70.3	AVERAGE	10.2	79.2	10.1	69.5

Note:- Q -- Quality on Thorndike Scale.
S -- Speed in letters a minute.

TABLE NO. II (Cont'd.)

TEAM NO. 3					TEAM NO. 4				
Pupil's Number	Jan.		March		Pupil's Number	Jan.		March	
	Q	S	Q	S		Q	S	Q	S
35	11.3	71	10.0	66	12	10.7	71	11.2	83
16	10.6	91	9.1	94	11	9.2	74	10.6	74
2	9.8	52	10.3	65	4	10.1	91	9.8	68
37	10.5	81	9.3	74	1	10.0	54	10.5	52
38	10.3	65	10.0	65	26	9.2	83	9.2	74
19	11.2	79	10.6	73	27	9.3	71	9.2	78
25	8.8	74	9.7	95	28	9.2	73	9.3	75
40	10.3	87	10.8	74	29	9.1	68	9.0	67
7	9.9	86	10.2	83	32	11.4	78	9.9	68
21	10.0	73	9.3	73	33	13.1	70	11.6	61
30	10.4	78	10.6	68	41	8.9	72	9.2	73
TOTAL	113.1	837	109.9	830	TOTAL	110.2	805	109.5	773
AVERAGE	10.28	76	9.99	75.5	AVERAGE	10.0	73.2	9.95	70.3

Note:- The lower scores in the March test may be due to one of the high graders leaving school before grading the March test papers.

9. Use of Objective Standards.¹

(a) Basis for Quarterly Grades. By using the

1. For method of giving monthly tests and the scores obtained, see p.122 .

scales for measuring handwriting and the grade norms in speed and quality, the pupils took the objective attitude toward handwriting. That is, the pupils became interested in their handwriting in comparison with what other pupils could do and they centered their attention more on their handwriting than on the teacher who gave the grades.

Bagley describes the situation quite succinctly in the following quotation:

"As means of directing the attention of the pupils toward their work and away from the mischief-impelling stimuli of the schoolroom, these scales have a marked advantage in that they represent objective rather than subjective standards. It is one thing to say to the pupil, 'Your writing does not please me; you must improve it.' Here the teacher is being pleased or displeased, and the subjective attitude is being encouraged on both sides. It is quite another thing to say: 'Here is a handwriting chart used throughout the country to find out just how well or how poorly people write. Let us see where your paper stands on this scale.' The teacher is now no longer the judge and the pupil the culprit. One is not combating the other, but both are looking toward an objective goal and the way is open for the teacher to come into his true function -- not that of a taskmaster, but rather that of a guide and counselor to the pupil.

pointing the way and showing the means toward an achievement the worth and significance of which the pupil can grasp."¹

At the end of the first quarter the pupil making the highest standing in quality as measured by the Thorndike scale, was given the highest grade in the class, an E. The pupil making the lowest score was given the lowest grade, an F. In descending order of quality, the next ten pupils were given S's. The next twenty pupils were given M's and the next ten, I's. The basis of grading the pupils was announced a month before the end of the quarter.

At the beginning of the next quarter a slightly different plan of giving grades was used. The St. Louis Blue Certificate Standard was used as the scale for this quarter. This standard was devised for use with the Walker System of Handwriting. The standard consists of a specimen of handwriting for each grade up to the seventh, and one specimen for the seventh and eighth. The writer made use of the standard as a basis for the quarterly grades for the second quarter, by placing an E on the sixth grade specimen, an S on the fifth grade specimen, an M on the fourth specimen, an I on the third, and an F on the

1. Bagley: School Discipline, Ch. V, p. 69.

second and below. The standard thus lettered was placed on the wall at a proper height so that the pupils could compare their handwriting with the specimens. The pupils were told that those who wrote as well as the specimen for grade six would receive a quarterly grade of E, those who wrote as well as the specimen for grade five would receive an S, and so on for the other letters.

Twice during the quarter, the pupils judged their handwriting by use of the St. Louis Blue Certificate Standard.

At the end of the quarter a set of the last monthly test papers in the quarter was judged by the Blue Certificate Standards and the grades given according to the plan outlined above.

The next quarter the pupils were given their final quarterly grades on the basis of the amount of gain made in quality. The gain was determined by comparing the standing of the pupils in the first monthly test of the quarter with their standing in the last monthly test of the quarter. By "standing" is meant quality on the Thorndike scale. This was thought safe because the pupils, as a whole, wrote too rapidly for their grade in comparison with the quality.

The grades for the last quarter were given on the basis of the quality of the written work in other subjects. This was announced to the pupils the first week of the last

quarter. The pupils were told that a set of their papers would be used for the determining of their grades. These papers were graded by the Thorndike scale. The quarterly grades were distributed so that they would follow approximately the normal distribution curve.

(b) Monthly Tests. Six monthly tests were given to the pupils. For the method of giving the tests, and the scores obtained, see Data Pertaining to the Sixth Grade Lee School. When the papers were graded and the averages found for the class and for each pupil, then they were made known to the pupils. The class averages in speed and in quality were placed on the blackboard. These were compared with the standard grade-averages in speed and in quality. Then each pupil was told his speed and quality and he was asked how he stood in comparison with the standards for the sixth grade. If a pupil was below in quality and above in speed, he was asked if it would not be well to slow up a little in speed in order that the quality would come up. If a pupil was below in speed and above in quality, the reverse question was put to him.

Thus the problematic situation was vividly placed before the pupils. The monthly tests were given frequently enough so that gain resulting from effort could be detected and the reward to the pupil was the satisfaction of knowing that he was making definite progress.

(c) Competition. (1) These monthly tests gave

the pupils a fine opportunity to compete with their own records -- each against himself. The pupils were urged to do their best just for the pure sport of beating their former record.

(2) The class as a whole was urged to do its best to beat its preceding record in speed and quality.

(3) Another competition that the pupils were much interested in was that against the thousands of other children whose handwriting had been tested to make up the standard for the sixth grade. The pupils rejoiced very much when their class average was above the standard for the sixth grade.

(4) Each pupil was told that he was in competition with the thousands of children whose handwriting had been averaged to get the norms for the sixth grade. Each child seemed to take special pride in trying to get above the average child in the sixth grade.

(5) The supervisor of the elementary grades gave three speed-quality tests in handwriting -- one at the beginning of school in September, one in January, and one at the close of school. The pupils were anxious to lead the sixth grades of the city in quality and speed, and in per cent gain.

(d) Judging Own Handwriting. The pupils were shown in detail how to judge their own handwriting by the Thorndike scale. Following these instructions, the pupils

made use of the scale pretty often for a short time. When the voluntary interest subsided, they were assigned the problem of grading their papers for one lesson. On the whole, the pupils did not like the Thorndike scale, because they did not seem to understand, for example, how their handwriting could be quality 10 if they did not write backhand. The writer devised a sixth grade scale to clear up some of the difficulties the pupils had with the Thorndike scale; but, owing to the necessity of discontinuing the teaching, the scale was not tried out.

10. Summary.

The principles of appreciation -- suggestion, natural consequences, and the problematic situation -- are at work more or less potently in all the specifics which have been presented. In some of the specifics one or more of the principles are outstanding in their influence. In the summary which follows, no special pains have been taken to draw hard and fast lines between the principles at work.

(a) Suggestion. In the following specifics, suggestion is perhaps the chief principle at work:

- (1) Appreciation of Other Pupils' Handwriting.
- (2) Uses of the Handwriting of the Teacher and of the Writer.

- (3) Use of Manuals.
- (4) Use of Fancy Exercises.

(b) Natural Consequences. The natural consequences of poor handwriting were the chief incentives to better handwriting in the following specifics:

- (1) Use of Displays.
- (2) Use of Handwriting Teams.
- (3) Basis for Quarterly Grades.
- (4) Competition.
- (5) Monthly Tests.

(c) Problematic Situation. The problematic situation, perhaps, was the chief factor working for appreciation in the following specifics:

- (1) Listing the Reasons for Good Handwriting.
- (2) Judging Own Handwriting.
- (3) Penmanship Manuals Made by the Pupils.

However, the problematic situation arose in all the specifics listed. At every turn the pupils were confronted with the problem: How can I make my work secure the desired results?

watch gets to sixty, I shall say "Start" and you are to begin writing immediately. You are to continue to write until I say "Stop". When I say "Stop", you are to quit writing at that instant, even though you have a letter just half finished.

"You are to write the sentence (here was supplied the sentence that was used on the date indicated below) as well and as rapidly as you can."

The following sentences were used on the dates indicated:

Oct. 9 -- "Mary had a little lamb".

Nov. 3 -- "Mary had a little lamb".

Dec. 3 -- "Mary had a little lamb".

Jan. 19 -- "Art is long and time is fleeting."

March 7 -- "A quick brown fox jumped over the
lazy dog".

April 13 -- "Art is long and time is fleeting".

Note:- No drill was done on these sentences between tests and the pupils did not know what sentence would be used until the beginning of the test.

2. Methods of Grading the Monthly Tests.

Two methods were used in grading the monthly tests.

The first method described below followed each monthly test and was used as a basis for the diagnostic and corrective work. The second method, to be described later, was used at the close of the teaching at the Lee School. It was used as a check on the first method.

A. First Method.

(1) Graders. Six members of a class in Statistical Studies in the Theory of Teaching graded the monthly tests for October, November, December and January. One of the six graders left school before the test in March, thus leaving only five of the former graders, and one more left before the test in April, so the April test was not graded by the first method.

The six graders were seniors and graduates in the School of Education. They were teachers of experience. For the October test they had only two hours of training in the use of the Thorndike Scale for Handwriting. As the months passed by they became more experienced graders.

(2) Instructions for Grading. The following instructions for grading the tests were given:

1. Grade the samples by the ascending descending method on the Thorndike Scale.
2. Use fractional parts of a step/^{if} you wish to.
3. Do not consult with anyone about the value of a sample.

(3) Calculations. The speed and the average speed was calculated by the writer. The average quality was calculated in most cases by the graders and checked by the writer. The derived tables and data were worked out by the writer.

B. Second Method of Grading.

At the close of the teaching at the Lee School, it was decided to use a second method of grading the monthly test papers. The object of this second method was to check **up** the gradings which were done by the first method.

In the first method there were only six graders and they knew the dates on which the tests were given. These six people might have expected a gain in quality of penmanship from month to month, thus raising the average of each month, or they might have been more or less in sympathy with the work of the writer, which might also have influenced the grades give. Therefore, the second method was designed to overcome these difficulties as far as possible.

(1) Graders. The graders who did the grading by the second method were members of a class in Statistical Studies in the Theory of Teaching. Four of whom had assisted in the grading by the first method. These four

had, therefore, considerable experience in the use of the Thorndike scale. The remaining eight had also gained some experience in using the Thorndike scale, having done some other grading for the writer. The graders were seniors and graduate students in the School of Education of the University of Missouri. They were teachers of experience, with one exception.

For doing the grading by both methods, the writer is indebted to the following students who were members of a class in Statistical Studies in the Theory of Teaching in the University of Missouri in 1916-17:

Mrs. Carrie Bennett, Miss Minnie Caldwell, Miss Rae Kingsbaker, Miss Louise Marbut, Miss Rose Rosenthal, Miss Edna Steele, J. W. McCreery, V. A. Davis, Bertram Harry, J. A. McIntosh, R. H. Kenagy, A. E. Martin, F. W. Snider, and C. E. Stephens.

(2) Arranging the Papers for Grading. The monthly test papers were arranged in the following order before numbering each paper:

First, November 3, papers.
Second, December 3, papers.
Third, October 9, papers.
Fourth, April 13, papers.
Fifth, January 19, papers.
Sixth, March 7, papers.

The papers were then numbered consecutively from one to two hundred and thirty-eight inclusive. For example, on paper number two, two 2's were placed -- one at the top and one near the lower right-hand side.

After each paper was numbered in the preceding manner, the heading of the paper, which contained the pupil's name, date of writing the paper, and the number placed on it by the writer, was cut off and preserved for identification purposes .

By this method of handling the papers, the only means of identification that the graders had for each paper was the number in the lower right-hand corner.

Each set of monthly tests was placed in a package and the sample numbers therein marked on the outside of the package.

(3) Instructions for Grading. The following instructions were given to the graders:

1. Grade by the ascending-descending method on the Thorndike scale.
2. Grade by whole numbers.
3. Record each package on a separate sheet.
Rule two or three columns if necessary.
4. Do two packages at a sitting, one sitting a day.
5. Place at the bottom of each sheet the number of pupils, total score and average score.
6. Sign your name to each sheet before handing in.

3. Data Obtained by the
First Method of Grading.

The data obtained by the first method of grading were used in the teaching of the class in the different ways discussed under methods of teaching. No definite conclusions are drawn from this data because of the small number of graders. The data are presented as a record more than anything else.

(a) Individual Record of the Whole Class in Speed and Quality. Table III below shows the individual records of each member of the class for all the tests that he was present. The columns headed "Q" show the average judgment of the graders on the quality written by each pupil in each test. This table gives the results of the first grading of each monthly test. The other gradings of each test will be discussed farther on.

T A B L E N O . I I I

INDIVIDUAL RECORD OF THE WHOLE CLASS

SPEED AND QUALITY.

No. of Pupil:	Oct. 9		Nov. 5		Dec. 4		Jan. 19		Mch. 7		Apr. 15	
	Q	S	Q	S	Q	S	Q	S	Q	S	Q	S
1	9.1	90			10.0	54			10.5	52		80
2	9.0	69	8.9	58	9.8	52			10.3	65		73
3	11.4	88	11.3	81	12.2	72	10.8	91	10.4	71		75
4	9.0	72	9.3	72	9.5	53	10.1	91	9.8	68		66
5	8.8	81	9.9	48	10.0	52	10.8	73	10.2	70		69
6	9.5	63	10.8	54			12.6	44	11.3	37		
7	8.7	81	9.1	65	9.9	58	9.9	86	10.2	83		84
8	10.0	74	9.4	72	9.8	58	10.1	78	10.8	73		73
9	9.7	58	10.2	52	10.9	49	11.5	52	11.9	57		74
10	8.3	79	9.1	76	9.5	72	9.6	91	9.6	91		81
11	9.6	63	8.8	70	9.8	61	9.2	74	10.6	74		71
12	9.9	81	9.6	81			10.7	71	11.2	83		80
13	8.9	90	8.8	108	10.4	77	11.2	96	10.5	96		97
14	8.6	81	8.2	65	8.8	54	10.1	65	9.3	83		
15	9.3	91	10.3	72	10.1	45	10.3	91	9.9	100		78
16	9.6	90	9.5	85	8.6	67	10.6	91	9.1	94		97
17	8.2	79	10.3	84			10.8	80	10.3	91		93
18	8.9	67	10.3	65	9.8	63	10.7	90	10.4	91		79
19	8.9	99	9.9	54	10.1	48	11.2	79	10.6	73		74
20	9.4	65	9.9	63	10.7	63	9.9	78	10.7	67		74
21	7.7	84	8.1	55	8.6	45	10.0	73	9.3	73		91
22	9.1	79	8.8	63			11.0	68	10.7	78		81
23	9.8	73	9.4	90	9.3	63	11.3	65	10.7	70		78
24	7.5	79	9.1	72	8.5	72	10.6	70	9.0	58		82
25	9.8	92	9.2	97	9.1	85	8.8	74	9.7	95		91
26	9.7	90	8.4	90	8.2	79	9.2	83	9.2	74		85
27	8.2	79	8.3	73	8.3	64	9.3	71	9.2	78		65
28	8.7	71	8.8	74	9.0	80	9.2	73	9.3	75		68
29	8.8	79	8.2	72	8.8	63	9.1	68	9.0	67		69
30	8.8	63	8.8	58	8.9	63	10.4	78	10.6	68		73
31	10.0	99	10.2	84								
32	8.9	74	9.2	74	9.6	63	11.4	78	9.9	68		55
33	10.8	67	12.2	56	12.7	52	13.1	70	11.6	61		78
34	8.6	61	8.9	57	9.5	47	11.0	73	9.1	57		58
35	8.3	58	9.3	67	10.3	54	11.3	71	10.0	66		58
36	8.6	76	8.8	81	9.6	68	9.9	83	9.6	84		74
37	8.9	74	8.5	83	9.6	61	10.5	81	9.3	74		71
38	9.0	55	9.8	61	9.8	48	10.3	65	10.0	65		80
39	9.6	63	8.4	84			9.8	86				71

Table No. III.

(Cont'd.)

No. of Pupil	Oct. 9		Nov. 3		Dec. 4		Jan. 19		Mch. 7		Apr. 13	
	Q	S	Q	S	Q	S	Q	S	Q	S	Q	S
40	10.5	69	9.7	90	9.2	83	10.3	87	10.8	74		82
41			9.9	82	8.9	72			9.2	73		73
42			7.9	63	7.6	74	9.2	96	9.1	78		91
43			9.8	54	11.5	54	11.7	86				65
44							7.7	48				

Table No. III should read as follows:

Pupil No. 1 on October 9 had an average quality, based on the gradings of the six graders, of 9.1 on the Thorn-dike scale and a speed of 90 letters a minute; on Nov. 3 was absent; on Dec. 3 had an average quality of 10.0 and a speed of 54; on January 19 was absent; on March 7 had an average quality of 10.5 and a speed of 52 letters a minute; and on April 13 had a speed of 80 letters a minute.

Table No. IV gives the average speed and quality on the basis of the average of the average of the sixth graders -- the average speed however was calculated from Table III.

T A B L E N O . I V

SHOWING MONTHLY AVERAGES IN

SPEED AND QUALITY.

	Oct. 9	Nov. 3	Dec. 3	Jan. 19	Mch. 7	Apr. 13
Av. Speed	75.9	71.3	61.8	76.2	73.9	77
Av. Quality	9.15	9.31	9.63	10.37	10.1	

Table No. IV shows gain in quality as follows: On Nov. 3 the whole class gained 0.16 of a Thorndike quality over Oct. 9; on Dec. 3, a gain of 0.32 of a step over Nov. 3; on Jan. 19, a gain of 0.74 of a step over Dec. 3; and on March 7, a loss of 0.27 of a step. The loss may be due to the fact that one of the high graders left the class in Statistics before the papers for March 7 were graded. Another factor might have caused the loss, that is, the pupils may have reached a plateau in their learning curve.

The decrease in average speed from Oct. 9 to, and including, Dec. 3 may be due to the fact that after Oct. 9 pressure was brought to bear on the pupils to get them to write slower. After Dec. 3 the pupils were told that they might write a little faster. In fact, not very much was

said about speed from this date on to the close of the teaching on April 13.

(b) Regrading of the Monthly Tests. The monthly test papers for October, for November, and for December were graded more than once. The October papers were graded in October and regraded when the November papers were graded in November. The November papers were graded in November and regraded in December when the December papers were graded. The December papers were regraded in January at the time the January papers were graded.

The regrading was discontinued because one of the graders left school.

Table No. V which follows shows the averages of each grader for each set of papers and the averages of these averages for each time a set of papers was graded.

T A B L E N O . V

Grader's Number	October Papers		November Papers		December Papers	
	Av's for Oct.	Av's for Nov.	Av's for Nov.	Av's for Dec.	Av's for Dec.	Av's for Jan.
1	8.86	9.68	9.80	10.42	10.60	10.80
2	8.59	8.83	7.97	9.01	8.95	9.02
3	8.80	8.65	9.00	8.74	8.92	8.68
4	9.74	9.50	9.60	9.99	8.71	9.62
5	9.19	8.72	9.43	8.74	9.97	8.99
6	9.74	10.50	10.07	9.58	10.65	10.53
Av's of						
Av's	9.15	9.28	9.31	9.41	9.63	9.57

The table should be read as follows: Grader No. 1 found an average of 8.86 for the October papers when he graded them in October and an average of 9.68 when he graded them in November; he found an average of 9.80 for the November papers when he graded them in November and an average of 10.42 when regrading them in December; and his average for the December papers in December was 10.60 but in January he gave the same papers an average of 10.80.

The last row should read as follows: The average of the averages of the six graders for the October papers when they were graded in October was 9.15; and, when graded in November, was 9.28; etc.

Looking over the table one will see that the second grading gave a slightly higher average for the whole class on the October and the November papers, but the regrading of the December papers gave a slightly lower average.

4. Data Obtained by the Second Method of Grading.

(a) Individual Record of the Whole Class in Quality.

The monthly test papers were graded a second time by the method, and for the reasons given under the heading, Second Method of Grading. Only the average quality is given in this connection. The speed was given under the

first method of grading.

T A B L E N O . V I

INDIVIDUAL RECORD OF THE WHOLE CLASS

IN QUALITY -- SECOND GRADING

A V E R A G E Q U A L I T Y						
Pupil Number	Oct.	Nov.	Dec.	Jan.	Mch.	April
1	9.2		10.5		10.6	10.8
2	8.9	9.1	10.1		10.3	11.5
3	10.3	11.0	12.1	10.4	11.0	12.5
4	8.7	9.2	9.8	9.4	9.4	11.0
5	8.5	10.4	9.8	9.9	10.5	11.1
6	9.1	11.5		11.7	11.5	
7	8.9	9.5	9.5	9.5	9.8	10.1
8	9.6	9.3	9.6	9.3	10.2	10.8
9	9.1	10.3	10.5	11.6	11.5	12.6
10	8.2	9.4	9.4	9.4	9.1	10.5
11	9.3	9.5	9.6	8.6	9.8	10.6
12	9.4	10.3		10.9	10.8	11.8
13	9.2	9.4	10.8	10.5	10.3	10.7
14	8.5	8.5	8.8	9.5	8.9	
15	9.4	10.3	10.1	8.9	9.5	10.1
16	9.4	9.6	8.5	9.5	8.9	9.7
17	8.3	9.0		10.3	10.1	10.3
18	9.6	9.5	9.8	9.8	9.6	11.4
19	9.5	10.2	9.6	9.9	10.5	10.5
20	9.7	10.2	10.2	9.8	10.5	11.5
21	7.6	9.1	9.0	9.4	9.7	9.6
22	9.2	8.3		10.4	10.6	10.9
23	9.6	9.1	9.5	11.4	10.2	10.2
24	8.3	8.6	8.5	10.2	8.6	10.9
25	9.6	9.7	9.0	8.1	9.4	9.4
26	9.3	8.7	9.0	8.6	8.6	9.3
27	8.0	8.4	8.3	8.9	8.7	8.9
28	8.9	8.9	8.8	8.8	9.2	10.1
29	8.7	8.6	8.8	9.2	8.7	9.9
30	9.7	8.6	8.8	9.9	10.6	10.6
31	9.3	10.6				
32	9.1	9.0	10.2	11.2	10.3	10.7
33	11.0	12.1	12.6	11.9	11.2	12.3
34	8.7	9.5	9.3	9.6	8.5	10.1
35	7.7	8.7	9.9	10.7	10.0	10.3
36	8.6	8.6	8.9	10.1	9.6	9.9

TABLE NO. VI

(Cont'd.)

Pupil Number	Oct.	Nov.	Dec.	Jan.	Mch.	April
37	8.8	9.0	9.3	9.5	9.2	9.5
38	9.0	10.3	9.6	9.9	9.4	10.3
39	9.1	8.8		9.6		
40	10.0	9.9	9.1	9.5	10.0	9.9
41		10.4	9.5		9.1	9.9
42		8.0	7.8	8.6	9.0	8.6
43		9.9	10.4	9.8		9.9
44				7.5		

The table should be read as follows: Pupil No 1 in the October test made an average score quality 9.2, in November he was absent from the test, in the December test, an average score of 10.5, absent again in January in the March test made an average score of 10.6, and in the April test an average score of 10.8.

The blank spaces indicate that the pupils were absent.

(b) Averages for the Whole Class in Speed and Quality. The results of the five months of teaching penmanship in the sixth grade are shown in an objective way by the following averages for the whole class in speed and quality. The speed averages, it may be noted, are transcribed from the data presented in the preceding method of grading.

T A B L E N O . V I I

:	Oct.:	Nov.:	Dec.:	Jan.:	Mch.:	Apr.:	:
:Av. Speed	:75.9	:71.3	:61.8	:76.2	:73.9	:77.0	:
:Av. Quality	:9.06	:9.54	:9.52	:9.77	:9.81	:10.47	:

The table should be read thus: The average speed of the whole class in October was 75.9 letters a minute; in November, 71.3 letters; in December 76.2; etc. The average quality for the whole class in October was 9.06; in November, 9.54; in December 9.52; etc.

Table VII should be compared with the following table of standards for the grades.¹

T A B L E N O . V I I I

SHOWING NORMS OF PERFORMANCE

:	1	2	3	4	5	6	7	8	:
:Grades	:	:	:	:	:	:	:	:	:
:Speed	:	:	:	:	:	:	:	:	:
:(Letters	:	:	:	:	:	:	:	:	:
: a	20	31	38	47	57	65	75	83	:
:Minute)	:	:	:	:	:	:	:	:	:
:Thorn-	:	:	:	:	:	:	:	:	:
: dike	6.5	7.5	8.2	8.7	9.3	9.8	10.4	10.9	:
:Quality	:	:	:	:	:	:	:	:	:

By comparing the two tables, it will be seen that

1. Starch: Educational Measurements, p. 83.

the sixth grade pupils in the Lee School started in October with a seventh grade speed, dropped to a sixth grade speed in December, and finished in April with a seventh grade speed.

By comparing the two tables again, it will be seen that the sixth grade pupils in the Lee School began in October with an average quality lying between the standards for the fourth and fifth grades, and finished in April with an average quality slightly above the standard performance in quality for the seventh grade.

The greatest gains in quality are: (1) between the monthly tests for October and November -- the gain being 0.48 of a step; and (2) between the monthly tests for March and April -- the gain being 0.66 of a step.

The gain in the April test may be due to one or more of the following causes: (1) The pupils were told at the reorganization of the Special Class in March that in the April test all who wrote quality 10 or better would be transferred to the Advanced Class.

(2) The April test papers were cleaner than the other test papers, due to the fact that the latter test papers had been handled twice by students who graded them following each monthly test.

(3) The rapid rise in the practice curve due to unknown causes.

(4) Variation in the judgment of the graders.

(5) To the cumulative effect of the methods of teaching.

(c) Monthly Record of the Pupils Who Were at No Time in the Special Class. The monthly record of the pupils who were at no time in the Special Class was prepared. Those pupils were the ones who were the best in penmanship. The following table given the data pertaining to these pupils.

T A B L E N O . I X

MONTHLY RECORD OF PUPILS
WHO WERE AT NO TIME
IN THE SPECIAL CLASS.

Pupil Number	Average Quality						Average Speed					
	Oct.	Nov.	Dec.	Jan.	Mch.	Apr.	Oct.	Nov.	Dec.	Jan.	Mch.	Apr.
1	9.2		10.5		10.6	10.8	90		54		52	80
*3	10.3	11.0	12.1	10.4	11.0	12.5	88	81	72	91	71	75
*5	8.5	10.4	9.8	9.9	10.5	11.1	81	48	52	73	70	69
6	9.1	11.5		11.7	11.5		63	54		44	37	
*9	9.1	10.3	10.5	11.6	11.5	12.6	58	52	49	52	57	74
*11	9.3	9.5	9.6	8.6	9.8	10.6	63	70	61	74	74	71
12	9.4	10.3		10.9	10.8	11.8	81	81		71	83	80
*13	9.2	9.4	10.8	10.5	10.3	10.7	90	108	74	96	96	97
*18	9.6	9.5	9.8	9.8	9.6	11.4	67	65	63	90	91	79
*19	9.5	10.2	9.6	9.9	10.5	10.5	99	54	48	79	73	74
*20	9.7	10.2	9.8	10.5	11.5	11.5	65	63	63	78	67	74
22	9.2	8.3		10.4	10.6	10.9	79	63		68	78	81
31	9.3	10.6					99	84				
*33	11.0	12.1	12.6	11.9	11.2	12.3	67	56	52	70	61	68
*38	9.0	10.3	9.6	9.9	9.4	10.3	55	61	48	65	65	71
39	9.1	8.8		9.6			63	84		86		
*40	10.0	9.9	9.1	9.5	10.0	9.9	69	90	83	87	74	82
43		9.9	10.4	9.8		9.9		54	54	86		65

TABLE NO. IX.

(Cont'd.)

:Pupil :	Average Quality						Average Speed					
	:Number:	Oct.:	Nov.:	Dec.:	Jan.:	Mch.:	Apr.:	Oct.:	Nov.:	Dec.:	Jan.:	Mch.:
:TOTAL :	160.5:	172.9:	134.2:	164.9:	158.8:	166.8:	1277 :	1168 :	776 :	1210 :	1049 :	1140 :
:NUMBER :												
: OF :	17 :	17 :	13 :	16 :	15 :	15 :	17 :	17 :	13 :	16 :	15 :	15 :
:PUPILS :												
: AV. :	9.44:	10.17:	10.32:	10.30:	10.58:	11.12:	75.11:	68.7:	59.7:	75.7:	69.9:	76.0:
:TOTAL* :	105.2:	113.5:	113.3:	112.5:	115.3:	123.4:	802 :	748 :	668 :	855 :	803 :	834 :
:NUMBER :												
: OF :	11 :	11 :	11 :	11 :	11 :	11 :	11 :	11 :	11 :	11 :	11 :	11 :
:PUPILS :												
: AV. :	9.56:	10.31:	10.3:	10.22:	10.48:	11.21:	72.9:	68 :	60.7:	77.7:	73.0:	75.8:
: AV. :												
: OF :	9.06:	9.54:	9.52:	9.77:	9.81:	10.47:	75.9:	71.3:	61.8:	76.2:	73.9:	77.0:
:WHOLE :												
:CLASS :												

The table should be read in the same manner as the table showing the individual record of the whole class. The starred pupil numbers indicate the pupils who took all of the tests. The starred total and the averages from it were secured by adding the scores for the starred pupils and dividing by the total number of starred pupils. For purposes of comparison the averages for the Whole Class were placed at the foot of the table.

Observations

(1) This set of pupils, as a whole, had an average quality of 9.44 in October and an average of quality 11.12 in April. Thus these pupils made a gain of 1.68 steps on the Thorndike scale in the five months of teaching. In other words, these pupils began in October with an average score of 0.04 of a Thorndike step above the standard quality for the fifth grade and closed in April with an average score of 0.22 of a step above the standard for the eighth grade. See preceding table on page 138, showing the standard norms of performance.

(2) The average speed in October was 75 letters a minute or 10 letters above the standard for the sixth grade; then the rate dropped to 59.7 in December or about 5 letters below standard; in April the speed was again above standard -- this time 11 letters.

(3) The averages from the starred totals show practically the same scores as for the set as a whole.

(4) This set of pupils as a whole began 0.38 of a step in quality above the average for the Whole Class in October and closed in April 0.65 of a step above the average for the Whole Class.

(5) The speed for this set of pupils, for all practical purposes paralleled the speed for the Whole Class.

(d) Monthly Record of the Pupils Who Were at No Time in the Advanced Class. In order to get at the status of the pupils who were at no time in the Advanced Class, the following table was prepared.

T A B L E N O . X

MONTHLY RECORD OF THE PUPILS
WHO WERE AT NO TIME
IN THE ADVANCED CLASS.

Pupil Number	Average Quality						Average Speed					
	Oct.	Nov.	Dec.	Jan.	Mch.	Apr.	Oct.	Nov.	Dec.	Jan.	Mch.	Apr.
*4	8.7	9.2	9.8	9.4	9.4	11.0	72	72	53	91	68	66
14	8.5	8.5	8.8	9.5	8.9		81	65	54	65	83	
*16	9.4	9.6	8.5	9.5	8.9	9.7	90	85	67	91	94	97
*21	7.6	9.1	9.0	9.4	9.7	9.6	84	55	45	73	73	91
*25	9.6	9.7	9.0	8.1	9.4	9.4	92	97	85	74	95	91
*26	9.3	8.7	9.0	8.6	8.6	9.3	90	90	79	83	74	85
*27	8.0	8.4	8.3	8.9	8.7	8.9	79	73	64	71	78	65
*28	8.9	8.9	8.8	8.8	9.2	10.1	71	74	80	73	75	68
*29	8.7	8.6	8.8	9.2	8.7	9.9	79	72	63	68	67	69
*34	8.7	9.5	9.3	9.6	8.5	10.1	61	57	47	73	57	58
41		10.4	9.5		9.1	9.9		82	72		73	73
42		8.0	7.8	8.6	9.0	8.6		63	74	96	78	91
44				7.5						48		
TOTAL	874	1086	106.6	107.1	108.1	106.5	799	885	783	906	915	854
NUMBER OF PUPILS	10	12	12	12	12	11	10	12	12	12	12	11
AV.	8.74	9.05	8.88	8.92	9.00	9.68	97.9	73.7	65.2	75.5	76.2	77.6
TOTAL*	78.9	81.7	80.5	81.5	81.1	88.0	718	675	583	697	754	763
NUMBER OF PUPILS	9	9	9	9	9	9	9	9	9	9	9	9
AV.	8.76	9.07	8.94	9.06	9.01	9.66	79.7	75.0	64.7	77.4	83.6	84.8
AV. of WHOLE CLASS	9.06	9.54	9.52	9.77	9.81	10.47	75.9	71.3	61.8	76.2	73.9	77.0

The table is read in the same manner as the preceding table showing the monthly record of the pupils who were at no time in the Special Class.

Observations

(1) This set of pupils, as a whole, had an average quality in October of 8.74 and in April an average quality of 9.68. Therefore these pupils made a gain of 0.94 of a step on the Thorndike scale. In other words, these pupils began in October with a fourth grade score and closed in April 0.12 of a step below the average for the sixth grade. See preceding table showing standard norms of performance on page 141.

(2) The average speed in October was 14.9 letters above the standard for the sixth grade and decreased to the average of the sixth grade in December, then increased to 12.6 letters above the standard in April.

(3) The averages based on the starred totals do not show a material difference from the averages of the set as a whole.

(4) This set of pupils as a whole began 0.32 of a step in quality below the average for the Whole Class and closed in April with 0.79 of a step below the average for the Whole Class.

(5) The average speeds of these pupils is slightly above the averages for the Whole Class.

Further Observations

on (c) and (d).

(1) The pupils who remained in the Advanced Class and the pupils who remained in the Special Class made good gains. The first set of pupils gained 1.68 of steps, or three grade gains, -- counting 0.50 of a step as a normal grade gain. The latter set of pupils made a gain of 0.94 of a step, or nearly two grade gains. It should be noted that the teaching extended over only five months of the nine months of the school year.

(2) The decrease in speed in both (c) and (d) to December may be explained by the fact that the writer in his teaching insisted that the pupils lower their speeds. However, after December the pupils were told that they might increase their speed and accordingly the speed averages went up again.

(3) In connection with observations (1) and (2) above, it is worth noting that the pupils in the Advanced Class had only 60 minutes a week for penmanship drill while the Special Class had 100 minutes a week for drill.

Comparison of the Gradings

by the Two Methods.

The following table will make easy a comparison of the average gradings by the first method with the average gradings by the second method.

T A B L E N O . X I .

COMPARISON OF AVERAGE GRADINGS.

Date	First	Second	Difference
of	Method	Method	
Tests			
Oct.	9.15	9.06	0.11
Nov.	9.31	9.54	0.23
Dec.	9.63	9.52	0.11
Jan.	10.37	9.77	0.60
*Mch.	10.10	9.81	0.29
Apr.		10.47	

The table should be read as follows: The October test papers averaged quality 9.15 on the Thorndike scale by the first method of grading, by the second method of grading these papers averaged quality 9.06 and the difference between these two gradings was 0.11 of a Thorndike step. The starred month was the one in which there were only four of the six graders who had been doing the grading by the first method. The April test papers were

were not graded by the first method.

It should be recalled that six students did the first grading with the exception of the March test, and that eleven students did the second grading -- four of whom helped in the first grading. With these facts in mind and a study of the column of differences in the table, one is confronted with the question of the consistency of graders. The November, January, and March gradings show wide differences obtained by the two methods of grading. Hence the reliability of these gradings should be kept in mind in drawing conclusions about results.

In conclusion, it should be said that the writer has taken a tentative attitude toward all the data presented, even though he has not explicitly stated such in every case. More study and experimentatim along these lines must be done before anything like absolute reliability can be placed in the results of tests which have been obtained by objective standards.

5. Letter Errors.

Problem

To determine the errors in the letter-forms made by the sixth grade pupils in the Lee School.

One of the chief virtues of the method of teaching by diagnosis and corrective measures is the analysis and tabulation of the errors made in the letter forms. This part of the study was made prior to the teaching of letters. It was done in order that the commonest errors could be dwelt on and corrected.

In the study of the errors in letter forms many obstacles were encountered. In the first place there is practically no literature on the subject to which reference could be made for suggestions on method and content. One reference needs mentioning. It is the Messenger for November 1915. This little pamphlet was issued by the St. Louis Board of Education. The work was done by Mr. H. C. Walker, Supervisor of Penmanship of St. Louis Schools and his assistant. In this pamphlet was found listed some errors made by pupils in the elementary schools, but no quantitative results shown.

A second obstacle encountered, when a minute analysis of the letters was begun, was that ^{but} few parts of the letters have been given names. Some names are found but the nomenclature is not standardized. Therefore, names of parts of letters have been chosen quite arbitrarily and in some cases the names may have been invented.

A third obstacle was that there has been no graded scale of errors worked out. So the only standard used was perfection as gauged by the forms of the letters

found in Walker's Manual Penmanship No. 2. The form was either right or wrong.

Therefore, what is offered is mostly suggestive of needed further study.

However, the data presented had its practical side in that it was used to direct the attention of the class to the difficult parts of the letters that needed careful attention and drill.

Method of Procedure.

The analysis of errors was made from the handwriting tests that were given on October 9 and 10, 1916. The test on October 9 was on the sentence, "Mary had a little lamb". The children wrote the sentence for two minutes as well and as fast as they could. The test on Oct. 10 was on the sentence, "A quick brown fox jumps over the lazy dog". It was written under the same instructions.

The method of analysis was as follows:

The test papers were gone thru and the middle sentence starred on each paper. The letter to be studied was taken from this middle sentence. An earlier general analysis had indicated some of the letters that needed study because it was found that the class had difficulty

in making them. Therefore, the letter to be taught first was analyzed first. First, the October ninth papers were gone thru and the letter studied to find some of the outstanding errors in form. These errors were made in table form as a tentative table of errors. Names of parts were decided on as the first general analysis was made. With the tentative table on paper the work of closer analysis and tabulation was begun. Other errors were added as closer analysis revealed them. The standard of reference was the perfected form found in Walker's Manual of Penmanship No. 2.

In judging the correctness of the elements in question in a letter, if any element in the letter does not correspond exactly to the standard in the Manual, it is counted an error. An element was either an error or not. Exact measurement was not used. The method of judgment was by looking at the two elements and more or less closely comparing them in this way. Exact measurement was not deemed feasible in this preliminary study of the errors, and for the further reason that a teacher would not have the time to devote to such close analysis.









The following tables give the result of the analysis of the error in the letter forms. There were about forty pupils who wrote in the test.

All the tables are read in the same manner as Table XII which is read as follows: The error in the first down

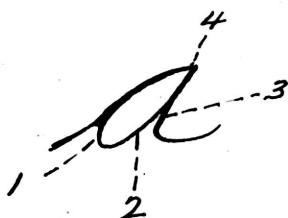
stroke, which is as illustrated, was made by three pupils on October ninth, the total errors for the first down stroke were twenty three.

T A B L E X I I

Errors of Small Letter "a"

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
First down stroke looped		23
Second up stroke too high		4
Second up stroke too straight		2
Second up stroke too low		1
Second down stroke looped		3
Second down stroke too high		2
Top open		12
Top too narrow		2

Name of Parts

















1. First down stroke
2. Second up stroke
3. Second down stroke
4. Top

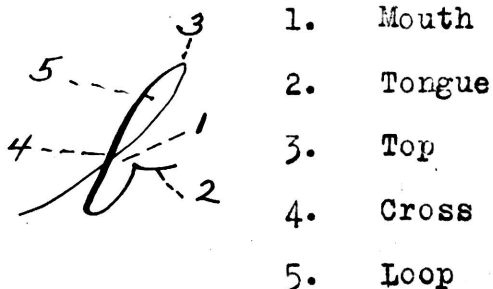
The commonest errors that the pupils of the sixth grade, Lee School, Columbia, Mo., made on October ninth were "Looped first down stroke" and "open top".

T A B L E X I I I

Errors of Small Letter "b"

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Cross too high		5
Cross too low		17
Loop too wide		13
Loop too narrow		14
Mouth too wide		24
Mouth too narrow		5
Mouth closed		10
Tongue looped		2
Tongue too high		3
Tongue too low		7
Tongue too long		15
Tongue too short		5
Top round		6
Top pointed		17

Name of Parts



The commonest error is "mouth too wide" with twenty four pupils making this error. "Top pointed" and "cross too low" are the next two in rank.

T A B L E X I V

Errors of Small Letter "d"

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Loop too wide		10
Loop open		7
Stem of loop too high		7
Oval too small		3
Oval open at top		9
"d" like <u>cl</u>		5
Up stroke thru oval		21
Up stroke over oval		2
Ending too short		12
Ending too long		6
Superfluous initial stroke		1

Names of Parts














1. Up stroke
2. Oval
3. Stem or loop
4. Ending

The commonest error that the sixth grade made in the letter "d" is the "upstroke thru the oval". The two next greatest errors are the "ending too short" and the "loop too large" in the cases of the use of the loop in making the letter.

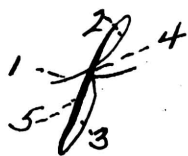
T A B L E X V

Errors of Small Letter "f"

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Upper loop too wide		6
Upper loop too narrow		14
Upper loop too long		7
Upper loop too short		1
Upper loop too closed		7
Upper loop absent		1
Lower loop too wide		6
Lower loop too narrow		12
Lower loop closed		7

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Lower loop pointed		14
Lower loop too long		4
Lower loop too short		16
Mouth looped		2
Mouth open		6
Mouth above line		21
Mouth below line		1
Mouth left of back		13
Back curved		13
Beginning too short		5
Extreme slant to right		29

Name of Parts

















1. Beginning
2. Upper loop
3. Lower loop
4. Mouth
5. Back

The commonest error of the small letter "f" is the extreme slant to the right by the upper loop and to the left by the lower loop. Next lower in order is the opening of the mouth above the line. The following errors are common enough to need mentioning: "lower loop too short", "lower loop too pointed", "lower loop too narrow", "upper loop

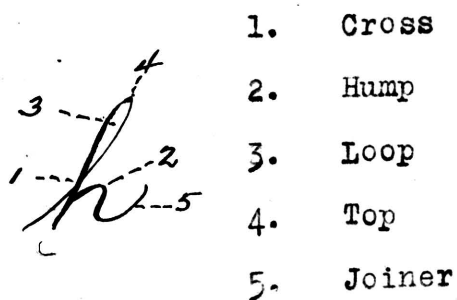
too narrow", "mouth left of back", and "back curved".

T A B L E X V I

Errors of Small Letter "h"

<u>Name of Error</u>	<u>Illust. of Errors</u>	<u>No. Cases</u>
Cross too high		14
Cross too low		4
Loop too large		13
Loop too small		13
Hump too high		4
Hump too low		8
Hump too wide		9
Hump narrow or pointed		21
Top too round		25
Top pointed		10
Joiner absent		2
Joiner too wide		10
Joiner too high		4
Joiner too low		2

















Name of parts



The commonest error is the "narrow or pointed hump". The next ones in order are: "top too round", "cross too high", "loop too large", and the "loop too small". The other errors are of less frequency.

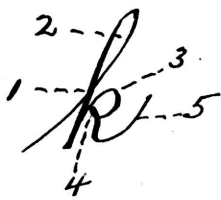
T A B L E X V I I

Errors of Small Letter "k"

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Cross too high		8
Cross too low		22
Loop too large		14
Loop too small		18
Hump too high		12
Hump too low		12
Hump too wide		8
Hump too narrow		20
Tie looped		11
Tie too small		9
Tie too large		11
Tie too high		6
Tie too low		26
Joiner too high		3
Joiner too low		25
Joiner too long		2

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Joiner too short	<i>h</i>	23
Looped at beginning of hump	<i>h</i>	4

Names of Parts








- 
1. Cross
 2. Loop
 3. Hump
 4. Tie
 5. Joiner

A study of the table will locate the commonest errors. Arranged in descending order, they are "tie too low", "joiner too low", "joiner too short", "cross too low", "hump too narrow", and "loop too small". Other errors have less frequency.

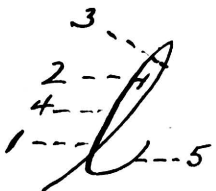
T A B L E X V I I I

Error of Small Letter "l"

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Cross too high	<i>l</i>	5
Cross too low	<i>l</i>	25
Loop too wide	<i>l</i>	14
Loop too narrow	<i>l</i>	10
First up stroke too straight	<i>l</i>	19

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
First up stroke too curved		8
Down stroke too straight		8
Down stroke too curved		18
Joiner too narrow		13
Joiner too wide		11
Irregular line first up stroke		8
Irregular line first down stroke		7


Name of Parts









- 
1. Cross
 2. Loop
 3. First up stroke
 4. Down stroke
 5. Joiner

The commonest errors in the small letter l as written by the sixth grade pupils in the October ninth test are: "cross too low", "up stroke too straight", and "down stroke too curved". The other errors occurred with less frequency.


T A B L E X I X

Error in Small Letter "m"

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Looped parts		1

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Too wide		21
Parts sharp at top		19
Last stroke out of slant		11
Parts both round and sharp		5
Uneven height of parts		10
Higher towards end		10
Lower towards end		1
Last stroke sharp		22



Name of Parts

















	1, 1, 1. Top
	2. Last stroke
	3, 3, 3. Parts

The commonest errors that the pupils made in the small letter m are: "last stroke sharp", "parts sharp at top", and "parts too wide".

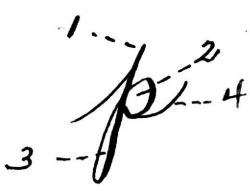
T A B L E X X

Errors in Small Letter "p"

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Upper stem open		2
Upper stem rounded, looped		1

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No.</u>	<u>Cases</u>
Upper stem looped		8	
Upper stem too high		3	
Upper stem too short		19	
Loop too wide		4	
Loop too long		4	
Loop too short		10	
Loop too narrow		7	
Loop pointed		6	
Oval too large		7	
Oval too small		11	
Oval open		23	
Oval, ending stroke thru		13	
Oval pointed at top		10	
Extreme slant		21	
Vertical slant		2	
Small "p" like <u>js</u>		10	

Name of Parts








- 
1. Upper stem
 2. Oval
 3. Loop
 4. Ending stroke

The small letter p has the following commonest errors in the sixth grade handwriting in the Lee school: "extreme


slant", "oval open", "upper stem too short", and "ending stroke thru the oval".

T A B L E X X I

Errors of Small Letter "r"

<u>Name of Error</u>	<u>Illust. of Errors</u>	<u>No. Cases</u>
Top square		10
Top rounded		10
Top unformed		7
Top too narrow		3
Top stroke curved too much		1
Top stroke in vertical position		2
<u>r</u> made like small <u>s</u>		2


Name of Parts









	1. Top
	2. Top stroke

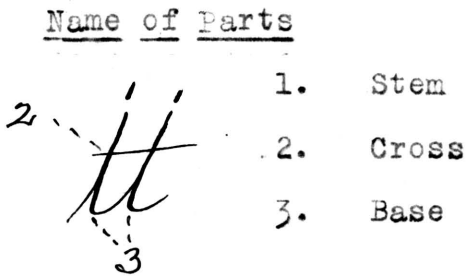
The commonest errors of the small letter r are: "square top", "round top", and "unformed top".

T A B L E X X I I

Errors in the Small Letters "tt" in the Word Little

<u>Name of Error</u>	<u>Illust. of Errors</u>	<u>No. Cases</u>
Stem looped		17

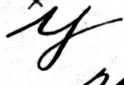

<u>Name of Error</u>	<u>Illust. of Errors</u>	<u>No. Cases</u>
Stem open		10
Stem too tall		14
Stem too short		5
Cross too long		1
Cross sloped downward at right		24
Cross too high		15
Cross too low		22
Angular at base		7













The commonest errors are: the "cross sloping downward", "stem looped", "cross too high", and "stem too tall".

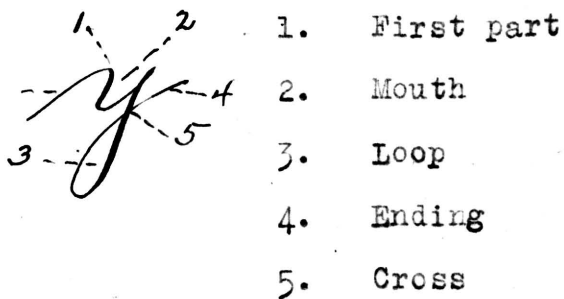
T A B L E X X I I I

Errors in Small Letter "y"

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
First part sharp		31
Loop too large		18

<u>Name of Error</u>	<u>Illust. of Error</u>	<u>No. Cases</u>
Loop too long		11
Loop too small		7
Loop slants under to left too far		19
Loop slants under to right too far		2
Cross too low		26
Cross too high		4
Ending too long		7
Ending too short		16
Mouth too wide		15
Mouth too narrow		2

Name of Parts



The commonest errors are: "first part sharp", "cross too low", "loop too large", and "loop slanting under to the left too far".

CHAPTER VII

AUXILIARY PROBLEMS

Introductory Statement

In the study that was conducted, five auxiliary problems arose that needed tentative answers for teaching purposes. These problems were: (1) the effect of different instructions on speed; (2) the variation from day to day in speed; (3) a comparison of the St. Louis Scale and the Thorndike scale; (4) the derivation of a sixth grade scale; and (5) a determining of the frequency of the occurrence of the letters of the alphabet.

1. Effect of Different
Instructions on Speed

As the diagnosis and teaching of handwriting progressed, it became evident that certain problems remained unsolved. When the standing of the sixth grade was to be determined, the question of standards

arose. In the search for standard speed in letters a minute and quality of handwriting, it was found that various investigators in deriving their standards gave different instructions. For example, Starch¹ tells the pupils to write as well and rapidly as they can in the handwriting tests. Melcher² in his study of the handwriting of the children in the Kansas City schools gives these directions: Write as well as you can at your usual speed.

In the Cleveland survey³ the children were told to "write as much as possible in two minutes". The chief difficulty is that the results found by one set of instructions are compared to the results found by another set of instructions.

In order to find out what would be the effect upon speed of giving different instructions to pupils, a study was made of the effect of different instructions given to pupils. The study was made in the Columbia, Missouri Elementary Schools. The tests were given to about 680 pupils in the third, fourth, fifth, sixth, and seventh grades. The tabulation of the data was

-
1. Starch, D.: "Educational Measurements",
 2. ^{p.} Bulletin No. 1 of the Bureau of Research and Efficiency, p. 34.
 3. Judd, C. H.: "Measuring the Work of the Public Schools, p. 61.

done by a class in Statistical Studies in Theory of Teaching.

The following instructions were sent to the elementary teachers and the tests were given by them:

"Handwriting Studies

Effect of Different Instructions to Pupils

The purpose of this study is to determine the effect of different instructions given to pupils on the quality and speed of their handwriting. We want to determine how much reliance can be placed on grade averages found in various surveys and tests. Give tests in third, fourth, fifth, sixth, and seventh grades.

The tests outlined should be given one day apart.

After each day's test have the pupils write their name, age, grade, date, and school on the back of their papers. Use the regular penmanship paper.

First Day: (1) Read over twice to your pupils the following instructions:

"You are to begin writing at the instant that I say 'Start' and write the sentence repeatedly until I say 'Stop'. You must quit writing the instant that I say 'Stop' even if you are in the act of making a letter.

"You are to write as well as you can and as rapidly as you can."

(2) Tell them they are to write the sentence: "Mary had a little lamb." One sentence to a line.

(3) When the second hand of your watch

gets to 55 seconds, tell the pupils to get ready. At 60 seconds say 'Start'. See that they write exactly two minutes.

Second Day: The second day, that is, two days after the first test, give exactly the same instructions with one exception. The exception is in the last paragraph of the instructions that you read twice to the pupils. This paragraph should read:

"You are to write as well as you can at your usual speed".

The children should not know about each day's test until the day and hour arrives for it.

The papers should be tied in separate bundles for ^{each} grade and the grade, school, and the date written on the outside. The bundles from each school should be tied together. The papers should be sent to the supervisor's office the day that they are written.

The results of the tests may be seen by a study of the table of data that follows:

T A B L E X X I V

Effect of Different
Instructions on Speed

	:No. Pupils:		: Av. Speed :		Var. in Number/ Letters:
	I	II	I	II	
:Grade III:					
:Grant	: 39	: 37	: 46.9	: 50.8	: 3.9
:Jefferson:	: 28	: 28	: 49.8	: 48.2	: 1.6
:Jefferson:	: 18	: 19	: 55.5	: 52.5	: 3.0
:Benton	: 30	: 32	: 40.0	: 49.9	: 9.9
:Lee	: 13	: 14	: 51.8	: 46.5	: 5.3
:Grade IV :					
:Grant	: 43	: 42	: 73.7	: 62.0	: 11.7
:Jefferson:	: 19	: 19	: 63.0	: 55.9	: 7.1
:Jefferson:	: 33	: 32	: 59.8	: 46.9	: 2.9
:Benton	: 38	: 37	: 71.8	: 72.1	: 0.21
:Lee	: 28	: 28	: 59.5	: 63.8	: 4.22
:Grade V					
:Grant	: 39	: 39	: 72.7	: 76.1	: 3.4
:Jefferson:	: 32	: 44	: 72.4	: 73.1	: 0.7
:Benton	: 33	: 36	: 65.8	: 67.0	: 1.17
:Lee	: 30	: 27	: 44.4	: 38.8	: 5.62
:Grade VI :					
:Grant	: 36	: 36	: 95.5	: 83.2	: 12.3
:Jefferson:	: 42	: 36	: 89.4	: 76.2	: 13.2
:Benton	: 38	: 40	: 75.8	: 70.9	: 4.93
:Lee	: 37	: 37	: 74.3	: 71.1	: 3.2
:Grade VII:					
: In	: 28	: 27	: 91.3	: 80.1	: 11.2
: High	: 27	: 29	: 69.0	: 81.6	: 12.6
: School	: 43	: 40	: 94.3	: 73.8	: 20.5
: Lee	: 39	: 40	: 76.1	: 74.4	: 1.7

The table should be read as follows: In the third

grade in the Grant school 39 pupils took the first test and 37 took the second test. They wrote on an average for the grade 46.9 letters a minute for two minutes in the first test and 50.8 letters a minute for two minutes in the second test. The variation in number of letters a minute for the grade was 3.9 plus, using the number of letters written a minute in the first test as a basis. In the case of the Jefferson school, third and fourth grades, there were a and b sections for these grades.

Observations

1. A study of the plus and minus variations will show that there are 14 minus variations and 8 plus variations. This means that in the second test 14 of the grade averages were lower than in the first test and that 8 grades gained over their averages in the first test. It should be recalled that the first test called for as well and as fast, while the second test called for as well and at usual speed.

2. The data shows a wide variation in number of letters written in a minute. The extremes are 0.21 plus and 20.5 minus letters a minute. This raises the

question of grade standards. Starch¹ gives the following grade standards in speed:

T A B L E X X V

Grade	I	II	III	IV	V	VI	VII	VIII
Speed	20	31	38	47	57	65	75	83

A simple calculation on the basis of this table will give the following table:

T A B L E X X V I

Grade	I	II	III	IV	V	VI	VII	VIII
Speed	20	31	38	47	57	65	75	83
DIFF. in		11	7	9	10	8	10	8
Letters								

This table should be read as follows: The second grade standard is 11 letters a minute more than the first grade standard; the third grade seven more than the second; etc.

The difference between the grade standards from the

1. Starch: "Educational Measurements", p. 83.

third grade up ranges from 7 to 10 letters a minute. Looking again at Table XXIV, one sees that in six cases the variation in the number of letters a minute is more than one grade. For example in the Grant School, sixth grade, the first test average is 95.5 letters a minute, while in the second test the grade average is 83.2 letters a minute -- a difference of 12.3 letters.

3. The average deviation for all of the grades tested is 6.4 letters a minute which is close to the variation from grade to grade. Not only close to the variation from grade to grade, but an average deviation of 6.4 letters would place a score in a grade above or in a grade below according to the laws of chance.

4. The widest variations are found in the sixth and seventh grades, with one exception and that is in the Grant School, fourth grade.

5. The foregoing paragraphs are based on the averages obtained by not excluding the records of the pupils who were absent from one of the tests.

This question should be answered: What effect on the averages and conclusions will be made if the records of these pupils are not included in the data from which the averages are calculated? To answer this question Table XXVII was prepared.

T A B L E X X V I I

Based on Only the Pupils
Who Took Both Tests

Grade III	No. Pupils	Av. Speed		Var. in Number Letters
		I	II	
Grant	37	46.6	50.8	4.2
Jefferson	27	49.9	48.3	1.6
Jefferson	16	56.1	54.3	1.8
Benton	29	40.8	56.6	15.8
Lee	13	51.8	46.6	5.2
Grade IV				
Grant	41	75.1	62.5	12.6
Jefferson	35	59.0	59.6	0.6
Jefferson	32	57.4	56.9	0.5
Benton	37	69.5	72.1	2.6
Lee	27	59.7	65.0	5.3
Grade V				
Grant	37	76.5	77.5	1.0
Jefferson	32	72.4	73.7	1.3
Benton	32	65.4	68.1	2.7
Lee	27	44.5	38.8	5.7
Grade VI				
Grant	36	95.5	83.2	12.3
Jefferson	35	87.2	76.4	10.8
Benton	38	75.8	69.8	6.0
Lee	37	74.3	71.1	3.2
Grade VII				
In	24	91.0	81.5	9.5
High	25	70.6	89.6	19.0
School	40	94.0	73.8	20.2
Lee	39	76.1	74.2	1.9

This table should be read in the same manner as

Table XXIV.

The average deviation as calculated from Table XXIV is 6.4 letters, while for Table XXVII it is 6.5 letters. For Table XXIV there were 14 minus cases and 8 plus cases, while for Table XXVII there are 13 minus cases and 9 plus cases.

Therefore, in these two respects the two tables give practically the same results.

Conclusions

1. This study of the effect of different instructions on speed must be evaluated in the light of the results found in the study of the variation from day to day in speed.

In the first place, the variation in the two studies are practically the same, as far as the unreliability of defining the status of a grade by one test is indicated by these studies. These conclusions are tentative and need further investigation to confirm or deny the results.

2. However, the data secured in the study of the effect of different instructions shows a slight tendency toward a lower grade average in the test that called for the pupils to write as well and at their natural speed.

To be sure the results of the study on variation from day to day in speed might negate these results. Chance variation might overcome the downward tendency indicated. Here further investigation is needed to clear up the effects of chance variation.

Therefore, in order that the chance for change of averages with a change of instructions might be offset, the same instructions were given in the series of monthly tests given to the class under investigation.

3. Further, this study shows the greatest variations in the sixth and seventh grades. This is a question of some pedagogical importance and needs further investigation.

4. This study applies only to speed, but it raises the question of quality which can be settled only when more delicate scales are devised so that small differences can be detected and measured.

2. Variation From Day to Day in Speed

PROBLEM:- To determine the amount children vary from day to day in speed of handwriting.

The problem of determining the progress of the pupils in the sixth grade by the use of scales and standards raised the question of the reliability of

defining their status in speed at any one time by a single test. Therefore, a city-wide series of tests in handwriting was conducted in the elementary schools of Columbia, Missouri. The tests were given in the third, fourth, fifth, sixth, and seventh grades. There is no eighth grade in the system. The city teachers gave the tests and a class in Statistical Studies in the Theory of Teaching tabulated the data.

The following instructions were sent to the grade teachers:

"The purpose of this study is to find out how much children vary from day to day in their penmanship in speed and quality. To make a study of this problem, we shall use on three consecutive days the sentence: "Mary had a little lamb." The sentence shall be written for exactly two minutes on each day.

"Before beginning to write the sentence, have the pupils write on their papers at the top, their name, age, grade and date.

"Read over twice to your pupils the following directions:

"You are to begin writing at the instant that I say 'Start' and write repeatedly until I say 'Stop'. You must quit writing the instant that I say 'Stop' even tho you are making a letter. You are to write as well as you can and as fast as you can the sentence, 'Mary had a little lamb.'

"When the second hand of your watch gets to 55 seconds, tell the pupils to get ready. At 60 seconds say 'Start'. See that they write exactly two minutes.

"Give the test at the beginning of the writing period. Turn the papers over and give practice work on the back."

After the data was collected, it was not found desirable to measure the variation from day to day in quality of handwriting, so the study is confined to speed.

The data should be fairly reliable in showing the trend since there were about 728 pupils who took the tests.

The results of the tests are shown in the following table of data:

T A B L E X X V I I I

Variation from Day to Day in Speed

Grade	No. Pupils			Av. Speed			Variation Between			Gr. Var.
	I	II	III	I	II	III	I-II	II-III	I-III	
Grade III:										
Grant	37	39	38	42.9	45.9	50.1	2.8	4.4	7.2	7.2
Jefferson	30	27	26	39.8	45.6	48.9	5.8	3.3	9.1	9.1
Jefferson	16	18	17	43.8	31.5	31.4	12.3	0.1	12.4	12.4
Benton	35	36	36	48.5	57.9	47.3	9.4	10.6	1.2	10.6
Lee	15	15	14	37.6	49.2	45.3	11.6	3.9	7.7	11.6
Grade IV										
Grant	42	42	40	49.1	69.4	61.3	20.3	8.1	12.2	20.3
Jefferson	20	17	16	56.2	33.6	34.9	22.6	1.3	21.3	22.6
Jefferson	34	31	33	64.2	59.6	65.5	4.6	5.9	1.2	4.6
Benton	38	38	36	63.7	71.2	73.5	7.5	2.3	9.8	9.8
Lee	30	29	30	51.2	56.7	56.7	5.5	0.0	5.5	5.5
Grade V										
Grant	39	40	38	60.1	66.0	76.2	5.9	10.2	16.1	16.1
Jefferson	41	41	42	69.2	77.3	76.3	8.1	1.0	7.1	8.1
Benton	32	35	33	56.1	72.6	68.0	16.5	4.6	11.9	16.5
Lee	29	30	30	42.4	44.0	43.1	1.6	0.9	0.7	1.6
Grade VI										
Grant	36	36	33	80.1	86.1	85.0	6.0	1.1	4.9	6.0
Jefferson	39	42	39	83.0	85.3	80.1	2.3	5.2	2.9	5.2
Benton	40	36	38	69.5	71.6	79.8	2.1	8.2	10.3	10.3
Lee	41	41	41	78.4	84.2	80.6	5.8	3.6	2.2	5.8
Grade VII:										
In	29	29	28	82.5	95.6	95.4	13.1	0.2	12.9	13.1
High	23	27	26	74.6	80.4	80.1	5.8	0.3	5.5	5.8
School	42	39	38	85.2	74.0	89.5	11.2	15.5	4.3	15.5
Lee	40	39	40	91.2	83.7	75.8	7.5	7.9	15.4	15.4

The table should be read in this manner: The Grant school in the third grade had 37 pupils taking

the first test, 39 the second, and 38 the third; the average speed in letters a minute in the first test is 42.9, in the second test 45.7 and in the third test 50.1; the variation in the number of letters written a minute in the first and second tests is plus 2.8 letters -- the basis being the first test; the variation between the second and third tests is plus 4.4 letters -- the second test being the basis; the variation between the first and third is plus 7.2 letters -- the first being the basis; and the greatest variation is 7.2 letters.

Observations

1. The first observation is that there is a wide variation between the number of letters written in two minutes on the three days. In two cases the variation is as wide as, or more than, two grade steps in speed. These cases are the Grant school, fourth grade with a variation of 20.3 letters, and the Jefferson school, fourth grade with a variation of 22.6 letters.

The following table of grade-speed standards forms the basis of the above judgment:

T A B L E X X I X

Grade-Speed Standards

Grade	1	2	3	4	5	6	7	8
Speed	20	31	38	47	57	65	75	83
Step		11	7	9	10	8	10	8

The steps were calculated, but the grade-speed standards were taken from Starch.¹

The table should be read in the following manner: The standard for the second grade is 31 letters a minute, with an increase of 11 letters a minute over the first grade. The step between the first and second grades is, therefore, 11 letters. Each column is read in a similar way. The steps from the third grade up are between 7 and 10 letters a minute.

Looking over the widest variations in Table XXVIII again, it will be seen that there are eleven grades that show a variation of a grade or more in number of letters written a minute.

2. The plus and minus variations show some

1. Starch: "Educational Measurements", p. 83.

interesting data. For example, the variations between the first and second tests contain seventeen plus and five minus variations. This means a gain in speed of the second test over the first in seventeen grades and a loss in five grades. The variations between the second and third tests give eight pluses and thirteen minuses, with one grade giving the same score in both tests. There are seventeen plus and five minus variations between the first and third tests. Therefore, the chances are about three to one that the class will reach a higher standing in a second test, while the chances are more nearly even that the class will reach a higher or a lower score if a third test is given. That is, the pupils have more nearly reached their speed ability in the second or third tests.

3. The average deviations between the speeds in the different tests give added weight to the tentative conclusion drawn in the preceding paragraph. The average deviation for the widest variations is 10.6 letters; the average between the first and second tests is 8.6 letters; between the second and third tests, 4.6 letters; and between the first and third tests, 8.2 letters. Thus the least average deviation is between the second and third tests.

4. The median deviations are as follows: The widest variations have a median deviation of 10.3 to

10.6 letters; the median deviation between tests 1 and 2 is 7.5 letters; between tests 2 and 3 the median deviation lies between 3.6 and 3.9, and the median deviation between tests 1 and 3 lies within the limits 7.7 and 9.1.

Conclusions

1. The data shows that the second or third tests more nearly defines the status of a grade in speed. This indicates that more than one test should be given to obtain reliable figures.
2. After the first test, the effects of learning are slight -- the data shows a slight negative effect. The teacher could obtain a higher standing in speed for her class by giving two tests and turning in the second set of results.
3. After the first test the grade will score within the limits of the grade standards if the median deviation is used, except in the third grade. If the average deviation is used the grade will score within the grade standards provided it is the fifth and seventh grades, but doubt exists for the fourth grade.
4. Individual grades show erratic scores. Therefore, the conclusions above refer only to a school system.
5. The data on the speed raises the question of

the reliability of the scores in quality. However, more accurate scales of quality are needed to study this phase of penmanship.

The foregoing conclusions do not take into account the fact that a few pupils were absent during some of the tests. Were these pupils the ones who caused the averages to vary so much? The answer to this may be solved tentatively by finding the averages for each grade when these pupils are omitted. To state the proposition positively: Find the averages from the scores made by the pupils who were present during all three tests. Table ~~XXX~~ gives the results by this method. The table should be read in the same manner as Table XXVIII.

This table needs no special comment.

The conclusions were based on the A. D.'s and M. D.'s of Table XXVIII. The conclusions will be further tested out by comparing the A. D.'s and M. D.-- Tables XXVIII and XXX.

Table XXXI makes the comparison of the A. D.'s and M. D.'s easy:

T A B L E X X X I

Comparison of A. D.'s and M. D.'s of
Table XXVIII and Table XXX

A. D.	I-II	II-III	I-III	Gr. Var.
I	8.6	4.5	8.2	10.6
III	7.5	5.8	8.0	10.6
M. D.	I-II	II-III	I-III	Gr. Var.
I	7.5	3.6	7.7	10.3
		3.9	9.1	10.6
III	5.8	4.6	6.5	10.3
	6.4	5.7	10.1	

The table should be read as follows: The average deviation (A.D.) between Test I and Test II in Table XVIII is 8.6 letters; between Test II and Test III in

Table XVIII is 4.5; between Test I and Test III is 8.2 and the A.D. of the greatest variation is 10.6 letters; while the corresponding data from Table XXX is 7.5, 5.8, 8.0 and 10.6 letters. The median deviation between Test I and Test II in Table XXVIII is 7.5 letters while in Table XXX it is between 5.8 and 6.4 letters, etc.

A study of Table XXXI shows in general that no material change in the A.D.'s and M.D.'s is made by counting out the pupils who did not take all three of the tests. The A.D. of the greatest variation between any two tests are exactly the same in Table XVIII and Table XXX. The M.D.'s in both cases are practically the same. The same may be said of the A. D. between the first and third tests in Table XVIII and Table XXX. For these two tests the M.D.'s are widened, but not enough to change the conclusions.

Therefore, the tentative conclusions should stand as stated.

3. Comparison of St. Louis and Thorndike Scales

Problem

The problem of this study is to procure an estimate of the quality of the St. Louis Principals' Scale for

Measuring Handwriting in terms of the Thorndike Scale of Handwriting.

An estimate of the samples of the St. Louis Principals' Scale in terms of the qualities on the Thorndike Scale was desired for the following reasons:

1. The St. Louis Principals' Scale was composed of samples of handwriting written by children who use the Walker System -- the same system in use in the schools of Columbia, Missouri.
2. Norms of grade performance were not available in terms of the St. Louis Scale without the comparison of the two scales. When the comparison was made, norms of performance could be located on the St. Louis Scale.

These considerations led to the problem of estimating the St. Louis Scale in terms of the Thorndike Scale.

Method of Procedure

The samples of the St. Louis Scale were cut apart and pasted on cards. The numbering system used on the scale was cut from each sample and another method of identification of the sample was devised. In the

numbering of the samples they were arranged at random so far as the qualities were concerned, with the exception of the best sample which was placed near the middle of the numbering scheme. Four packages were prepared, each containing a Thorndike Scale, the St. Louis samples and a set of instructions on the method of grading.

The following is the set of instructions:

- I. Grade the samples on the cards by the ascending-descending method on the Thorndike Scale.
- II. Grade in whole numbers.
- III. Do not consult with anyone about the value of the card-samples.
- IV. Sign your name to your work and hand in immediately to Room 120 Academic Hall.

The grading was done by 69 members of the School of Education of the University of Missouri. They were, in a great majority, juniors and seniors. A few were graduate students. A great many, perhaps a majority, have been teachers.

Table XXXII which follows gives the distribution of the gradings.

T A B L E X X X I I

Distribution of Gradings.

Qualities on the Thorndike Scale

St. Louis:	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	No. of
Scale	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	Judgments
Model	:	:	:	:	:	:	:	:	:	:	:	5	25	7	31	68
1	:	:	:	:	:	:	:	5	3	8	8	19	18	5	1	67
2	:	:	:	:	:	:	:	3	4	11	13	14	20	2	1	68
3	:	:	:	:	:	:	:	3	12	16	20	8	9	:	:	68
4	:	:	:	:	1	:	2	24	10	5	9	9	8	:	:	68
5	:	:	:	:	:	5	5	32	13	8	4	:	1	:	:	68
6	:	:	:	:	1	8	7	30	12	7	3	:	1	:	:	69
7	:	:	:	4	19	26	8	9	:	1	1	:	:	:	:	68
8	:	:	:	4	31	15	3	13	1	:	:	:	1	:	:	68
9	1	3	32	20	9	3	:	:	:	:	:	:	:	:	:	68
10	7	46	14	1	:	:	:	:	:	:	:	:	:	:	:	68

The table should be read thus: The sample on the St. Louis Scale called Model was rated as quality 15 on the Thorndike Scale by five of the judges, as quality 16 by twenty-five judges, as quality 17 by seven judges and as quality 18 by thirty-one of the judges. There were sixty-eight who judged the sample.

Table XXXIII which follows given the crude modal and median qualities on the Thorndike Scale for each of the St. Louis Scale samples.

T A B L E X X X I I I

Comparison of Qualities

St. Louis Scale	Thorndike Scale		
Model	Crude Mode	Median	Step
Model	18	16.23	1½
1	15	15.03	½
2	16	14.60	1
3	14	13.60	1¼
4	11	11.72	1½
5	11	11.21	1/10
6	11	11.11	2¼
7	9	8.83	½
8	8	8.38	2
9	6	6.38	1
10	5	5.30	

The table should be read as follows: The sample called Model on the St. Louis Scale measured a crude modal quality of 18 on the Thorndike Scale, and a median quality of 16.63 on the Thorndike Scale. There is a step of 1½ Thorndike qualities between the median Thorndike value of the St. Louis sample called Model and Sample 1 on the same scale.

Perhaps the median is the better measure of evaluation of the two scales. A study of the Thorndike steps between the successive qualities of the St. Louis Scale will show that they are not equal, in so far as the data of this problem is reliable. Running over the

data of Table XXXIII, one will see that the steps range from $1/10$ to $2 \frac{1}{4}$ Thorndike qualities on the basis of the median qualities. However, the St. Louis Scale shows a rise in quality from the lowest to the highest.

Around some of the qualities the distribution is narrow, e.g. Sample 10 and Model. Other samples show a wide distribution in the judgment of their value.

Conclusions

1. The Thorndike Scale is constructed on the theory that there should be equal steps between the successive qualities. That is, quality 9 is as much better than quality 8 as quality 13 is better than quality 12, etc.¹

The St. Louis Scale is constructed on the same principle as the Thorndike Scale in regard to equal steps between the successive qualities.²

This study shows wide variation in the steps between the samples of the St. Louis Scale when they are measured in terms of the Thorndike Scale by inexperienced graders. The range is from $1/10$ to $2 \frac{1}{4}$ Thorndike steps when the median judgment is used. See Table XXXIII.

The data of this study indicate that there is some-

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1. Thorndike in Teachers College Record, March, 1910.
 2. Elementary School Journal, Feb. 1916, pp. 308-10-11-12.

thing wrong in at least one of four places -- the Thorndike Scale, the St. Louis Scale, the method of grading or the reliability of the judgment of the graders who did the grading of these samples. More study and experimentation is needed to define the difficulty and solve it.

2. The St. Louis Scale is of some use as a teaching device because it is based on one system of handwriting. The weakness, in the light of this study, seems to be that there are no samples near the average of the fifth, sixth, seventh and eighth grades. These grade averages are respectively 9.3, 9.8, 10.4, and 10.9 in Thorndike qualities.

3. The preceding tentative results caused the writer to lay aside the St. Louis Principals' Scale for the present. Further investigation is needed to clear up the case.

4. Derivation of

Sixth Grade Scale

Problem

To derive a scale and teaching device for the

sixth grade.

As a scale and teaching device, the Thorndike Handwriting Scale did not answer the purposes of the writer in his teaching of handwriting in the sixth grade. The reasons were pointed out under the caption, Comparison of St. Louis and Thorndike Scales. They will not be restated here. In the same study the writer concluded that the St. Louis Principals' Scale did not suit his purposes for the reasons there stated.

Sixth Grade Scale

Materials.

The samples that make up the scale were taken from a set of 119 samples of handwriting which was written on February 26, 1917 by the sixth grade pupils in the Horace Mann School, St. Louis, Missouri.

The following set of instructions was sent to Principal C. R. Stone:

"Have the sixth grade pupils in your school write the sentence, "A quick brown fox jumps over the lazy dog", as well and as rapidly as they can for exactly two minutes.

"Have all children start writing at the same time and stop immediately when two minutes are up. Have them stop even though they have started to make a letter. Tell them not to finish the letter.

"Have each child fill out on his paper his name, age, and grade".

It is presumed that Principal Stone followed the instructions to the letter because of his experience in deriving handwriting scales and his study of the problems of teaching handwriting.

The samples were taken from the St. Louis pupils' handwriting because they had been trained through the grades in the Walker System of Handwriting -- a medial slant system. The Walker System was chosen for the scale because it is the system in use in the Columbia, Missouri Public Schools.

Method of Grading Samples

When the writer received the samples, he numbered them from 1 to 119 inclusive, no care being taken concerning the distribution of qualities. Samples numbered from one to twenty-three were placed in one package, from twenty-four to seventy-three in another and from

seventy-four to one hundred and nineteen in still another.

The samples were graded according to the following instructions:

1. Grade the samples by the Thorndike Hand-Writing Scale.
2. Use the ascending-descending method.
3. Grade by whole numbers".

The grading was done by a class in Statistical Studies in Theory of Teaching, which was composed of fourteen members. Five of the graders were graduate students in Education and experienced graders by the Thorndike Scale, while the other nine were seniors and graduates, who had received fifty minutes of instruction in the use of the Thorndike Scale. All of the graders were teachers of experience.

Calculations

The calculation of the averages, medians, average deviation from the median, and the speed was done by the same class that did the grading of the samples.

Data

The record sheets that follow give the results of the grading and of the calculation.

RECORD SHEET I

Sam- ple No.	5	6	7	8	9	10	11	12	13	14	15	16	Range	Av.	Median	A.D.	Speed Mi.
1				1	1	1	6	3	1			1	8	12.21	12.25	1.26	77.4
2		1	1	6	3	3							5	9.43	9.42	.99	79.
3			2	9	1	2							4	9.21	9.11	.57	69
4				6	4	4							3	9.86	9.88	.73	66
5			4	6	2	2							4	9.14	9.08	.75	66.5
6		3	5	4	2								4	8.35	8.40	.84	62
7			2	5	4	3							4	9.57	9.63	.86	50
8		1	4	5	4								4	8.86	9.00	.71	66
9		2	7	5									3	8.21	8.29	.58	66
10			2	9	3								3	9.07	9.11	.42	71.5
11			4	4	4	2							4	9.29	9.38	.91	79
12			3	4	3	2	2						5	9.71	9.67	1.14	86
13		1	4	6	3								4	8.79	8.92	.67	87.5
14			3	6	3	2							4	9.29	9.25	.79	84.5
15			2	9	3								3	9.07	9.11	.42	56.5
16		1	1	6	4	2							5	9.36	9.42	.85	52.5
17		1	2	4	5	2							5	9.36	9.60	.93	54
18	1	1	3	7	2								6	7.71	7.88	.74	49.5
19			1	3	5	5							4	10.00	10.20	.77	56.5
20	1	4	6	2	1								5	7.00	6.92	.47	56.
21		1	3	8	2								6	8.86	8.94	.74	57
22			5	3	4	2							4	8.21	8.33	.99	56.5
23		1	1	10	1	1							6	8.07	8.06	.54	66
24					2	5	3	3		1			6	11.79	10.67	1.70	59
25						4	7	1		1	1		6	12.29	12.00	.86	75.5
26			3	5	5		1						6	8.42	8.40	.91	53.5
27				1	4	4	3	2					5	11.06	11.13	.96	66
28			3	4	3	3	1						5	9.64	9.67	1.07	94
29				1	3	3	6						4	11.09	11.20	.80	85.5
30				2	4	1	4	3					5	11.14	11.00	1.29	66
31				2	4	3	4		1				6	10.93	11.00	1.07	79
32		1	5	4		4							5	9.07	8.88	1.09	32.5
33		1	4	2	5	1	1						6	9.29	9.60	1.14	81
34				6	3	3		2					5	10.21	10.00	.73	85.5
35		1	3	5	3	1	1						6	9.21	9.20	.99	84.5
36			2	2	4	3	3						5	10.21	10.38	1.12	99
37		1	2	4	1	6							5	9.64	10.00	1.07	74
38			2	1	6	4	1						5	10.07	10.25	.86	77.5
39			1	3	3	2	3	2					6	10.64	10.75	1.36	77.5
40		1	3	3	3	3	1						6	9.50	9.67	1.22	79
41			3		1	4	5	1					6	10.71	11.38	1.34	66
42		4	3	4	2	1							5	7.50	7.63	1.35	73.5
43			1	1	2	4	5	1					6	11.00	11.38	1.05	66.5
44			1	2	4	7							4	10.21	10.57	.79	49.5

Sam- ple No.	Thorndike Qualities																Range	Av.	Median	A.D.	Speed
	5	6	7	8	9	10	11	12	13	14	15	16									
45				2	2	1	3	3	1	1	1		8	11.07	11.33	1.69		67			
46				2	5	4	5						4	8.57	8.63	.85		49.5			
47				3	4	1	5	1					5	9.78	10.00	1.21		71.5			
48					2	3	7	1	1				5	10.71	10.86	.75		90.5			
49	1	2	2	7	1		1						7	7.64	7.86	.96		69			
50				4	3	1	4	1	1				6	9.85	10.00	1.42		62.5			
51				2	4	6	2						4	9.57	9.75	.78		60.5			
52		2	2	5	4			1					7	8.14	8.20	1.07		58.5			
53			1	3	3	5	2						5	9.29	9.60	1.00		43			
54			1	3	4	3	2	1					6	9.36	9.38	1.20		84.5			
55		1	5	4	2	1	1						7	8.07	7.88	1.08		64.5			
56		1		1	2	1	6	3					7	10.29	10.92	1.17		69			
57			1	2	1	2	3	3	1	1			8	10.59	11.00	1.57		75.5			
58				2	1	6	4	1					6	11.43	11.25	1.21		81			
59				1	2	5	2	3	1				6	10.50	11.40	1.13		69			
60			1	4	6	2		1					6	8.93	8.92	.81		44.5			
61			1	4	2	4	2	1					6	9.36	9.62	1.21		59			
62					2	5	3	3	1				5	10.71	10.67	1.00		66			
63			2	3	3	2	4						5	9.21	9.33	1.26		85.5			
64				3	4	3	3	1					5	9.64	9.67	1.07		86.5			
65		1	2	5	4	1	1						6	8.35	8.40	.96		75.5			
66				3	5	4	4	1					5	9.43	9.40	.91		85			
67				4	6	3		4					5	9.14	9.08	.75		85.5			
68		2	4	6	1		1						6	7.71	7.75	.89		82.5			
69			4	4	5	1							4	8.28	8.38	1.34		64.5			
70				1	7	2	2	2					7	9.29	9.43	.99		77.5			
71			1	3	2	4	3		1				7	9.64	9.68	1.16		69			
72				3	5	2	3		1				6	9.64	9.40	1.12		74.5			
73							2	3	5	2	2		5	12.93	13.00	.93		66.5			
74			3	3	4	2	2						5	8.79	8.88	1.09		69			
75				3	5	1	3	3					5	9.43	9.40	1.39		74.5			
76				1	2	4	5	2					5	10.36	10.60	.93		66			
77						1	5	3	4	1			5	11.93	12.00	.94		66			
78				1		3	3	6	1				6	11.14	11.58	1.00		71.5			
79			5	4	3	2							4	8.14	8.13	.89		55			
80						3	5	2	3	1			5	11.57	11.40	1.06		55			
81				4	4	3	2	1					5	9.43	9.38	1.05		83			
82				1	2	1	5	4	1				6	10.86	11.20	1.06		64			
83				4	5	3	1	1					5	9.29	9.20	.91		61			
84			1	2	3	5	3						5	9.50	9.86	.94		52.5			
85				3	4	1	4	1	1				6	9.85	10.00	1.42		75.5			
86		1	1	4	2	4	1		1				8	9.07	9.25	1.39		83			
87				1	2		2	5	3	1			7	11.50	12.00	1.21		50.5			
88		1	1	4	4	1	1	2					7	9.00	8.88	1.08		52.5			
89			4	2	4	3		1					5	8.71	8.88	1.16		73			

Sam- ple No.	Thorndike Qualities																Range	Av.	Median	A.D.	Speed
	5	6	7	8	9	10	11	12	13	14	15	16					Mi.				
90					3	6	4	1					4	11.21	11.25	.71	71.5				
91			5	7	1		1						5	8.93	8.86	.69	56.5				
92				2	3	6	2	1					5	10.79	10.92	.81	78				
93		1	3	6	1	1	2						6	9.29	9.08	1.00	57				
94		3	6	2	2	1							5	8.42	8.25	.92	72				
95		2	5	6			1						6	8.57	8.58	.85	55				
96			1	4	2	4	2	1					6	10.36	10.63	1.12	52.5				
97				5	2	2	3	2					5	10.64	10.75	1.36	71.5				
98			1	5	3	1	2						6	10.28	10.00	1.28	64.5				
99			2	5	4	1							6	9.86	9.63	1.14	75.5				
100				2		3	6	2	1				6	11.64	11.92	.95	66				
101			1	3	5	3	1	1					6	10.21	10.20	.89	59				
102		3	5	5		1							5	8.35	8.40	.84	66				
103		5	2	5	1		1						6	8.42	8.60	1.14	55				
104		1	5	5	2		1						6	8.85	8.80	.89	73				
105			3	2	4	3	2						5	10.07	10.12	1.10	59				
106		1	6	3		1	3						6	9.21	8.67	1.35	55				
107		1	5	5	2	1							5	8.79	8.80	.81	71				
108		1	7	5			1						6	8.57	8.43	.77	73				
109	2		7	4		1							6	8.21	8.29	.86	58				
110	1	3	5	3	1	1							6	8.21	8.20	.98	82.5				
111		1	6	4	2				1				7	8.86	8.63	.73	66.5				
112	2	6	4	1	1								5	7.50	7.42	.56	57.5				
113	3	4	5	1			1						7	7.57	7.60	.84	58				
114		3	5	3	1	1	1						6	8.64	8.40	1.10	50				
115				2	3	5	4						4	10.93	11.00	.64	59				
116			1	2	5	3	1	2					6	10.50	10.40	1.13	66				
117				3	1	5	3	2					5	11.00	11.20	1.06	75				
118			1	1	1	2	7	2					6	11.36	11.86	.97	75.5				
119		1	2	3	5	2		1					7	9.64	9.80	1.10	64.5				

The data should be read as follows: Sample No. 1 was graded quality 9 by one grader, quality 10 by one grader, quality 11 by one grader, quality 12 by six graders, quality 13 by three graders, quality 14 by one grader, and quality 16 by one grader; the judgments

ranged over eight steps; the average was 12.21; the median was 12.25; the average deviation from the median was 1.26; and the speed in letters a minute was 77.5.

Graph of the Medians

The graph of the medians of the fourteen graders, shown on the following page, presents a close approximation to the normal surface of frequencies. The exception is the piling up of the medians which lie between 11.00 and 11.50. This is probably due to the graders avoiding the use of quality 10.

Method of Selecting the Samples for the Scale

(a) Rearranging the Data. The data on the preceding record sheets were rearranged in order that the samples for the scale might be more easily selected. For example, around quality 7.5 was grouped all samples whose medians fell between 7.25 and 7.74; around quality 8 was grouped all samples whose medians fell between 7.75 and 8.24. In this manner, all the samples were

DEPARTMENT OF ENGINEERING UNIVERSITY OF MO.

Graph of Medians of 14 graders

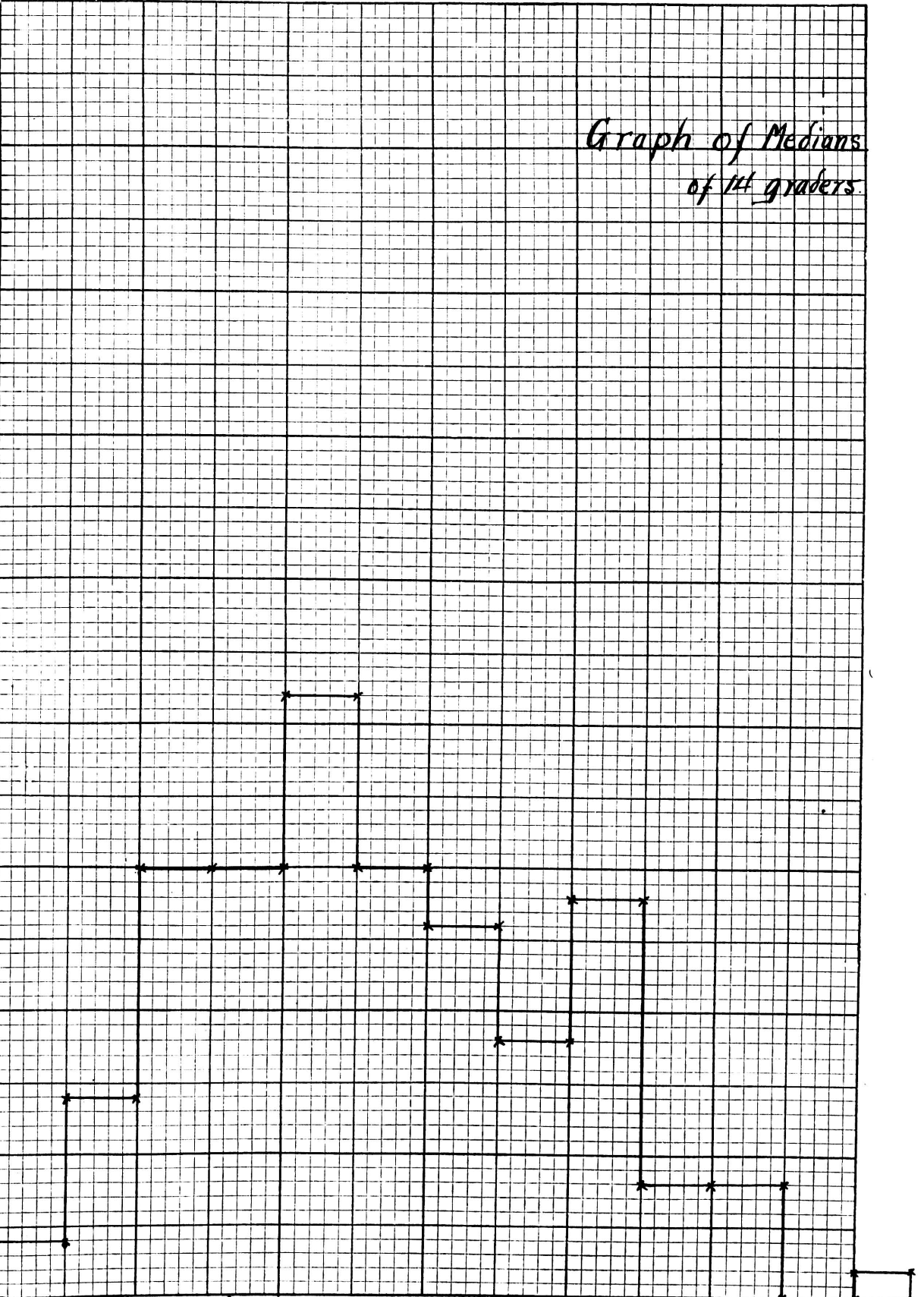
Medians

20
15
10
5

PLATE A - FOR SALE AT THE UNIVERSITY OF OPERATIVE STONE, COLUMBIA, MO.

7.00 7.50 8.00 8.50 9.00 9.50 10.00 10.50 11.00 11.50 12.00 12.50 13.00 13.50
7.50 8.00 8.50 9.00 9.50 10.00 10.50 11.00 11.50 12.00 12.50 13.00 13.50

Thorndike Qualities



rearranged so that they were grouped within their respective half step limits.

(b) Standard Requirements.¹ The standard requirements for the selection of the samples for the scale were formulated. The standards were arranged in their order of importance, as the writer judged their value, in the following manner:

1. The median quality for the sample selected should lie as near as possible to the half step.
2. The sample should show the narrowest range of distribution of judgments.
3. The average deviation from the median should be the smallest possible.
4. The average quality should lie as near as possible to the half step.
5. The speed should be as near as possible to the norm for the grade, i.e. 65 letters a minute.

An illustration of the use of the standard requirements in the selection of one sample will make clear the method pursued. The following table, showing the data for each sample whose median quality fell within the limits of 7.75 and 8.24 was prepared so that the selection of the sample for quality 8 would be made

1. Cf. Ballou: Harvard-Newton Scale.

made comparatively easy.

T A B L E X X X I V

Sam- ple No.	5	6	7	8	9	10	11	12	13	14	Range	Av.	Median	A. D. from Med.	Speed
18	1	1	3	7		2					6	7.71	7.88	.74	49.5
*23		1	1	10	1		1				6	8.07	8.06	.54	66
49	1	2	2	7	1		1				7	7.64	7.86	.96	69
52		2	2	5	4			1			7	8.14	8.20	1.07	58.5
55		1	5	4	2	1		1			7	8.07	7.88	1.08	64.5
68		2	4	6	1		1				6	7.71	7.75	.89	82.5
79			5	4	3	2					4	8.14	8.13	.89	55
110		1	3	5	3	1	1				6	8.21	8.20	.98	82.5

This table is read in the same manner as the record sheets. The starred sample is the one chosen for quality 8.

Sample No. 23 has a median lying nearer to quality 8 than any of the other samples; the range of distribution of grades is 6, which is not the narrowest range but the wide range was caused by one erratic grade; the average deviation from the median is the smallest; the average lies the nearest to 8; and the speed is practically the standard speed for the sixth grade.

Therefore, sample 23 was chosen to represent quality 8 on the sixth grade scale.

In the foregoing manner, the samples were studied and a representative one chosen for each half step.

T A B L E X X X V

Showing samples selected for the
scale and the data pertaining to
each.

Quality	Sam- ple- No.	5	6	7	8	9	10	11	12	13	14	15	16	Range	Av.	Med.	A. D. from Med.	Speed
7.00	20	1	4	6	2	1								5	7.00	6.92	.47	56
7.50	112		2	6	4	1	1							5	7.50	7.42	.56	57.5
8.00	23	1	1	10	1			1						6	8.07	8.06	.54	66
8.50	108		1	7	5				1					6	8.57	8.43	.77	73
9.00	15			2	9	3								3	9.07	9.11	.42	56.5
9.50	16		1	1	6	4	2							5	9.36	9.42	.85	52.5
10.00	4				6	4	4							3	9.86	9.88	.73	66
10.50	44			1	2	4	7							4	10.21	10.57	.79	49.5
11.00	115				2	3	5	4						4	10.93	11.00	.64	59
11.50	78			1		3	3	6	1					6	11.14	11.58	1.00	71.5
12.00	25						4	7	1		1	1		6	12.29	12.00	.86	75.5
12.50	No sample was found that approximated this quality.																	
13.00	73						2	3	5	2	2			5	12.93	13.00	.93	66.5

The table should be read the same way that the record sheet was, with this exception: To represent the half step 7, Sample No. 20 was chosen; to represent the half step 7.50, Sample No. 112 was chosen; etc.

For the half step 12.50, no sample was found that approximated it. This deficiency was probably due to the

limited number of samples graded. The defect could be remedied by collecting more samples, perhaps 200 or 300, from the same grade, or by selecting a limited number of samples of apparently high quality, and grade them in the same manner as the 119 collected in the Horace Mann School.

Scale

When the samples were selected, they were pasted, in ascending order, on a strip of paper. By "ascending order" is meant that the sample chosen for quality 7 was placed at the bottom of the scale, the sample for quality 7.50 next above, and so on for the series.

On each sample was placed its average, median, the range of judgments, and the speed.

At the top of the scale was placed the standard scores in quality and speed for the sixth grade.

Note:- The samples selected for the scale are in the writer's possession. They were kept by the writer because it was not advisable to have copies of them made at this time.

Some Defects in the Scale and Its Derivation

1. The number of samples graded was too small.

2. There were too few cases in the low and the high qualities.
3. The half step, 12.50, was missing.
4. The weighting of the standard requirements was quite arbitrary.
5. The number of graders was small.

Some Advantages

Claimed for the Scale

1. The scale was based on the system of handwriting in use in the grade for which it was derived.
2. There were many samples of handwriting for the grade.
3. The method of derivation was comparatively easy.
4. The scale was based on a standard handwriting scale.
5. The scale was made up of actual specimens of handwriting written by children in the same grade as that for which it was derived.
6. The scale, having the advantages claimed for it, becomes a teaching device, as well as a scale, for the sixth grade.

5. Frequency of the Occurrence
of the Letters of the Alphabet

Problem

The problem of this study is to determine the frequency of the occurrence of the letters of the alphabet.

One of the considerations in deciding which of the letters shall be stressed more in teaching is the frequency of the occurrence of the letters as found for the most part in personal and business letters.

A tentative answer to the problem of this study is taken from an article by H. T. Manuel¹. Manuel's problem was somewhat different from the one stated above, but parts of his table can be used by rearranging the data. The explanation that goes with his table is as follows:

"To determine this (his problem) I have used the first 300 words of Ayers' Test of the 'thousand commonest words'. This list gives the frequency with which

1. School and Society, March 17, 1917, pp. 327-330.

each commonest word occurs 'per hundred thousand running words' in the written English as found for the most part in personal and business letters. The first 300 words in their cumulative frequency make up about 76 per cent of the hundred thousand words. The 76,111 words (the cumulative frequency with which the first 300 commonest words occur in 100,000 running words) on which this calculation is based contain 248,478 letters. The frequency with which each letter occurs is given in Table I".

T A B L E X X X V I

Showing the Frequency of the Various Letters
of the Alphabet in the First 76 Per Cent
of the 100,000 Commonest Words

<u>Letter</u>	<u>Actual Frequency</u>	<u>Per Cent Actual Frequency</u> <u>is of the Total Frequency</u>
a	20,466	8.0
b	3,676	1.5
c	3,726	1.5
d	8,830	4.0
e	30,488	12.0
f	7,288	3.0
g	2,603	1.0
h	20,136	8.5
i	15,934	6.0
j	160	0.1
k	1,956	1.0
l	8,868	4.0
m	5,838	2.0
n	15,757	6.0
o	23,570	9.5
p	1,605	1.0
q	63	0.0
r	12,107	5.0
s	11,356	5.0
t	27,170	11.0
u	7,190	3.0
v	2,406	1.0
w	8,103	3.0
x	240	0.1
y	7,441	3.0
z	-----	---

Letters a,)
c, o, q,)
occurring as) ----- 18,953 8.0
initials)

The small letters occurring with a per cent frequency of 5 or above are, in descending order of frequency, e, t, o, h, a, n, i, s, and r.

Therefore, on the basis of this study, no other factors taken into consideration, these small letters should be given chief consideration in teaching the form of small letters.

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