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COMPARATIVE ATTAINMENT IN TYPEWRITING SKILL UNDER TWO METHODS OF CONDUCTING PRACTICE

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COMPARATIVE ATTAINMENT IN TYPEWRITING SKILL UNDER TWO METHODS OF CONDUCTING PRACTICE

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Partial Fulfilment of the Requirements for
the Degree of Master of Science

By

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CHAPTER I

THE PROBLEM AND METHODS OF EXPERIMENTATION

Statement of the Problem

The problem forming the basis of this thesis arose out of the writer's curiosity regarding different methods of handling typewriting practice work. Some typewriting instructors contend that the only way to develop accurate typists is to require the work done by the students to be very accurate. There is a still smaller number of teachers who insist that all practice work turned in shall contain no errors.

On the other hand there are instructors who maintain that requiring work with no errors or very few errors interferes with the proper development of typing technique, especially in the early part of the course. These teachers say that in order to get an assignment with no errors or with a very small number of errors within a given time that students will use improper methods of practice and develop habits which will tend to keep them from becoming rapid and accurate typists later. This second group of teachers would place technique first in learning. They insist that speed and accuracy will come as a natural result of proper technique.

The question to be answered then in this thesis is: Is it better to require a student to do a comparatively small amount of practice work, with a high degree of accuracy and some perfect copy work or to require him to do a larger amount

of practice work with a lower degree of accuracy and no perfect copy work?

This thesis is an attempt on the part of the writer to set forth the results and conclusions reached by him from experiments conducted in his own classes in trying to answer this question. The experiments cover the two school years, 1932-33 and 1933-34, with slightly different methods each year.

General Plan of the Experiment

In making this experiment the first year typewriting classes in the Crawford County Community High School at Arma, Kansas, were divided into two groups. It was proposed to give one group a comparatively small amount of practice work. This first group was to meet rather high accuracy requirements and each member was to turn in some "perfect copy." The second group was to write about two-thirds more practice work than the first group but was not required to turn in any "perfect copy" and the accuracy requirements were to be much lower. In order to make a fair test of these two methods it was necessary to select two groups of students of equal typewriting ability, if possible. This was and is a difficult task because of the fact that there is no recognized method that will indicate with any known degree of accuracy a student's probable success in developing typing skill of any kind.

Investigations in Typewriting Prognosis

A number of investigations and studies have been made in an attempt to discover some method by which a student's typing ability and probable achievement can be determined before he takes a course in typewriting. It seems that little progress has been made, however. In the studies that have been reported it is evident that what one person may have found to be of some prognostic value may be entirely discredited by some other investigator.

The writer investigated some of these studies in order to determine what tests to use and what information to consider as a basis for dividing his students into groups of equal typewriting ability and probable achievement. Brief summaries of a few of these studies are given here.

Minnie A. Vavra and Mable Easterbrook conducted an experiment in typewriting prognosis at Grover Cleveland High School in St. Louis, Missouri, with 332 students.[1] The prognostic test used was a substitution test devised by Miss Mary Lynch while at the University of Chicago. The correlation between test scores and the term marks after twenty weeks of typewriting instruction was .48, which was considered by them to be high enough for prognostic value. The typewriting mark of the students was determined from an objective standard prepared in advance of the course. These writers also claim

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[1] Minnie A. Vavra, "Success in Typewriting," Journal of Educational Psychology, XVI (October, 1925) 487-92

that when an intelligence test was combined with the substitution test almost perfect prognosis was obtainable, failing in only about two per cent of the cases.

In a study made by W. W. Tuttle, Principal of University High School, University of South Dakota, an "Attention and Accuracy" test was used as a prognostic test.[2] The correlation between the test scores and typewriting achievement was .68. Mr. Tuttle also used a substitution test similar to the one used by Vavra and Easterbrook.

A spelling test, the National Intelligence Test, and an original substitution test similar to the one used by Vavra and Easterbrook were used by Helen Korngold in a study made at Normandy High School, St. Louis County, Missouri.[3] The correlation between the spelling test and typewriting achievement was .507; between the substitution test and typewriting achievement, .49. The correlation between the intelligence test scores and typewriting achievement was somewhat lower, .23. However, since Miss Korngold thinks that the abilities measured by the substitution and spelling tests are mental abilities, she concludes that the intelligence test is useful for prognostic purposes, at least for sectioning students.

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[2] W. W. Tuttle, "The Determination of Ability for Learning Typewriting," Journal of Educational Psychology, XIV (March, 1923) 177-181

[3] Helen Korngold, "An Experimental Study of Certain Tests as a Means of Predicting Success in Typewriting." (Unpublished Master's Thesis, St. Louis, Washington University, 1933)

The tests used in Miss Korngold's study were given to ninth, tenth, eleventh, and twelfth grade students. She found that those in the upper grades made higher scores on the typing tests than those in the lower grades. This would seem to indicate that the older student has a better chance of becoming a good typist.

C. E. Limp in an article in the Journal of Educational Research describes an experiment in which 118 students were included.[4] In this experiment the Number Series division of the Terman Group Test of Mental Ability was given. The coefficient of correlation between the scores on this test and typing achievement was .30.

None of the prognostic measures used by any of the people in the studies just referred to would be considered reliable enough to make an exact prediction regarding the typing attainments of an individual student. These, however, were among the most reliable found.

The First Experiment

A total of fifty-four students were enrolled in three typewriting classes at the beginning of the first year of the experiment. These students, divided into two practice groups, were not placed in separate classes practicing at different periods. Thus each class or recitation group had in it students of both practice groups, not necessarily, however, in equal numbers.

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[4] C. E. Limp, "A Work in Commercial Prognosis," Journal of Educational Research, XVI (June, 1927) 48-56

The criteria tests used for the purpose of dividing the students into groups of equal ability were given during the first few days of the term and before any actual typing had been done or any practice work handed in.

The length of the typewriting period was sixty minutes. Students were allowed to practice extra periods during mornings and evenings if they chose to do so. Part of the regular typing period was devoted to class drills and exercises and the remainder of the time to practice work. Those drills and exercises were the same for all students.

The experiment was carried on during this first year until the first eighteen sections of work in the text were completed. No differentiation of practice work was made after that time. Since a little time was consumed at the beginning of the year in giving the tests used in pairing the students and in some cases a little more than a week was allowed for working out a section, the experiment did not close until the end of the twenty-first week. The achievement tests were given at that time on separate days.

Division into groups. Since no apparent agreement was found among investigators several of the most reliable measures found were used in dividing the students into two groups of approximately equal ability. The following items were given equal weight in making the division by matched pairs: age, score on the Otis Self-Administering Test of Mental Ability,[5]

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[5]Arthur S. Otis, "Otis Self-Administering Tests of Mental Ability," (Higher Examination: Form A, For High Schools and Colleges) Yonkers-on-Hudson, New York: World Book Company, 1922

score on a substitution test, score on an attention and accuracy test, score on a spelling test, and the score on a number series test. Boys were matched with boys and girls with girls.

An attempt was made to place as many students having typewriters at home in one group as in the other. This made the matchings a little irregular in a few instances. It was assumed that a student having a machine at home might spend extra time in practice which would be reflected in increased typing skill.

The substitution test was in two forms, A and B, and was one of the tests devised and used by Miss Helen Korngold in her study at Normandy High School.[6] The spelling test was also used by her.[7] The attention and accuracy test was constructed and used by Mr. W. W. Tuttle in his study.[8] It was in two forms, designated as Part I and Part II. The number series test was the Number Series division of the Terman Group Test of Mental Ability. Copies of the tests used, with information as to how they were given and scored are to be found in the Appendix of the study.

Scores on these tests and final ranking of the students are given in Table I. In this table the score on the substitution test is the sum of the scores made on the two forms, A and B. Likewise the score on the attention and accuracy

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[6] Helen Korngold, loc. cit.

[7] "Sixteen Spelling Scales for Secondary Schools," (Lists 5, 10, and 15). (Teachers' College Bulletin, Twelfth Series, No. 19. New York: Teachers' College, Columbia University)

[8] W. W. Tuttle, loc. cit.

TABLE I

Ages, Grades, and Scores on Prognostic and Achievement Tests for the First Experiment

Criteria Used in Matching									Records on Achievement Tests			
Student Number and Group	Age	Grade	Otis Test Score	Substitution Test Score	Spelling Test Score	Att. and Acc. Test Score	Number Series Score	Final Rank	Average Strokes Per Minute	Average Errors Per Test	Average Score	Ratio of Strokes Per Minute to Errors Per Test
Boys												
1-A	18-1	12	58	305	47	117	16	2	200	2	172	100
1-B	16-6	11	51	276	58	160	14	1	199	7.25	122	28
2-A	16-0	11	50	339	60	162	14	3	255	4.25	196	60
2-B	16-2	11	42	311	44	184	10	5	215	6.25	137	34
3-A	17-6	12	51	218	56	158	14	4	206	2.25	191	91
3-B	17-6	12	44	241	43	149	12	7	133	7.75	102	17
4-A	16-9	12	33	257	38	151	10	10	225	5.5	147	41
4-B	15-3	11	58	262	60	131	16	6	226	2.25	184	100
5-A	17-0	12	51	235	48	111	14	9	189	2.5	152	76
5-B	17-8	12	35	257	49	104	18	8	190	2	166	95
6-A	17-4	11	48	236	34	145	14	11	193	2.5	142	77
6-B	15-10	11	35	251	25	147	12	17.5	202	4.75	137	43

TABLE I (Continued)

Criteria Used in Matching									Records on Achievement Tests			
Student Number and Group	Age	Grade	Otis Test Score	Substitution Test Score	Spelling Test Score	Att. and Acc. Test Score	Number Series Score	Final Rank	Average Strokes Per Minute	Average Errors Per Test	Average Score	Ratio of Strokes Per Minute to Errors Per Test
7-A	16-1	11	32	251	45	139	4	14	209	3.75	154	56
7-B	16-3	11	33	206	49	171	14	12	235	1.5	206	157
8-A	16-10	11	28	265	45	107	10	14	249	4	183	62
8-B	15-3	11	48	225	57	131	16	14	230	6	152	38
9-A	17-0	11	31	241	38	125	14	17.5	204	2.75	163	74
9-B	18-8	11	33	242	13	107	10	16	188	1.5	165	125
10-A	16-0	11	26	209	38	116	10	22	262	5.5	170	47
10-B	16-6	11	33	247	44	95	6	20	189	4.25	139	44
					Girls							
1-A	17-10	12	56	290	47	159	12	1	227	4.25	161	53
1-B	15-5	11	53	305	59	156	12	2	219	2.5	175	88
2-A	16-0	11	49	245	59	136	16	6	190	5.25	131	36
2-B	16-9	11	39	288	49	141	6	8	203	5.25	135	39
3-A	18-0	12	30	238	44	159	6	10	267	3.75	176	71
3-B	18-1	11	39	302	26	119	8	9	144	7.75	85	19
4-A	17-1	11	42	236	47	122	4	15	134	3.75	97	36
4-B	16-11	11	32	229	51	148	12	13	203	2.25	166	90

TABLE I (Continued)

Criteria Used in Matching									Records on Achievement Tests			
Student Number and Group	Age	Grade	Otis Test Score	Substitution Test Score	Spelling Test Score	Att. and Acc. Test Score	Number Series Score	Final Rank	Average Strokes Per Minute	Average Errors Per Test	Average Score	Ratio of Strokes Per Minute to Errors Per Test
5-A	16-9	11	46	253	37	133	18	14	214	2.5	172	86
5-B	15-3	12	36	291	42	141	14	20.5	228	3	177	76
6-A	18-0	11	37	226	47	141	12	12	124	1	115	124
6-B	16-9	12	47	229	49	116	20	17.5	236	3.25	185	73
7-A	16-1	11	44	246	43	138	6	19	187	2.5	150	78
7-B	15-9	11	45	255	53	114	20	17.5	218	3.5	156	62
8-A	15-11	11	40	276	36	140	10	22	185	2.75	146	67
8-B	15-0	11	46	282	50	108	14	20.5	184	4	131	46
9-A	15-2	11	39	233	56	120	12	23.5	194	3	150	65
9-B	16-2	11	31	284	50	107	14	23.5	151	2.75	120	55
10-A	17-11	11	34	236	9	91	6	25	96	1.25	87	77
10-B	16-11	11	21	207	52	99	8	26	264	3.75	223	70
11-A	15-10	11	30	223	54	94	2	27	233	6	156	39
11-B	17-4	11	13	227	36	89	0	28	178	2.25	148	79
12-A	16-3	11	29	215	37	116	8	29	173	7	106	25
12-B	15-4	11	36	203	40	97	14	32	165	8.75	98	19
13-A	16-10	11	30	218	42	77	8	31	133	2.75	105	49
13-B	14-9	11	42	202	39	110	8	30	201	6.25	123	32

test is the sum of the scores made on Parts I and II of the test.

Terms used in referring to groups. An arbitrary designation will be used in referring to the groups. Those students writing with the higher degree of accuracy in their practice work will be referred to as Group A. They are the "accuracy" or "quality" group. Students in the other division writing about two-thirds more practice work but with a lower degree of accuracy will be referred to as Group B. They might be thought of as the "quantity" group.

Students included. Forty-six of the fifty-four students enrolled took all of the preliminary tests and all of the achievement tests at the end of the experiment. There were ten boys and thirteen girls in each of the groups, A and B. In Group A, boys, there were six juniors and four seniors; in Group B, boys, eight juniors and two seniors. In Group A, girls, there were eleven juniors and two seniors; in Group B, girls, eleven juniors and two seniors.

Practice work assigned each group. The text used in the course was the 1927 edition of "Rational Typewriting."[9] Assignments of practice work were made in the form of budgets, each section in the text comprising a budget.

Students in Group A were required to write for practice work only the first three of the five assignments in each section to complete a budget of work. These students were

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[9]Rupert P. SoRelle, The New Rational Typewriting, 1927 edition. New York: Gregg Publishing Company, 1927

required to turn in one of these assignments without errors. To receive a mark of "A" on a budget of work a maximum of four errors was allowed; a mark of "B," five errors; "C," six errors; and "D," seven errors. Substitution of drills and exercises from the fourth assignment was made in cases where fundamental exercises were not fully covered in the first three assignments.

Students in Group B were required to write all five assignments of each section to complete a budget. None of this was "perfect copy" work. A wide limit of errors was allowed. To obtain a mark of "A" on a budget of work the student was allowed an average of two errors on each assignment or a total of ten errors on the section. A mark of "B" was given for an average of not more than four errors per assignment, "C" for not more than six errors, and "D" for an average of not more than eight errors on each assignment.

The Second Experiment

In making plans for the second year of the experiment it was decided that the method employed in grouping the students the first year included too many items and that the next grouping should be made on a more simple basis.

This decision came partly, at least, as the result of conclusions reached by Miss Jennie Lucille Bailey in her thesis written in the summer of 1933 and which were based on experimental work carried out by her during the school year of 1932-33.[10]

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[10] Jennie Lucille Bailey, "The Relation of Intelligence to Typing Achievement of the Students in the High School, Parsons, Kansas." (Unpublished Master's Thesis, Pittsburg, K. S. T. C., August, 1933)

Miss Bailey found a relationship between mental ability and rate of writing. The coefficient of correlation between scores on the Terman Group Test of Mental Ability and net words per minute on a fifteen minute timed test was .47. She also found a correlation of .52 between mental ability and composite typewriting achievement.

Division into groups. The students were again divided into two groups by means of matched pairs, matching boys with boys and girls with girls. This time only two items were taken into consideration, mental ability as determined by the score on the Terman Group Test of Mental Ability, Form A,[11] and the class marks made by the students in their previous years of high school work. Ranking on class marks was determined by giving three points for each semester course with a mark of "A," two points for each semester course having a mark of "B," and one point for each "C." No points were allowed for "D's" and one point was deducted for each "F."

Students included. Forty-four students finished the course the second year and took all the tests used in the study. A number of others finished the course and took all of the tests, but in a few instances students paired with these dropped out or were transferred to other classes, therefore their records were not considered in determining the results.

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[11] Lewis M. Terman, "Terman Group Test of Mental Ability," (For Grades 7 to 12, Examination: Form A). Yonkers-on-Hudson, New York: World Book Company, 1920

There were eleven students in each one of the four groups. Nine students in each of the boys' groups were juniors and two were seniors. Group A of the girls contained two seniors and nine juniors. Group B of the girls was composed entirely of juniors. Table II shows how the students were matched for the two groups for the second year of the experiment.

Teaching procedure. The same text was used during this second year's experiment. The procedure followed with respect to practice work in the two groups was similar to the work of the first year. The experiment, however, was carried to the end of Section 23 of the text, and thus lasted five weeks longer than the previous year, or a total of twenty-six weeks.

TABLE II

Criteria Used in Matching for the Second Experiment

Student Number and Group	Terman Score	Grade Points	Terman Rank	Grade Points Rank	Total Rank Points	Final Rank
			Boys			
1-A	154	40	5.5	4	9.5	4
1-B	183	38	2	5	7	3
2-A	144	41	9	3	12	5
2-B	151	25	7	8.5	15.5	6
3-A	176	19	4	15.5	19.5	7.5
3-B	140	25	11	8.5	19.5	7.5
4-A	126	18	15.5	17.5	33	17.5
4-B	148	12	8	24	32	16
5-A	126	18	15.5	17.5	33	17.5
5-B	110	22	23	10.5	33.5	19
6-A	93	35	30	6	36	21
6-B	114	21	22	12.5	34.5	20
7-A	116	16	18.5	21	39.5	22
7-B	97	19	28	15.5	43.5	23
8-A	115	9	20.5	27	47.5	25
8-B	115	12	20.5	24	44.5	24
9-A	105	11	26	26	52	26.5
9-B	92	16	31	21	52	26.5
10-A	68	8	35.5	28.5	64	33
10-B	85	5	32	31.5	63.5	32
11-A	70	3	34	33	67	34
11-B	77	-1	33	35	68	35

TABLE II (Continued)

Student Number and Group	Terman Score	Grade Points	Terman Rank	Grade Points Rank	Total Rank Points	Final Rank
			Girls			
1-A	141	40	1	4	5	1
1-B	130	42	7.5	1	8.5	2
2-A	138	22	2	16	18	5
2-B	131	23	5.5	14	19.5	6.5
3-A	129	26	9	12	19	8
3-B	119	39	14.5	5	19.5	6.5
4-A	128	22	10	16	26	11
4-B	118	31	16	10	26	11
5-A	133	18	4	23	27	13
5-B	106	41	25	2.5	27.5	14
6-A	135	8	3	32	35	17
6-B	117	21	17	18.5	35.5	18.5
7-A	106	19	25	21.5	46.5	25
7-B	109	16	22.5	25	47.5	26
8-A	95	21	31	18.5	49.5	28
8-B	104	20	28	20	48	27
9-A	106	16	25	25	50	29
9-B	82	22	34.5	16	50.5	30
10-A	105	9	27	30.5	57.5	32
10-B	111	5	19.5	34	53.5	31
11-A	75	13	32	29	61	33
11-B	96	6	30	33	63	34

CHAPTER II

PRESENTATION OF RESULTS OF THE EXPERIMENT

Data for First Year

No attempt was made to measure any typing skill other than the operation of the machine on straight copy material. It was felt that the two different types of practice would affect only this skill, since both groups were given the same instructions regarding the care of the machine, paragraphing and punctuating, centering, etc.

Achievement tests. For the purpose of measuring the achievement of the students the Typewriting Tests, Forms A, B, C, and D, of the Blackstone Stenographic Proficiency Tests were used.[12] These tests were chosen principally for the reason that they are the only published standardized tests of recognized value of this particular type. A copy of Form A will be found in the Appendix.

In addition to the prognostic test scores, Table I, page 8, also shows the average record made by each student on the four Blackstone Tests. The average strokes per minute, the average number of errors per test, and the average score are given. Another figure for each student was computed. This was the ratio of strokes per minute to the number of errors on each test and was an attempt to find a number that

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[12] E. C. Blackstone, "Blackstone Stenographic Proficiency Tests, Typewriting Tests: Forms A, B, C, D, and E." Yonkers-on-Hudson, New York: World Book Company, 1923

would show the student's accuracy in comparison with other students.

Number of strokes per minute. Figure 1 gives percentile curves showing the average number of strokes per minute written by the students in each group. The boys in Group A ranked higher than the boys in Group B, the Q1, median, and Q3 of Group A being 200, 207.5, and 249, respectively, while for Group B these figures were 189, 200.5, and 226, respectively. The three scores mentioned abovefor Group A, girls, were 153.75, 187, and 217.75 and for Group B, girls, 174.75, 203, and 221.25. The average difference between the boys' groups was 18.5 strokes per minute in favor of Group A. For girls the average difference was 18.2 strokes per minute in favor of Group B.

The writer is unable to offer any reason for this difference with respect to boys and girls. Group A of the boys was considerably superior not only to Group B, boys, but also to either of the girls' groups. It may be that this group was superior in ability because of deficiencies in the method of grouping or it may be that the students in the group possessed a greater interest in their typing work.

Scores on Blackstone Tests. Figure 2 shows the average scores of the students in the two groups graphically. The score on the Blackstone Tests is found by multiplying the number of strokes per minute by ten and dividing that result by the number of errors plus ten. This score is thus an expression in one number of both speed and accuracy.

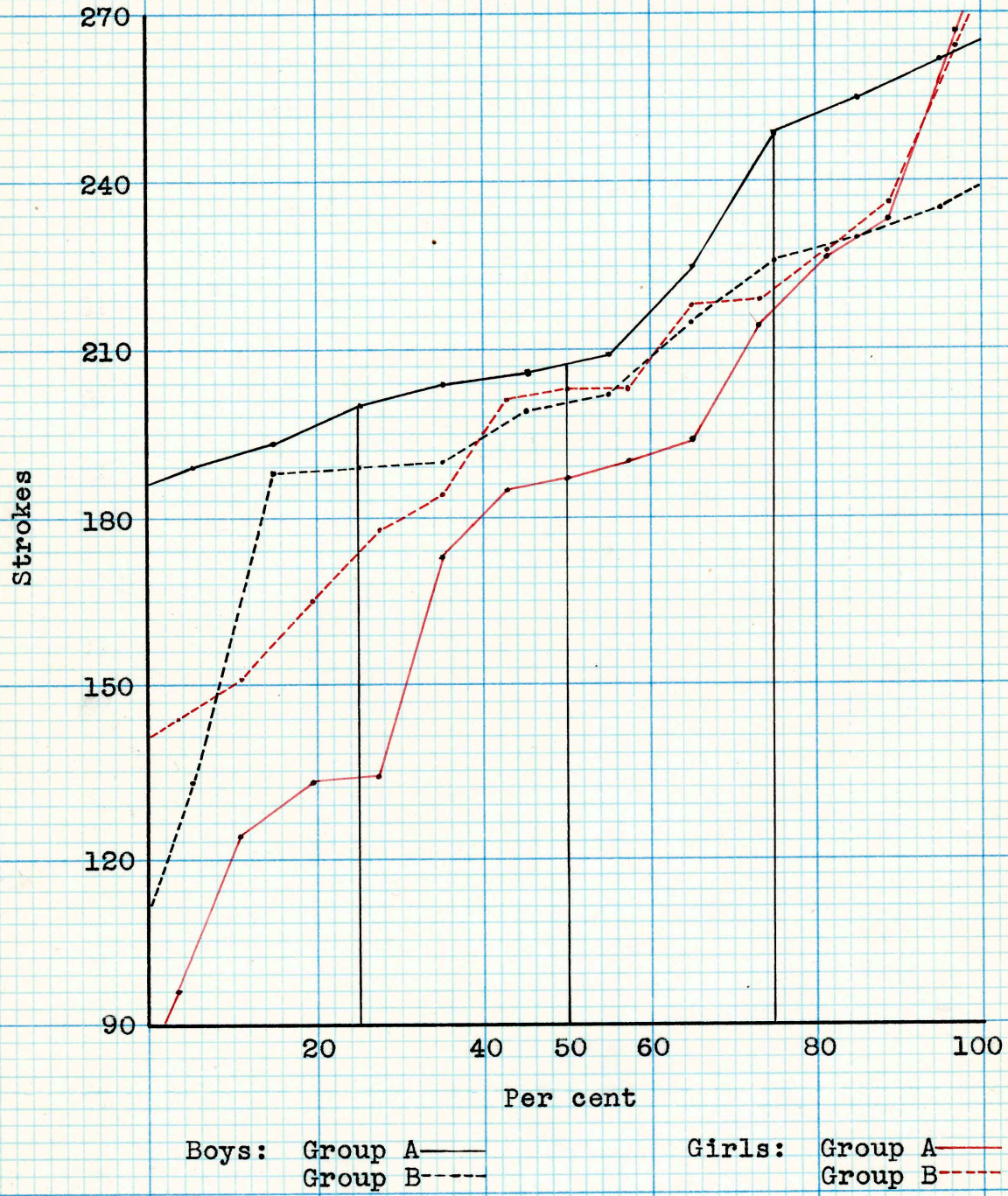

Figure 1. Strokes per Minute on Blackstone Proficiency Tests, First Year

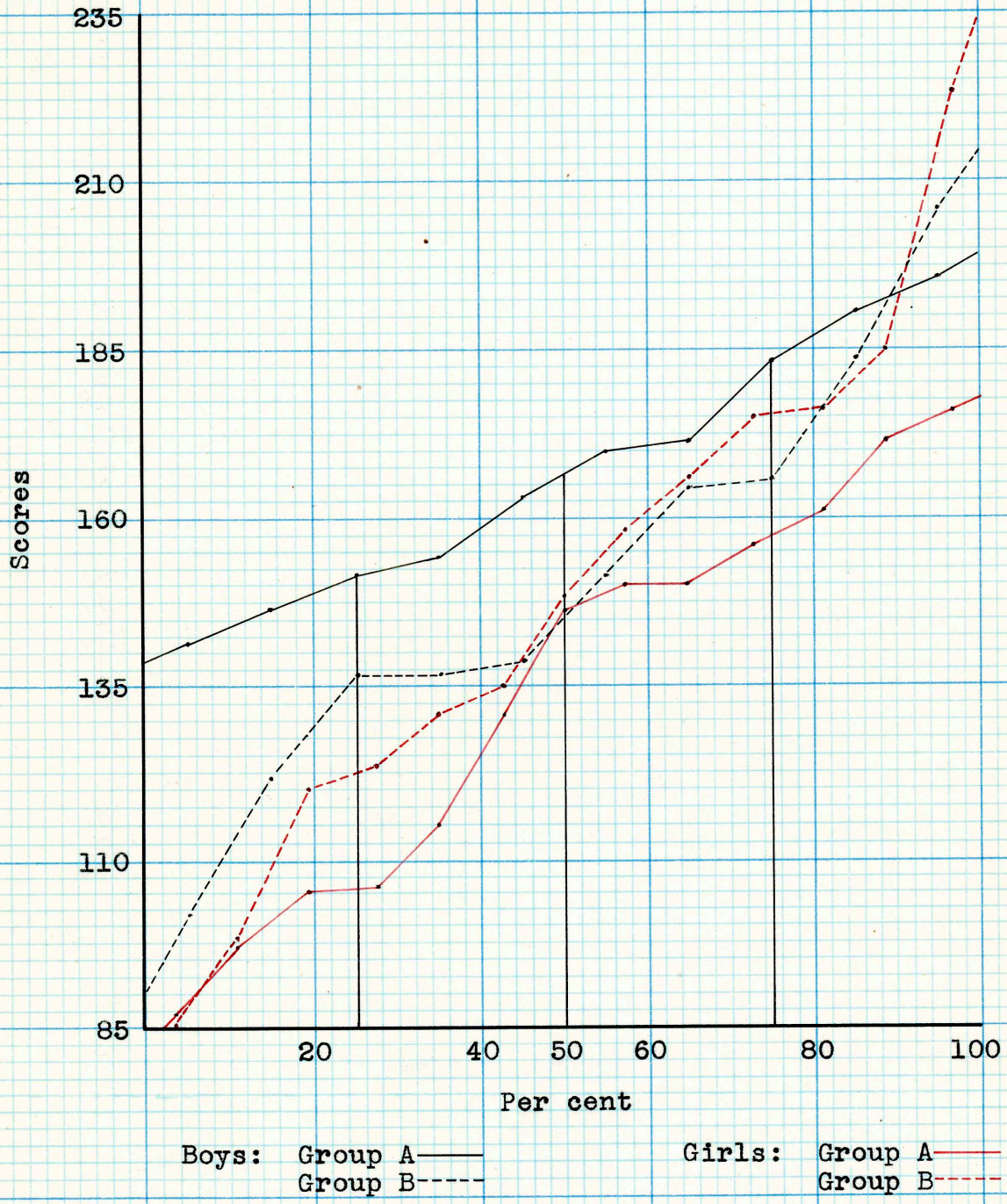

Figure 2. Scores on Blackstone Proficiency Tests, First Year

Figure 2 shows the same relative position of the groups as does Figure 1. The Q1, median, and Q3 for Group A, boys, were 152, 166.5, and 183, respectively, and 137, 145.5, and 166, respectively, for Group B. Q1 for Group A of the girls was 105.75, for Group B, 122.25. The median for Group A was 146 and for Group B, 148. Group A had a Q3 of 157.25, and Group B, 175. The average differences were 16 in favor of Group A of the boys and 13.1 in favor of Group B of the girls.

Ratio of strokes per minute to average errors on each test.

The percentile curves in Figure 3 show the ratio of strokes per minute to average errors per test. Since all of the tests were of the same length, three minutes, the figures represented on this chart show for purposes of comparison the accuracy of the different students. The medians for Groups A and B of the boys were 71.5 and 43.5, respectively. Q1 for Group A, boys, was 56 and for Group B, 34. Group B's Q3 was an exception to what was shown by the median and Q1. The Q3 of this group was 100 and the Q3 of Group A only 77. For the girls the Q1, median, and Q3 of Group A were 38.25, 65, and 77.25, and for Group B, 37.25, 62, and 78.25. Here Q3 of Group B was larger than Q3 of Group A, as in the case of the boys. The average differences were 1.2 in favor of Group A of the boys and 4.5 in favor of Group A of the girls.

In order that the reader may make the comparisons more easily the information contained in the three previous subheads is summarized in Table III.

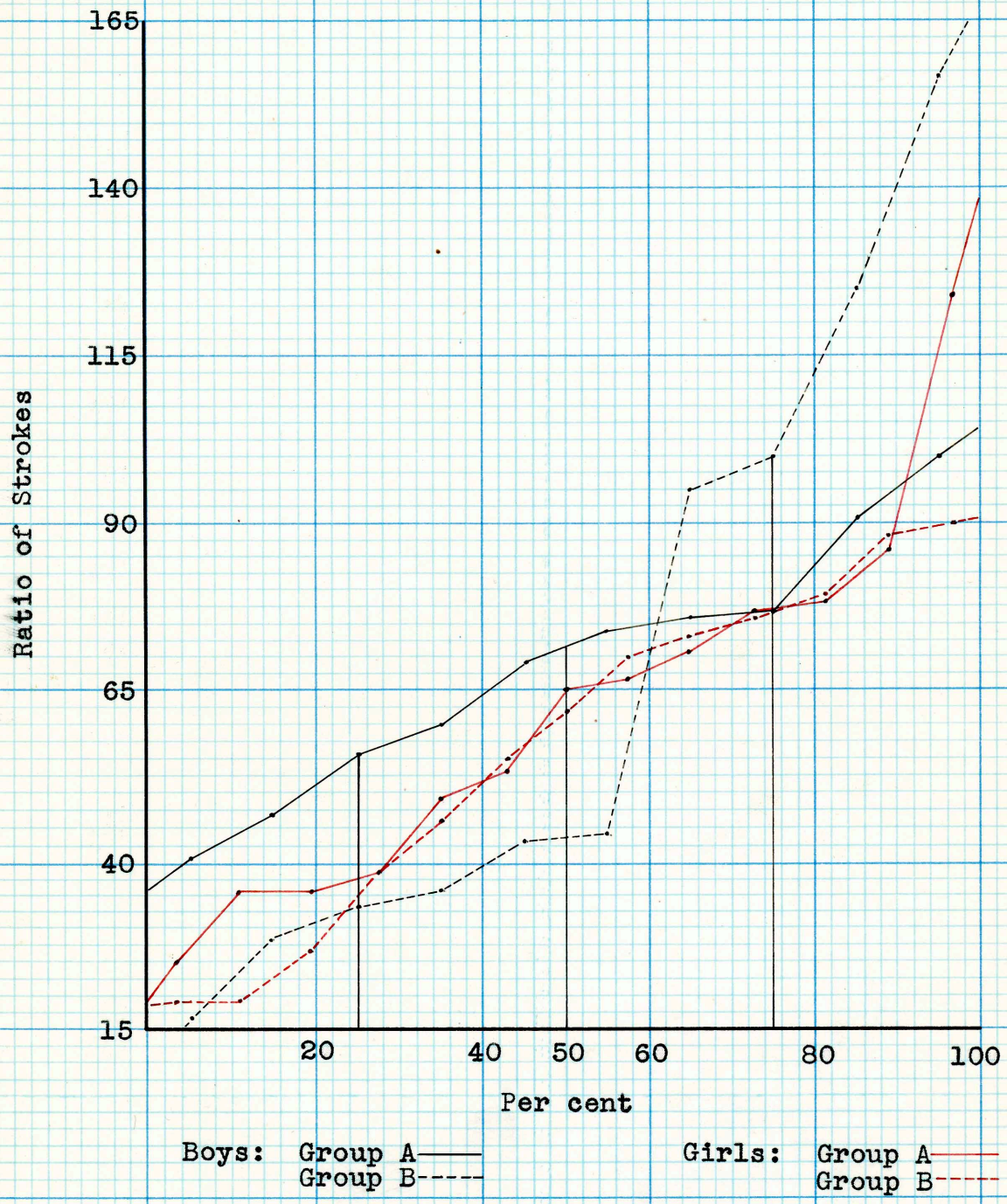

Figure 3. Ratio of Strokes per Minute to Errors per Test, Blackstone Proficiency Tests, First Year

TABLE III

Summary of Quartiles, Medians, and Average Differences for First Year

	Quartile	Group	Strokes per Minute	Score on Blackstone	Ratio of Strokes..
Boys:	Q3	A	249	183	77
	Q3	B	226	166	100
	Median	A	207.5	166.5	71.5
	Median	B	200.5	145.5	43.5
	Q1	A	200	152	56
	Q1	B	189	137	34
Girls:	Q3	A	217.75	157.25	77.25
	Q3	B	221.25	175	78.25
	Median	A	187	146	65
	Median	B	203	148	62
	Q1	A	133.75	105.75	38.25
	Q1	B	174.75	122.25	37.25
			Average Differences*		
	Boys		A-18.5	A-16	A-1.2
	Girls		B-18.2	B-13.1	A-4.5

*The differences were in favor of the groups named. Thus, the average difference in strokes per minute was 18.5 in favor of Group A, boys, and 18.2 in favor of Group B, girls.

Data for Second Year

Achievement tests. A different measure of achievement was used at the end of the second year's experiment. At the close of the experiment five fifteen minute timed tests were given on separate days. These five tests were written from the booklet containing the copy for the 1923 International Typewriting Contest. This booklet, "Sacramento and the Trail of '49," was written especially for that contest and is supposed to contain material of approximately equal difficulty throughout.[13] A copy is given in the Appendix.

These tests were checked and scored in accordance with International Typewriting Contest Rules. The percentage of accuracy was found by dividing the net words written by the gross words written in the fifteen minute period. In studying each student's record three things were considered, the median number of strokes written on the five tests, the median net speed per minute, and the median percentage of accuracy. Table IV shows these medians for the four groups of students.

It was decided not only to measure the achievement of the different students at the end of the experiment, but also to determine final achievement at the end of the year. For this purpose the results of nine speed tests given during the last six weeks of the school year were studied. These tests were a part of the regular work of the course, and the class

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[13] J. N. Kimball, "Sacramento and the Trail of '49," New York: Underwood Typewriter Company, 1923

TABLE IV

Record of Achievement, Second Experiment

Student Number and Group	Series of Five Tests			Final Achievement		
	Median Strokes	Median Net Speed	Median Accuracy	Median Strokes	Median Net Speed	Median Accuracy
Boys						
1-A	2746	31	85	3013	35	88
1-B	2697	26	72	2855	30	80
2-A	2913	33	85	3203	36	85
2-B	2683	27	77	2699	27	79
3-A	3309	38	92	3300	38	85
3-B	3233	35	81	3342	38	90
4-A	2721	27	75	2443	24	84
4-B	2593	29	80	2575	28	76
5-A	2722	27	75	2820	27	77
5-B	3254	36	80	3404	38	82
6-A	2994	27	70	2882	27	73
6-B	3350	33	71	3260	32	74
7-A	3265	38	88	3524	40	88
7-B	3326	31	71	3363	38	84
8-A	1987	21	79	2349	22	73
8-B	2582	24	71	2732	30	84
9-A	2486	26	79	2574	28	84
9-B	2815	32	84	2816	32	86
10-A	2348	26	81	2498	28	84
10-B	2124	21	75	2221	25	85
11-A	2430	25	73	2490	27	76
11-B	2555	28	83	2738	29	82

TABLE IV (Continued)

Student Number and Group	Series of Five Tests			Final Achievement		
	Median Strokes	Median Net Speed	Median Accuracy	Median Strokes	Median Net Speed	Median Accuracy
Girls						
1-A	2480	26	78	2614	30	83
1-B	4064	50	90	4094	51	95
2-A	3701	44	87	3806	44	88
2-B	3489	39	83	3604	38	81
3-A	3481	35	77	3569	40	85
3-B	4018	49	90	4072	48	91
4-A	2529	25	69	2697	28	81
4-B	4317	52	91	4334	53	93
5-A	2474	26	77	2546	27	71
5-B	2695	27	71	2740	30	82
6-A	1984	23	85	2302	25	84
6-B	3386	39	87	3444	38	85
7-A	2643	26	78	2569	28	86
7-B	2906	31	84	2965	35	88
8-A	3134	36	86	3071	39	97
8-B	3111	33	78	3061	37	88
9-A	3512	36	78	3793	36	72
9-B	3154	39	92	3205	37	89
10-A	3565	41	85	3447	37	80
10-B	2689	29	83	2777	31	85
11-A	2759	33	88	2722	30	81
11-B	1878	14	55	1925	18	70

mark was determined in part from the records made on them. The median number of strokes, the median net speed per minute, and the median percentage of accuracy for each student on these tests are also given in Table IV.

Strokes on five-test series. The speed records in median number of strokes on the five fifteen minute tests are shown in Figure 4. For the boys Q1 was 2444 for Group A and 2583 for Group B. Medians were 2722 and 2697, respectively, for the two groups. Q3 was 2974 for Group A and 3249 for Group B. Q1, median, and Q3 for the girls were 2492, 2759, and 3504, respectively, for Group A and 2748, 3154, and 3886, respectively, for Group B. The average differences were 117.2 strokes in favor of Group B of the boys and 313.2 strokes in favor of Group B of the girls.

Net rate of speed on five-test series. Figure 5 shows the median net words per minute of the students on the five achievement tests given at the end of the experiment. Q1, median, and Q3 for Group A, boys, were 26, 27, and 32.5, respectively, and for Group B, 26.25, 29, and 32.75. Group A, girls, had Q1, median, and Q3 of 26, 33, and 36, respectively, and Group B, 29.5, 39, and 46.5, respectively. The average differences show that Group B of the boys had an advantage of .27 net words per minute over Group A, while Group B of the girls had an advantage of 4.4 net words per minute over Group A.

Percentage of accuracy on five-test series. The median percentages of accuracy are shown in Figure 6. Here Group A

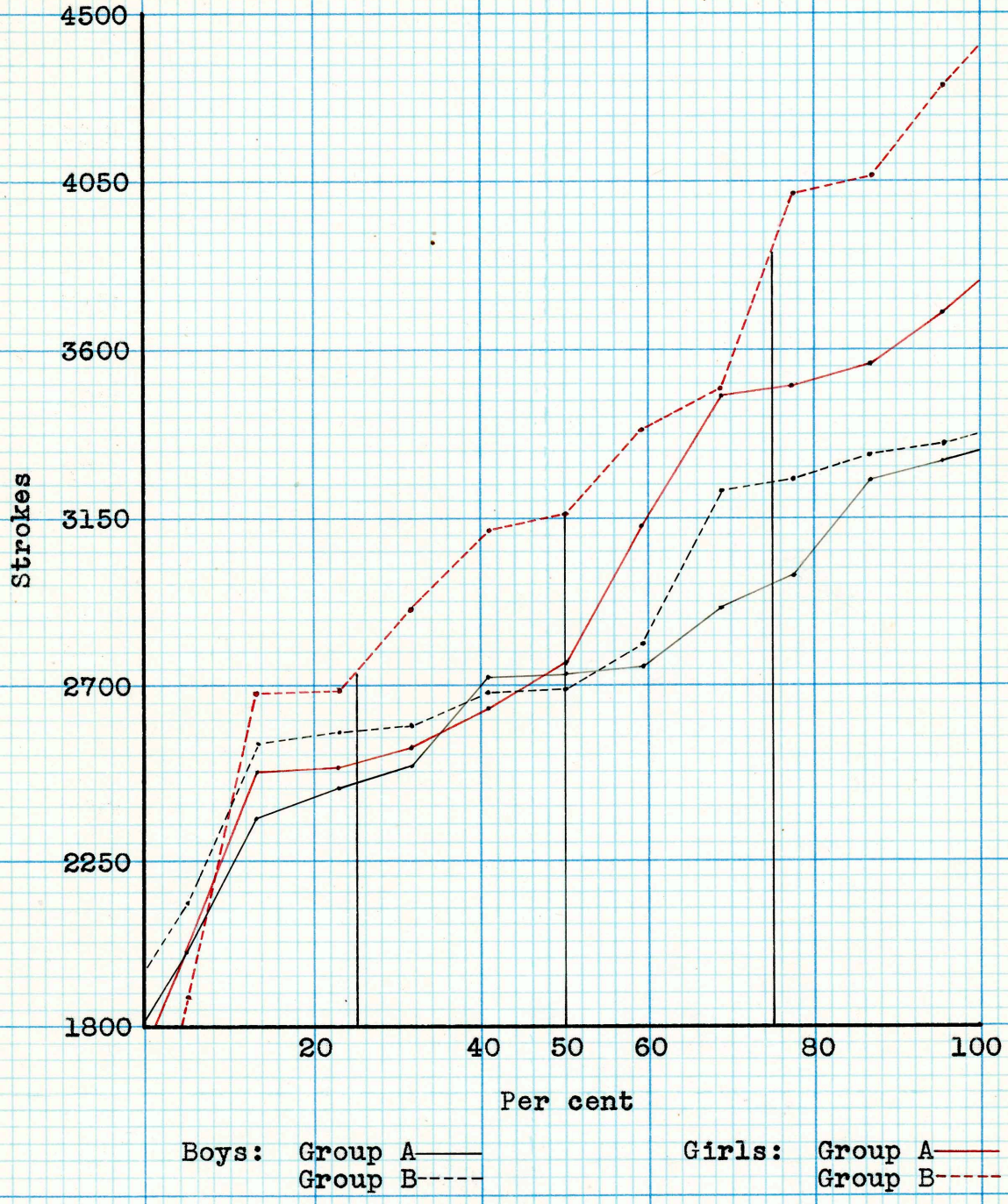

Figure 4. Median Number of Strokes, Five-Test Series, Second Year

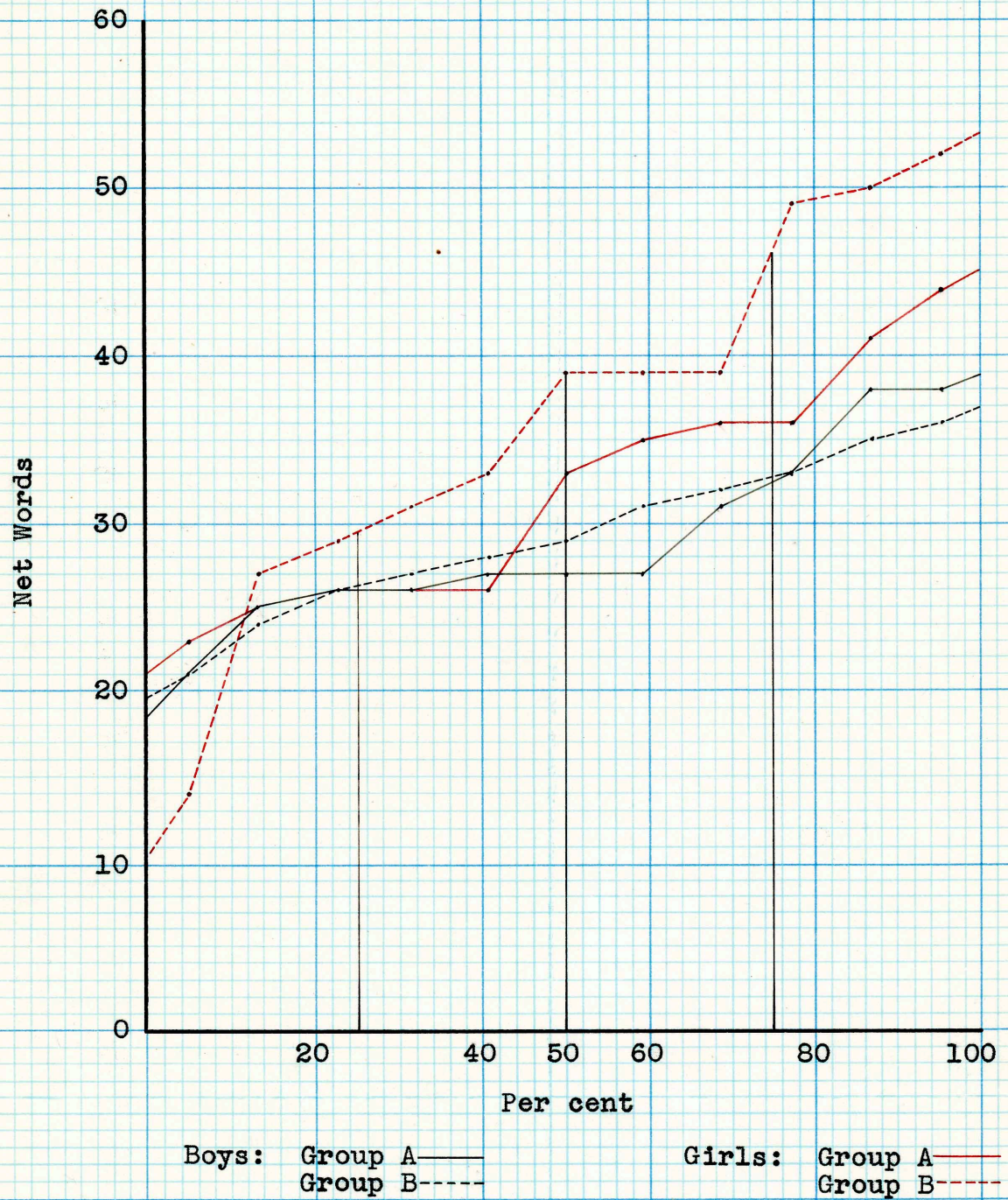

Figure 5. Median Net Words per Minute, Five-Test Series, Second Year

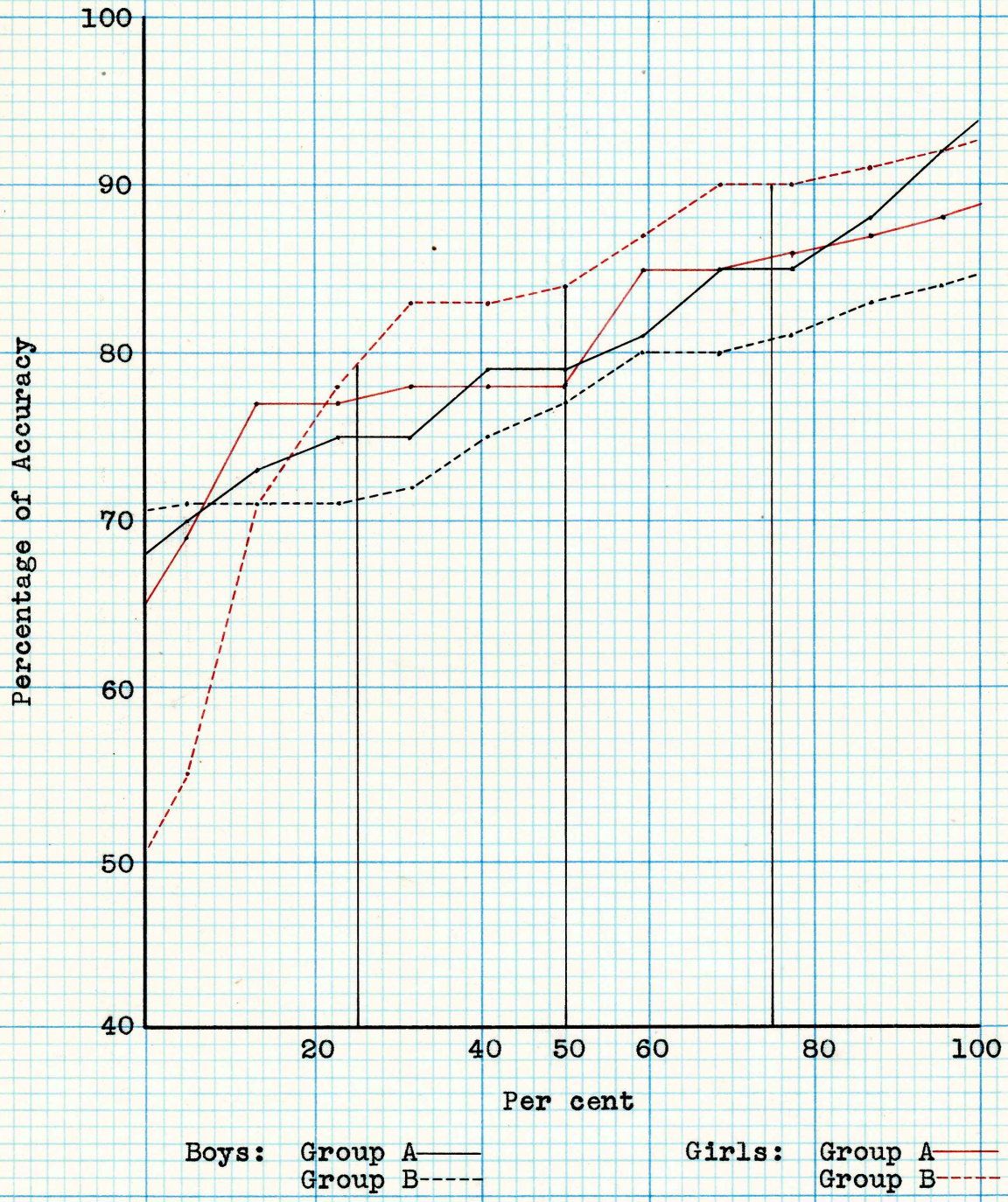

Figure 6. Median Percentage of Accuracy, Five-Test Series, Second Year

of the boys and Group B of the girls seem to be superior. For Group A, boys, Q1, median, and Q3 were 75, 79, and 85, respectively, and for Group B, 71.25, 77, and 80.75, respectively. Group B of the girls had a Q1 of 79.25, median of 84, and Q3 of 90, against 77.25, 78, and 85.75, respectively, for Group A. Average differences were 2.5% in favor of Group A, boys, and 1.5% in favor of Group B, girls.

A summary of the information regarding the series of five tests given at the close of the experiment is given in Table V.

Strokes on final achievement tests. The results of the tests given during the last six weeks of the term are shown in Figures 7, 8, and 9. Some of the students made poorer records on these tests than on the tests given at the end of the experiment. No explanation can be given for this unless the copy material was more difficult than that used in the five-test series. The copy used during this last six weeks' period was an assortment of material sent out several years ago by the different typewriter companies in the form of monthly tests and on file in the school typewriting room since that time.

From Figure 7, Group A, boys, show a Q1 of 2492 strokes, median of 2620, and Q3 of 3156; Group B, boys, a Q1 of 2707, median of 2816, and Q3 of 3322. For the girls the Q1, median, and Q3 for Group A were 2580, 2722, and 3529, respectively, and for Group B, 2824, 3205, and 3955, respectively. The average difference between the boys' groups was found to be

TABLE V

Summary of Quartiles, Medians, and Average Differences for Second Year (Five-Test Series)

	Quartile	Group	Strokes per Test	Net Words per Minute	Percentage of Accuracy
Boys:	Q3	A	2974	32.5	85
	Q3	B	3249	32.75	80.75
	Median	A	2722	27	79
	Median	B	2697	29	77
	Q1	A	2444	26	75
	Q1	B	2583	26.25	71.25
Girls:	Q3	A	3504	36	85.75
	Q3	B	3886	46.5	90
	Median	A	2759	33	78
	Median	B	3154	39	84
	Q1	A	2492	26	77.25
	Q1	B	2748	29.5	79.25
			Average Differences*		
	Boys		B-117.2	B-.27	A-2.5
	Girls		B-313.2	B-4.4	B-1.5

*The differences were in favor of the groups named.

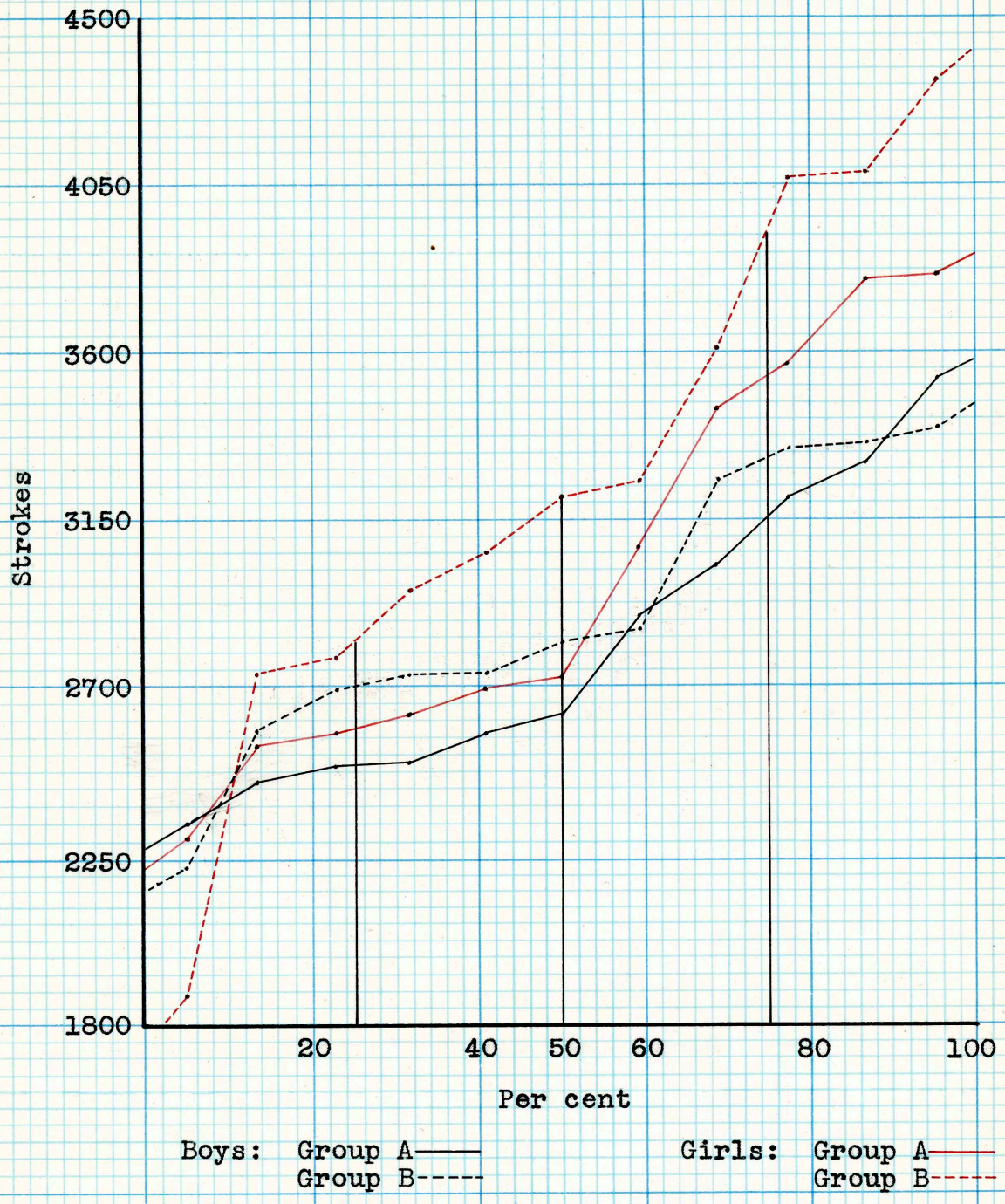

Figure 7. Median Number of Strokes, Final Achievement Tests, Second Year

100.8 strokes in favor of Group B, and between the girls' groups 200.5, also in favor of Group B.

Net rate of speed on final achievement tests. In net words per minute Figure 8 shows the same comparative results as Figure 7. The Q1, median, and Q3 for Group A of the boys were 27, 28, and 35.75, respectively; for Group B they were 28.25, 30, and 36.5, respectively. For the girls these figures were 28, 30, and 38.5 for Group A; and 32, 37, and 45.5 for Group B. In average differences Group B of both boys and girls ranked higher than Group A. For the boys this difference was 1.2 words per minute and for the girls 4.7 words per minute, both in favor of Group B.

Percentage of accuracy on final achievement tests. In percentage of accuracy Figure 9 shows that the Q1, median, and Q3 for Group A, boys, were 76.25, 84, and 85, respectively. For Group B, boys, these figures were 79.25, 82, and 84.75, respectively. For girls these figures were 81, 83, and 85.75 for Group A and 82.75, 88, and 90.5 for Group B. For boys the average difference was 1% in favor of Group B and for girls 3.6%, also in favor of Group B.

A summary of the information contained above regarding the final achievement tests will be found in Table VI.

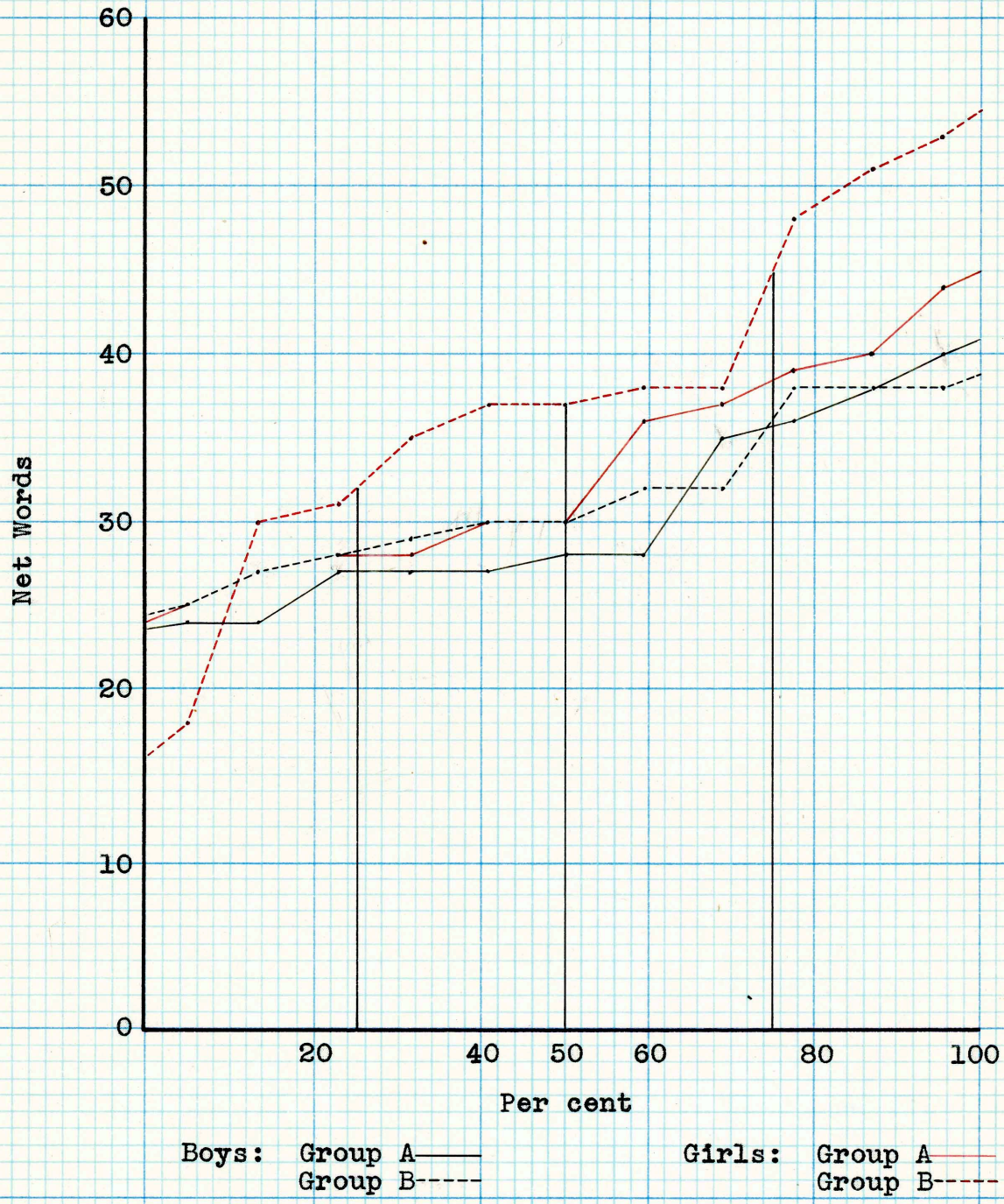

Figure 8. Median Net Words per Minute, Final Achievement Tests, Second Year

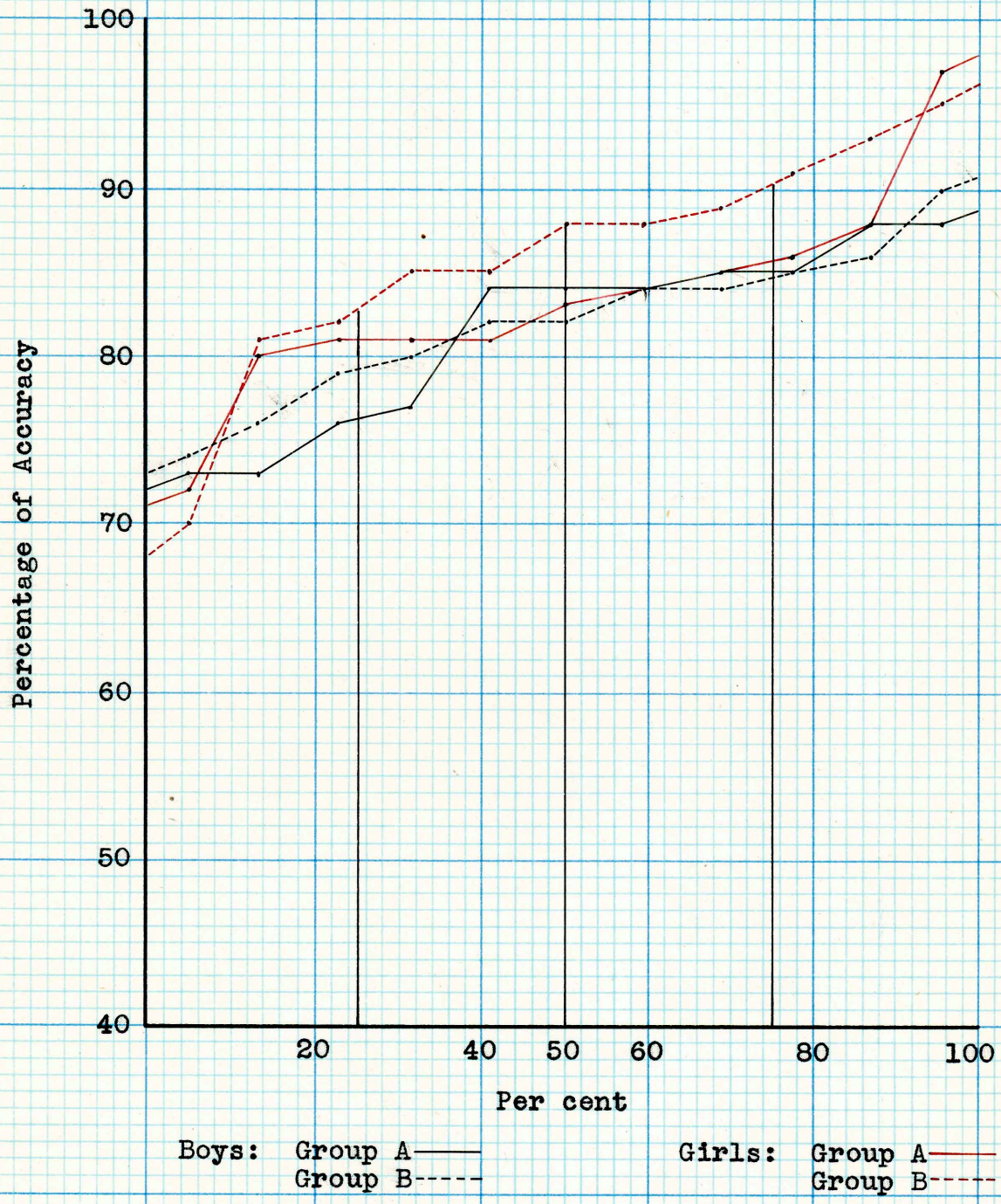

Figure 9. Median Percentage of Accuracy, Final Achievement Tests, Second Year

TABLE VI

Summary of Quartiles, Medians, and Average Differences for Second Year (Final Achievement Tests)

	Quartile	Group	Strokes per Test	Net Words per Minute	Percentage of Accuracy
Boys:	Q3	A	3156	35.75	85
	Q3	B	3322	36.5	84.75
	Median	A	2620	28	84
	Median	B	2816	30	82
	Q1	A	2492	27	76.25
	Q1	B	2707	28.25	79.25
Girls:	Q3	A	3539	38.25	85.75
	Q3	B	3955	45.5	90.5
	Median	A	2722	30	83
	Median	B	3205	37	88
	Q1	A	2580	28	81
	Q1	B	2824	32	82.75
			Average Differences*		
	Boys		B-100.8	B-1.2	B-1
	Girls		B-280.5	B-4.7	B-3.6

*The differences were in favor of the groups named.

CHAPTER III

CONCLUSIONS AND RECOMMENDATIONS

First Year

1. Strokes per minute. Group A (with emphasis upon accuracy) of the boys were writing more rapidly at the close of the first experiment than Group B (with emphasis upon quantity) of the boys. This group was also superior to either of the girls' groups. Taking average differences into consideration Group B of the girls was superior to Group A in practically the same degree as Group A, boys, was superior to Group B, boys. (Table III, p. 23 and Fig. 1, p. 19)

2. Blackstone Proficiency Test scores. The same comparative results were found here as for strokes per minute. Group A of the boys was the better, but Group B of the girls was the better. (Table III and Fig. 2, p. 20)

3. Ratio of strokes to errors. The ratio of strokes per minute to errors per test indicates that in accuracy Group A of both boys and girls was superior to Group B. The differences were very slight, however. (Table III and Fig. 3, p. 22)

4. Conclusion. In the first year's experiment there is nothing to indicate that either method is superior to the other. The comparatively slight differences may be due to the fact that the groups were not equal in typing ability. Too many items may have been taken into consideration in matching the pairs of students before dividing them into groups.

Perhaps these different items should have been weighted instead of giving them equal value as was done.

Second Year

1. Number of strokes on fifteen minute test. From an examination of Tables V and VI (pages 32 and 37) it is evident that the students in Group B--taught by the "quantity" method--were able to write more rapidly than those in Group A. This applies to both boys and girls, being more pronounced in the difference between the girls' groups. (Fig. 4, p. 28 and Fig. 7, p. 33)

2. Net speed per minute. In net words per minute Group B made higher records than Group A. The average difference for boys on the tests given during the last six weeks' period was only 1.2 words per minute. For girls the average difference was 4.7 words per minute. (Tables V and VI; Figures 5 and 8, pages 29 and 35)

3. Percentage of accuracy. Boys in Group A wrote more accurately than those in Group B, while the reverse is true of the girls' groups. The margin of difference is small, the average difference between the boys' groups being only 1% and between the girls' groups 3.6%. (Tables V and VI; Figures 6 and 9, pages 30 and 36) One would expect Groups A to be definitely superior in accuracy since they were required to turn in some accurate copy for twenty-six weeks, while Groups B were not.

4. Conclusion. Group A and Group B were practically equal in achievement in the case of the boys. The achievement in strokes on each test and in net words per minute for Group B, girls, as compared with Group A, girls, is enough greater to warrant the conclusion that the "quantity" method is somewhat the more effective. This is also true with respect to the accuracy of writing. Since accuracy is more important than speed to most employers of typists the preceding statement is significant.

It seemed to the writer from observations made during the course of the experiment that the individual students in Group B, girls, had a greater interest in their work than the girls in Group A. This may account for their superior work, at least in some degree. It is also possible that the "B" method was a motivating factor in their achievement.

General Recommendations

Before an experiment of this kind can be carried out and a definite answer found to the main question asked in this study, more work must be done in the field of testing for typing ability. In comparing two methods by means of experimentation as in this study the two groups of students must, as far as possible, be equal in ability. This is not all, however, for equal ability does not in all cases mean equal achievement. There must also be some method of determining with a reasonable degree of certainty what a student will do as well as what he is able to do. Accurate prognosis must

consider both ability and probability of achievement.

It seems that some system for conducting typewriting practice work which would, to a greater extent, take into account individual differences in students would be more desirable than either of the two methods tried in this study. A method which would stress technique rather than accomplishment, especially in the early part of the course, and which would not place strict error limits at any time in the course seems desirable. It is quite likely that some students in each group in this study would have done better had they been taught by the method used with the opposite group.

The number of students included in this experiment, forty-six the first year and forty-four the second, is rather small upon which to base any exact conclusions. Further investigations are needed.

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APPENDIX

SUBSTITUTION TEST. FORM A

DIRECTIONS: In the Key given below you will notice that there are ten letters. A number appears under each one. When the word "GO" is given by your teacher, you are to place under each letter the number which corresponds to it in the Key. Place the numbers in the little squares provided for them. Take the letters in the order in which they are given. Work as rapidly as you can.

(Time: Four Minutes) KEY (Possible Score: 200)

G	H	I	J	K	L	M	N	O	P
1	2	3	4	5	6	7	8	9	10

L	O	G	J	M	H	G	K	J	I	N	L	M	P	O	K	I	N	P	H
H	P	I	K	N	O	I	H	G	P	J	K	N	L	M	J	G	M	O	L
N	J	G	K	I	J	H	I	L	K	N	P	G	M	O	P	M	O	H	L
M	K	J	I	N	M	K	N	H	P	G	J	I	O	L	G	L	L	N	M
J	K	I	G	H	L	N	I	K	H	M	O	P	J	G	P	L	O	H	P
K	L	H	J	N	M	L	H	J	N	P	O	G	K	I	P	I	O	H	G
P	G	H	O	I	G	J	I	P	H	L	O	M	N	K	M	I	L	N	K
G	P	J	L	K	I	M	O	H	N	K	L	G	N	O	M	I	J	H	P
J	N	I	L	H	M	P	N	O	G	I	K	L	H	K	G	M	P	O	H
L	N	P	G	H	P	G	L	K	O	H	I	N	M	J	I	M	K	O	J

SUBSTITUTION TEST. FORM B

DIRECTIONS: In the Key given below you will notice that there are ten letters. A number appears under each one. When the word "GO" is given by your teacher, you are to place under each letter the number which corresponds to it in the Key. Place the numbers in the little squares provided for them. Take the letters in the order in which they are given. Work as rapidly as you can.

(Time: Four Minutes) KEY (Possible Score: 200)

Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4	5	6	7	8	9	10

R	U	S	Z	Q	Z	Q	W	U	S	Y	V	T	X	R	V	W	X	T	Y
Q	X	T	V	W	U	S	Z	Y	R	Z	U	X	S	V	Y	T	R	W	Q
V	Z	R	Q	T	R	U	Y	S	T	W	V	Z	X	Q	S	Y	U	X	W
Z	V	T	X	U	T	Z	R	Q	W	U	Y	S	V	X	R	S	Y	U	Q
Y	X	V	U	S	V	T	Q	Y	Z	X	W	R	S	U	Z	T	Q	R	W
W	T	R	S	Y	S	V	Z	U	S	W	Q	T	R	Y	V	Z	U	X	Q
T	X	S	U	Q	R	X	U	S	Y	V	Z	W	Q	T	V	Q	T	V	Q
X	S	V	Y	R	W	S	U	Z	T	Q	X	R	Y	V	T	W	U	Q	Z
S	X	T	W	Z	X	T	V	S	Y	R	U	Q	Z	W	U	R	Y	Q	V
U	Z	S	R	X	Y	V	Q	X	T	Z	W	R	U	S	V	W	U	Y	T

SPELLING TEST

Directions to Instructor: Dictate the following sentences to your students. Check the spelling of the words that are underscored. The score on the test will be the number of underscored words spelled correctly. Do not indicate to the students which words are to be checked.

1. In the meantime you may stay here.
2. He belongs to a past generation.
3. He committed a minor offense.
4. I will pledge my last dollar.
5. Charity begins at home.
6. He appeared at frequent intervals.
7. I lived in a village.
8. They have radical ideas.
9. You are a fortunate man.
10. We had an electrical storm.
11. He is deputy sheriff.
12. The tramp looks peculiar.
13. The Ford ran on one cylinder.
14. I admire antique furniture.
15. The literary societies meet tonight.
16. He gave me financial aid.
17. That pamphlet contains good literature.
18. He answered in the affirmative.
19. I believe in woman suffrage.
20. The politician was elected.
21. We celebrate the birth of George Washington.
22. The baby is healthy.
23. I cannot see the advantage of it.

SPELLING TEST, Page 2

24. You have set a high standard.
25. Smith was a marine during the war.
26. New York is an industrial center.
27. I hurt my shoulder.
28. He was racing his car against an airplane.
29. The tiger has great strength.
30. Drinking cups are not sanitary.
31. This report comes on good authority.
32. Our politics have been corrupt.
33. The mayor granted a franchise to the taxicab company.
34. His death was mysterious.
35. The court appointed a guardian for the orphan.
36. I am soliciting your support.
37. The city council met last night.
38. I saw the capitol building in Washington.
39. Show me how this apparatus works.
40. The war was an awful tragedy.
41. We hope the war has destroyed sectional feeling.
42. This firm pays good salaries.
43. The science of medicine has lengthened life.
44. The choir sang last Sunday.
45. The question of tariff or free trade has not been settled.
46. He believes in socialism.
47. I shall acknowledge my guilt.
48. One must overcome many obstacles to succeed.
49. It is an unusually cloudy day.

SPELLING TEST, Page 3

50. The question was referred to a committee.

51. After the meeting the conferees returned home.

52. The superintendent directs the schools.

53. He is undoubtedly at home.

54. The motion was carried by unanimous vote.

55. The election occurred yesterday.

56. He emphasizes his remarks by gestures.

57. He takes his meals at the restaurant.

58. This group was the nucleus of a new party.

59. He is accused of misappropriating the money.

60. Legal decisions are governed by precedents.

ATTENTION AND ACCURACY TEST (Part I)

Directions: Underscore all pairs of consecutive numbers whose sum is 9. Mark the pairs in the order in which they occur. Work as rapidly as you can.

2 8 1 4 6 2 7 3 5 9 8 6 3 1 5 9 0 1 1 8 7 2 6 3 2 5 4 7 3 6

1 4 6 6 7 8 9 7 2 3 4 9 6 4 7 3 2 8 5 3 2 8 0 1 2 3 5 7 5 3

8 4 4 5 9 7 1 3 6 7 6 4 3 8 9 5 2 4 5 8 7 3 2 9 4 0 7 4 3 2

5 3 7 8 6 4 1 8 8 1 9 3 0 9 8 5 7 2 2 4 0 9 3 6 4 3 5 4 0 9

4 9 8 7 3 4 6 3 7 4 5 2 3 0 9 5 3 7 2 8 5 3 7 6 3 8 7 0 9 7

7 3 4 6 2 9 0 4 7 9 8 1 3 4 1 8 0 3 7 3 2 7 4 8 0 2 6 8 2 4

6 3 4 6 7 3 6 2 8 5 4 7 9 8 0 7 2 1 8 3 9 0 1 7 0 9 8 1 2 7

8 2 8 3 4 5 9 3 6 0 7 4 7 2 8 4 9 7 8 3 1 8 4 6 2 8 9 0 3 8

7 8 6 2 7 8 6 7 3 6 2 4 6 9 4 5 0 8 3 3 6 4 2 3 2 7 3 9 7 4

8 4 6 0 9 2 9 7 4 3 5 8 1 7 6 5 3 2 0 7 8 3 7 3 1 9 4 6 7 8

7 6 8 4 3 2 9 8 7 2 2 7 5 3 8 6 5 4 8 3 5 7 5 4 9 3 3 6 7 2

3 4 2 1 9 2 2 7 6 1 8 8 0 9 4 9 0 4 3 8 1 7 3 2 7 8 9 6 3 1

8 7 6 5 1 2 3 1 8 5 7 2 8 9 6 3 2 8 3 6 1 2 3 6 5 4 4 5 1 2

9 0 6 7 0 9 4 6 8 1 2 5 1 8 2 9 0 7 2 3 7 1 8 9 6 0 9 1 9 2

4 3 8 1 7 3 9 8 2 1 1 8 6 7 2 0 7 5 3 6 4 7 3 6 8 5 4 3 4 5

6 3 4 9 8 1 5 6 3 9 5 4 2 3 4 5 8 9 2 4 8 1 1 7 5 2 9 8 0 1

4 6 7 3 2 1 5 4 8 2 9 8 0 1 5 4 6 4 5 3 5 7 8 1 2 0 3 7 4 7

1 9 8 6 4 3 5 0 1 9 0 6 7 2 8 5 3 9 8 2 4 9 0 3 2 4 0 7 3 1

Time: Five minutes.

Possible Score: 100. One point for each correctly underscored combination.

ATTENTION AND ACCURACY TEST (Part II)

Directions: Underscore all combinations of X and N. Mark the combinations in the order in which they occur. Work as rapidly as you can.

S D N X C V T Y X N I U N X U X N I O P X C N X A B V O X N

A N J X N F X U N X P U X N I O P L X V N X E X M W V N N Y

A B C X J N X Y X N O T X N P E T X T O I X B X N M N C O L

N B N X Y X N I Q Z X N I U N X O N M X N P X N Y X B N X T

N X Z X C N X P O I N X L K J X N M N U T X N I N X A B X N

W E R T N X P O L M N X U I T N X T N G N I J N X T X N I R

O P X N N K J X N U N X X U T N X T U I O X N I U N X U X N

S Y T E M N X A G N J K L M N C X U T R E W Q N X X T U I O

N N X U Y T N N X N N X R E T Y O P X N I O X N N X T N X I

S N M N X X N U I N X C I O P N X C N X U T E R F N X U X N

X X N U Y T D S X N A B G T U Y Q W E F N J O P Y T E K L S

N T I N X X V X N I N M J X N N U O N X C X J U N N N X N I

W R T U N X C X V N M N N X I U N C X G T X U N J K L I M N

J K L M N X C X X N J U N X N Y T R F X N N M N J U N N X C

A G N R Y T U I O P N C X N N I O N C X M K I X N M N N X O

I U Y N X Q U T N C X N J U N X V X N O M N Y X N N U X J N

L O P X M N X U X N J I N X F R X N I O M N D X N O P J N X

I K L N B V N Y N X X G I O X N J N X N T Y R N C X N M N O

E R W U N X C X N J I N X M N V X U X N N Y N X X N U I N X

U I O N X X Y T R E X N I O P L B V X N N O P O T N X I X N

R T U I N X C X N I U Y T X N N Y R E S N N M U I T O P I O

Time: Two and one-half minutes.

Possible Score: 100. One point for each correctly underscored combination.

TERMAN GROUP TEST OF MENTAL ABILITY

For Grades 7 to 12

Prepared by Lewis M. Terman, Stanford University, California

EXAMINATION: FORM A

1. Name ..... (First name / Last name)
2. Boy or girl .....Grade .....High or Low .....
3. Age last birthday .....Date of birthday ..... (Month / Day / Year)
4. Name of city (or county) .....
5. Name of school .....
6. Name of teacher .....
7. Date of this examination .....19..... (Month / Day / Year)

Do not turn the page until you are told to.

Test	Score	Remarks or Further Data
1. Information		
2. Best Answer		
3. Word Meaning		
4. Logical Selection		
5. Arithmetic		
6. Sentence Meaning		
7. Analogies		
8. Mixed Sentences		
9. Classification		
10. Number Series		
Total		

TEST 1. INFORMATION

Draw a line under the ONE word that makes the sentence true, as shown in the sample.

SAMPLE. Our first President was
Adams Jefferson Lincoln <u>Washington</u>

1 Coffee is a kind of
bark berry leaf root 1
2 Sirloin is a cut of
beef mutton lamb veal 2
3 Gasoline comes from
grains petroleum turpentine seeds 3
4 Most exports go from
Boston San Francisco New Orleans New York . 4
5 The number of pounds in a ton is
1000 2000 3000 4000 5

6 Napoleon was finally defeated at
Leipzig Paris Verdun Waterloo 6
7 Emeralds are usually
blue green red yellow 7
8 The optic nerve is for
seeing hearing tasting feeling 8
9 Larceny is a term used in
medicine theology law pedagogy 9
10 Sponges come from
animals farms forests mines 10

11 Confucius founded the religion of the
Persians Italians Chinese Indians 11
12 The larynx is in the
abdomen head throat shoulder 12
13 The piccolo is used in
farming music photography typewriting 13
14 The kilowatt measures
rainfall wind-power electricity water-power 14
15 The guillotine causes
death disease fever sickness 15

16 A character in " David Copperfield " is
Sindbad Uriah Heep Rebecca Hamlet 16
17 A windlass is used for
boring cutting lifting squeezing 17
18 A great law-giver of the Hebrews was
Abraham David Moses Saul 18
19 A six-sided figure is called a
scholium parallelogram hexagon trapezium 19
20 A meter is nearest in length to the
inch foot yard rod 20

Right .....

TEST 2. BEST ANSWER

Read each question or statement and make a cross before the BEST answer, as shown in the sample.

SAMPLE

Why do we buy clocks? Because

1 We like to hear them strike.
2 They have hands.
× 3 They tell us the time.

1 **Spokes of a wheel are often made of hickory because**
1 Hickory is tough.
2 It cuts easily.
3 It takes paint nicely.

2 **The saying, "A watched pot never boils," means**
1 We should never watch a pot on the fire.
2 Boiling takes a long time.
3 Time passes slowly when we are waiting for something.

3 **A train is harder to stop than an automobile because**
1 It has more wheels.
2 It is heavier.
3 Its brakes are not so good.

4 **The saying, "Make hay while the sun shines," means**
1 Hay is made in summer.
2 We should make the most of our opportunities.
3 Hay should not be cut at night.

5 **If the earth were nearer the sun**
1 The stars would disappear.
2 Our months would be longer.
3 The earth would be warmer.

6 **The saying, "If wishes were horses, beggars would ride," means**
1 Wishing doesn't get us very far.
2 Beggars often wish for horses to ride.
3 Beggars are always asking for something.

7 **The saying, "Little strokes fell great oaks," means**
1 Oak trees are weak.
2 Little strokes are best.
3 Continued effort brings results.

8 **A steel battleship floats because**
1 The engines hold it up.
2 It has much air space inside.
3 It contains some wood.

9 **The feathers on a bird's wings help him to fly because**
1 They make a wide, light surface.
2 They keep the air off his body.
3 They decrease the bird's weight.

10 **The saying, "A carpenter should stick to his bench," means**
1 Carpenters should not work without benches.
2 Carpenters should not be idle.
3 One should work at the thing he can do best.

11 **The saying, "One swallow does not make a summer," means**
1 Swallows come back for the summer.
2 A single sign is not sufficient proof.
3 Many birds add to the pleasures of summer.

Right..... × 2 = *Score*.....

TEST 3. WORD MEANING

When two words mean the SAME, draw a line under "SAME."
When they mean the OPPOSITE, draw a line under "OPPOSITE."

SAMPLES	fall — drop	same — opposite	
	north — south	same — opposite	
1	expel — retain	same — opposite	1
2	comfort — console	same — opposite	2
3	waste — conserve	same — opposite	3
4	monotony — variety	same — opposite	4
5	quell — subdue	same — opposite	5
6	major — minor	same — opposite	6
7	boldness — audacity	same — opposite	7
8	exult — rejoice	same — opposite	8
9	prohibit — allow	same — opposite	9
10	debase — degrade	same — opposite	10
11	recline — stand	same — opposite	11
12	approve — veto	same — opposite	12
13	amateur — expert	same — opposite	13
14	evade — shun	same — opposite	14
15	tart — acid	same — opposite	15
16	concede — deny	same — opposite	16
17	tonic — stimulant	same — opposite	17
18	incite — quell	same — opposite	18
19	economy — frugality	same — opposite	19
20	rash — prudent	same — opposite	20
21	obtuse — acute	same — opposite	21
22	transient — permanent	same — opposite	22
23	expel — eject	same — opposite	23
24	hoax — deception	same — opposite	24
25	docile — submissive	same — opposite	25
26	wax — wane	same — opposite	26
27	incite — instigate	same — opposite	27
28	reverence — veneration	same — opposite	28
29	asset — liability	same — opposite	29
30	appease — placate	same — opposite	30

Right.....*Wrong*.....*Score*.....

TEST 4. LOGICAL SELECTION

In each sentence draw a line under the TWO words that tell what the thing ALWAYS has. Underline TWO, and ONLY TWO, in each line.

SAMPLE. A **man** always has
body cap gloves **mouth** money

1 A **horse** always has
harness hoofs shoes stable tail 1
2 A **circle** always has
altitude circumference latitude longitude radius 2
3 A **bird** always has
bones eggs beak nest song 3
4 **Music** always has
listener piano rhythm sound violin 4
5 An **object** always has
smell size taste value weight 5

6 **Conversation** always has
agreement persons questions wit speech 6
7 A **banquet** always has
food music persons speeches toastmaster 7
8 A **pistol** always has
barrel bullet cartridge sights trigger 8
9 A **ship** always has
engine guns keel rudder sails 9
10 A **debt** always involves
creditor debtor interest mortgage payment 10

11 A **game** always has
cards contestants forfeits penalties rules 11
12 A **magazine** always has
advertisements paper pictures print stories 12
13 A **museum** always has
animals arrangement collections minerals visitors 13
14 A **forest** always has
animals flowers shade underbrush trees 14
15 A **citizen** always has
country occupation privileges property vote 15

16 **Controversy** always involves
claims disagreement dislike enmity hatred 16
17 **War** always has
airplanes cannons combat rifles soldiers 17
18 **Obstacles** always bring
difficulty discouragement failure hindrance stimulation .. 18
19 **Abhorrence** always involves
aversion dislike fear rage timidity 19
20 **Compromise** always involves
adjustment agreement friendship respect satisfaction ... 20

Right .....

TEST 5. ARITHMETIC

Find the answers as quickly as you can.
Write the answers on the dotted lines.
Use the bottom of the page to figure on.

---

1 How many hours will it take a person to go 66 miles at the rate of 6 miles an hour? *Answer*.....

2 At the rate of 2 for 5 cents, how many pencils can you buy for 50 cents? *Answer*.....

3 If a man earns $20 a week and spends $14, how long will it take him to save $300? *Answer*.....

4 $2 \times 3 \times 4 \times 6$ is how many times as much as 3×4? *Answer*.....

5 If two pies cost 66 cents, what does a sixth of a pie cost? *Answer*.....

6 What is $16\frac{2}{3}$ per cent of $120? *Answer*.....

7 4 per cent of $1000 is the same as 8 per cent of what amount? *Answer*.....

8 A has $180, B has $\frac{2}{3}$ as much as A, and C has $\frac{1}{2}$ as much as B. How much have all together? *Answer*.....

9 The capacity of a rectangular bin is 48 cubic feet. If the bin is 6 feet long and 4 feet wide, how deep is it? *Answer*.....

10 If it takes 7 men 2 days to dig a 140-foot ditch, how many men are needed to dig it in half a day? *Answer*.....

11 A man spends $\frac{1}{4}$ of his salary for board and room, and $\frac{3}{8}$ for all other expenses. What per cent of his salary does he save? *Answer*.....

12 If a man runs 100 yards in 10 seconds, how many feet does he run in $\frac{1}{5}$ of a second? *Answer*.....

Right..... $\times 2 =$ *Score*.....

TEST 6. SENTENCE MEANING

Draw a line under the right answer, as shown in the samples.

SAMPLES	Is coal obtained from mines?	Yes	No	
	Are all men six feet tall?	Yes	No	
1	Does a conscientious person ever make mistakes?	Yes	No	1
2	Is an alloy a kind of musical instrument?	Yes	No	2
3	Is scurvy a kind of medicine?	Yes	No	3
4	Are mysterious things often uncanny?	Yes	No	4
5	Are destitute persons often subjects of charity?	Yes	No	5
6	Are anonymous letters ever properly signed?	Yes	No	6
7	Is the mimeograph sometimes used by stenographers? .	Yes	No	7
8	Is a curriculum intended for horses?	Yes	No	8
9	Are proteids essential to health?	Yes	No	9
10	Does " perfunctory " mean the same as " careful "? ..	Yes	No	10
11	Are premeditated deeds always wicked?	Yes	No	11
12	Do alleged facts often require verification?	Yes	No	12
13	Are sheep carnivorous?	Yes	No	13
14	Are aristocrats subservient to their inferiors?	Yes	No	14
15	Are venerable people usually respected?	Yes	No	15
16	Is clematis sometimes cultivated?	Yes	No	16
17	Are ultimate results the last to appear?	Yes	No	17
18	Are cerebral hemorrhages helpful to thinking?	Yes	No	18
19	Are all people religious who have hallucinations?	Yes	No	19
20	Are intermittent sounds discontinuous?	Yes	No	20
21	Are sable colors preferred for nations' flags?	Yes	No	21
22	Does social contact tend to reduce eccentricities?	Yes	No	22
23	Are tentative decisions usually final?	Yes	No	23
24	Is rancor usually characterized by persistence?	Yes	No	24

Right.....*Wrong*.....*Score*.....

TEST 7. ANALOGIES

SAMPLES

Ear is to hear as eye is to
table <u>see</u> hand play

Hat is to head as shoe is to
arm coat <u>foot</u> leg

Do them all like samples.

---

1 Coat is to wear as bread is to
eat starve water cook 1

2 Week is to month as month is to
year hour minute century 2

3 Monday is to Tuesday as Friday is to
week Thursday day Saturday 3

4 Tell is to told as speak is to
sing spoke speaking sang 4

5 Lion is to animal as rose is to
smell leaf plant thorn 5

6 Cat is to tiger as dog is to
wolf bark bite snap 6

7 Success is to joy as failure is to
sadness luck fail work 7

8 Liberty is to freedom as bondage is to
negro slavery free suffer 8

9 Cry is to laugh as sadness is to
death joy coffin doctor 9

10 Tiger is to hair as trout is to
water fish scales swims 10

11 1 is to 3 as 9 is to
18 27 36 45 11

12 Lead is to heavy as cork is to
bottle weight light float 12

13 Poison is to death as food is to
eat bird life bad 13

14 4 is to 16 as 5 is to
7 45 35 25 14

15 Food is to hunger as water is to
drink clear thirst pure 15

16 b is to d as second is to
third later fourth last 16

17 City is to mayor as army is to
navy soldier general private 17

18 Here is to there as this is to
these those that then 18

19 Subject is to predicate as noun is to
pronoun adverb verb adjective 19

20 Corrupt is to depraved as sacred is to
Bible hallowed prayer Sunday 20

Right .....

TEST 8. MIXED SENTENCES

The words in each sentence below are mixed up. If what a sentence means is TRUE, draw a line under "TRUE." If what it means is FALSE, draw a line under "FALSE."

SAMPLES	hear are with to ears	true	false	
	eat gunpowder to good is	true	false	
1	true bought cannot friendship be	true	false	1
2	good sea drink to is water	true	false	2
3	of is the peace war opposite	true	false	3
4	get grow they as children taller older	true	false	4
5	horses automobile an are than slower	true	false	5
6	never deeds rewarded be should good	true	false	6
7	four hundred all pages contain books	true	false	7
8	to advice sometimes is good follow hard	true	false	8
9	envy bad greed traits are and	true	false	9
10	grow an than strawberries oak tree higher	true	false	10
11	external deceive never appearances us	true	false	11
12	never is man what show a deeds	true	false	12
13	hatred bad unfriendliness traits are and	true	false	13
14	often judge can we actions man his by a	true	false	14
15	in are always American cities born presidents	true	false	15
16	certain always death of cause kinds sickness	true	false	16
17	are sheet blankets as as a never warm	true	false	17
18	never who heedless those stumble are	true	false	18

Right.....*Wrong*.....*Score*.....

TEST 9. CLASSIFICATION

SAMPLES
1 bullet cannon gun sword ~~pencil~~
2 Canada ~~Chicago~~ China India France

In each line cross out the word that does not belong there.
Cross out JUST ONE WORD in each line.

1	Frank James John Sarah William	1
2	Baptist Catholic Methodist Presbyterian Republican	2
3	automobile bicycle buggy telegraph train	3
4	Collie Holstein Shepherd Spitz Terrier	4
5	hop run skip stand walk	5
6	death grief picnic poverty sadness	6
7	bed chair dish sofa table	7
8	hard rough smooth soft sweet	8
9	mechanic doctor lawyer preacher teacher	9
10	Christ Confucius Mohammed Moses Cæsar	10
11	butterfly hawk ostrich robin swallow	11
12	cloth cotton flax hemp wool	12
13	digestion hearing sight smell touch	13
14	down hither recent up yonder	14
15	anger hatred joy pity reasoning	15
16	Australia Cuba Iceland Ireland Spain	16
17	Dewey Farragut Grant Paul Jones Schley	17
18	give lend lose keep waste	18

Right.....

TEST 10. NUMBER SERIES

SAMPLES	5	10	15	20	25	30	35
	20	18	16	14	12	10	8

In each row try to find out how the numbers are made up, then on the two dotted lines write the TWO numbers that should come next.

1st Row			8	7	6	5	4	3	....
2d Row		3	8	13	18	23	28	....	
3d Row		$11\frac{3}{4}$	12	$12\frac{1}{4}$	$12\frac{1}{2}$	$12\frac{3}{4}$	....		
4th Row			8	8	6	6	4	4	....
5th Row			1	2	4	8	16	32	....
6th Row		4	3	5	4	6	5	7	....
7th Row			16	8	4	2	1	$\frac{1}{2}$	....
8th Row		8	9	12	13	16	17	....	
9th Row	7	11	15	16	20	24	25	29	....
10th Row	31.3	40.3	49.3	58.3	67.3	76.3	....		
11th Row				$\frac{1}{25}$	$\frac{1}{5}$	1	5	....	
12th Row			3	4	6	9	13	18	....

Right ..... × 2 = *Score* .....

OTIS SELF-ADMINISTERING TESTS OF MENTAL ABILITY

By ARTHUR S. OTIS

Formerly Development Specialist with Advisory Board, General Staff, United States War Department

HIGHER EXAMINATION: FORM A

20 **For High Schools and Colleges** Score.....

Read this page. Do what it tells you to do.

Do not open this paper, or turn it over, until you are told to do so. Fill these blanks, giving your name, age, birthday, etc. Write plainly.

Name.....Age last birthday.....years
First name, initial, and last name

Birthday.....Class.....Date.....19....
Month Day

School or College.....City.....

This is a test to see how well you can think. It contains questions of different kinds. Here is a sample question already answered correctly. Notice how the question is answered:

Which one of the five words below tells what an apple is?
1 flower, 2 tree, 3 vegetable, 4 fruit, 5 animal.....(4)

The right answer, of course, is "fruit"; so the word "fruit" is underlined. And the word "fruit" is No. 4; so a figure 4 is placed in the parentheses at the end of the dotted line. This is the way you are to answer the questions.

Try this sample question yourself. Do not write the answer; just draw a line under it and then put its number in the parentheses:

Which one of the five words below means the opposite of north?
1 pole, 2 equator, 3 south, 4 east, 5 west.....( )

The answer, of course, is "south"; so you should have drawn a line under the word "south" and put a figure 3 in the parentheses. Try this one:

A foot is to a man and a paw is to a cat the same as a hoof is to a — what?
1 dog, 2 horse, 3 shoe, 4 blacksmith, 5 saddle.....( )

The answer, of course, is "horse"; so you should have drawn a line under the word "horse" and put a figure 2 in the parentheses. Try this one:

At four cents each, how many cents will 6 pencils cost?.....( )

The answer, of course, is 24, and there is nothing to underline; so just put the 24 in the parentheses.

If the answer to any question is a number or a letter, put the number or letter in the parentheses without underlining anything. Make all letters like printed capitals.

The test contains 75 questions. You are not expected to be able to answer all of them, but do the best you can. You will be allowed half an hour after the examiner tells you to begin. Try to get as many right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. No questions about the test will be answered by the examiner after the test begins. Lay your pencil down.

Do not turn this page until you are told to begin.

Published by World Book Company, Yonkers-on-Hudson, New York, and 2126 Prairie Avenue, Chicago
 OSATMA: HE: A-26

EXAMINATION BEGINS HERE:

1. The opposite of hate is (?)
   1 enemy, 2 fear, 3 love, 4 friend, 5 joy ..... ( )
2. If 3 pencils cost 5 cents, how many pencils can be bought for 50 cents? ..... ( )
3. A bird does not always have (?)
   1 wings, 2 eyes, 3 feet, 4 a nest, 5 a bill ..... ( )
4. The opposite of honor is (?)
   1 glory, 2 disgrace, 3 cowardice, 4 fear, 5 defeat ..... ( )
5. A fox most resembles a (?)
   1 wolf, 2 goat, 3 pig, 4 tiger, 5 cat ..... ( )
6. Quiet is related to sound in the same way that darkness is related to (?)
   1 a cellar, 2 sunlight, 3 noise, 4 stillness, 5 loud ..... ( )
7. A party consisted of a man and his wife, his two sons and their wives, and four children in each son's family. How many were there in the party? ..... ( )
8. A tree always has (?)
   1 leaves, 2 fruit, 3 buds, 4 roots, 5 a shadow ..... ( )
9. The opposite of economical is (?)
   1 cheap, 2 stingy, 3 extravagant, 4 value, 5 rich ..... ( )
10. Silver is more costly than iron because it is (?)
    1 heavier, 2 scarcer, 3 whiter, 4 harder, 5 prettier ..... ( )
11. Which one of the six statements below tells the meaning of the following proverb? "The early bird catches the worm." ..... ( )

    1. Don't do the impossible.
    2. Weeping is bad for the eyes.
    3. Don't worry over troubles before they come.
    4. Early birds like worms best.
    5. Prompt persons often secure advantages over tardy ones.
    6. It is foolish to fret about things we can't help.

12. Which statement above tells the meaning of this proverb? "Don't cry over spilt milk." .... ( )
13. Which statement above explains this proverb? "Don't cross a bridge till you get to it." .... ( )
14. An electric light is related to a candle as an automobile is to (?)
    1 a carriage, 2 electricity, 3 a tire, 4 speed, 5 glow ..... ( )
15. If a boy can run at the rate of 6 feet in $\frac{1}{4}$ of a second, how many feet can he run in 10 seconds? ( )
16. A meal always involves (?)
    1 a table, 2 dishes, 3 hunger, 4 food, 5 water ..... ( )
17. Of the five words below, four are alike in a certain way. Which is the one not like these four?
    1 bend, 2 shave, 3 chop, 4 whittle, 5 shear ..... ( )
18. The opposite of never is (?)
    1 often, 2 sometimes, 3 occasionally, 4 always, 5 frequently ..... ( )
19. A clock is related to time as a thermometer is to (?)
    1 a watch, 2 warm, 3 a bulb, 4 mercury, 5 temperature ..... ( )
20. Which word makes the truest sentence? Men are (?) shorter than their wives.
    1 always, 2 usually, 3 much, 4 rarely, 5 never ..... ( )
21. One number is wrong in the following series. What should that number be?
    1 4 2 5 3 6 4 7 5 9 6 9 ..... ( )
22. If the first two statements following are true, the third is (?) All members of this club are Republicans. Smith is not a Republican. Smith is a member of this club.
    1 true, 2 false, 3 not certain ..... ( )
23. A contest always has (?)
    1 an umpire, 2 opponents, 3 spectators, 4 applause, 5 victory ..... ( )
24. Which number in this series appears a second time nearest the beginning?
    6 4 5 3 7 8 0 9 5 9 8 8 6 5 4 7 3 0 8 9 1 ..... ( )
25. The moon is related to the earth as the earth is to (?)
    1 Mars, 2 the sun, 3 clouds, 4 stars, 5 the universe ..... ( )
26. Which word makes the truest sentence? Fathers are (?) wiser than their sons.
    1 always, 2 usually, 3 much, 4 rarely, 5 never ..... ( )

27. The opposite of awkward is (?)
1 strong, 2 pretty, 3 short, 4 graceful, 5 swift..... ( )

28. A mother is always (?) than her daughter.
1 wiser, 2 taller, 3 stouter, 4 older, 5 more wrinkled..... ( )

29. Which one of the six statements below tells the meaning of the following proverb? "The burnt child dreads the fire."..... ( )

1. Frivolity flourishes when authority is absent.
2. Unhappy experiences teach us to be careful.
3. A thing must be tried before we know its value.
4. A meal is judged by the dessert.
5. Small animals never play in the presence of large ones.
6. Children suffer more from heat than grown people.

30. Which statement above explains this proverb? "When the cat is away, the mice will play." ( )

31. Which statement above explains this proverb? "The proof of the pudding is in the eating." ( )

32. If the settlement of a difference is made by mutual concession, it is called a (?)
1 promise, 2 compromise, 3 injunction, 4 coercion, 5 restoration..... ( )

33. What is related to disease as carefulness is to accident?
1 doctor, 2 surgery, 3 medicine, 4 hospital, 5 sanitation..... ( )

34. Of the five things below, four are alike in a certain way. Which is the one not like these four?
1 smuggle, 2 steal, 3 bribe, 4 cheat, 5 sell..... ( )

35. If 10 boxes full of apples weigh 400 pounds, and each box when empty weighs 4 pounds, how many pounds do all the apples weigh?..... ( )

36. The opposite of hope is (?)
1 faith, 2 misery, 3 sorrow, 4 despair, 5 hate..... ( )

37. If all the odd-numbered letters in the alphabet were crossed out, what would be the tenth letter not crossed out? Print it. *Do not mark the alphabet.*
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z..... ( )

38. What letter in the word SUPERFLUOUS is the same number in the word (counting from the beginning) as it is in the alphabet? Print it..... ( )

39. What people say about a person constitutes his (?)
1 character, 2 gossip, 3 reputation, 4 disposition, 5 personality..... ( )

40. If $2\frac{1}{2}$ yards of cloth cost 30 cents, how many cents will 10 yards cost?..... ( )

41. If the words below were arranged to make a good sentence, with what letter would the second word of the sentence begin? Make it like a printed capital.
same means big large the as..... ( )

42. If the first two statements following are true, the third is (?) George is older than Frank. James is older than George. Frank is younger than James.
1 true, 2 false, 3 not certain..... ( )

43. Suppose the first and second letters in the word CONSTITUTIONAL were interchanged, also the third and fourth letters, the fifth and sixth, etc. Print the letter that would then be the twelfth letter counting to the right..... ( )

44. One number is wrong in the following series. What should that number be?
0 1 3 6 10 15 21 28 34..... ( )

45. If $4\frac{1}{2}$ yards of cloth cost 90 cents, how many cents will $2\frac{1}{2}$ yards cost?..... ( )

46. A man's influence in a community should depend upon his (?)
1 wealth, 2 dignity, 3 wisdom, 4 ambition, 5 political power..... ( )

47. What is related to few as ordinary is to exceptional?
1 none, 2 some, 3 many, 4 less, 5 more..... ( )

48. The opposite of treacherous is (?)
1 friendly, 2 brave, 3 wise, 4 cowardly, 5 loyal..... ( )

49. Which one of the five words below is most unlike the other four?
1 good, 2 large, 3 red, 4 walk, 5 thick..... ( )

50. If the first two statements following are true, the third is (?) Some of Brown's friends are Baptists. Some of Brown's friends are dentists. Some of Brown's friends are Baptist dentists.
1 true, 2 false, 3 not certain..... ( )

51. How many of the following words can be made from the letters in the word LARGEST, using any letter any number of times?
great, stagger, grasses, trestle, struggle, rattle, garage, strangle..... ( )

52. The statement that the moon is made of green cheese is (?)
1 absurd, 2 misleading, 3 improbable, 4 unfair, 5 wicked..... ( )

 Do not stop. Go on with the next page.

53. Of the five things following, four are alike in a certain way. Which is the one not like these four?
1 tar, 2 snow, 3 soot, 4 ebony, 5 coal..... ( )

54. What is related to a cube in the same way in which a circle is related to a square?
1 circumference, 2 sphere, 3 corners, 4 solid, 5 thickness..... ( )

55. If the following words were seen on a wall by looking in a mirror on an opposite wall, which word would appear exactly the same as if seen directly?
1 OHIO, 2 SAW, 3 NOON, 4 MOTOR, 5 OTTO..... ( )

56. If a strip of cloth 24 inches long will shrink to 22 inches when washed, how many inches long will a 36-inch strip be after shrinking?..... ( )

57. Which of the following is a trait of character?
1 personality, 2 esteem, 3 love, 4 generosity, 5 health..... ( )

58. Find the two letters in the word DOING which have just as many letters between them in the word as in the alphabet. Print the one of these letters that comes first in the alphabet.
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z..... ( )

59. Revolution is related to evolution as flying is to (?)
1 birds, 2 whirling, 3 walking, 4 wings, 5 standing..... ( )

60. One number is wrong in the following series: What should that number be?
1 3 9 27 81 108..... ( )

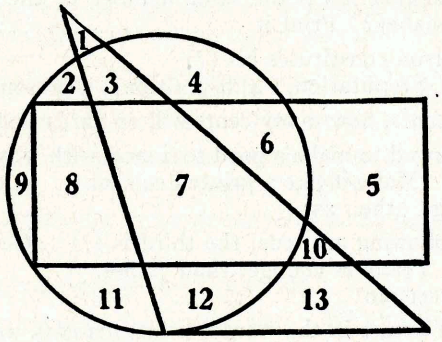
61. If Frank can ride a bicycle 30 feet while George runs 20 feet, how many feet can Frank ride while George runs 30 feet?..... ( )

62. Count each N in this series that is followed by an O next to it if the O is not followed by a T next to it. Tell how many N's you count.
N O N T Q M N O T M O N O O N Q M N N O Q N O T O N A M O N O M..... ( )

63. A man who is averse to change and progress is said to be (?)
1 democratic, 2 radical, 3 conservative, 4 anarchistic, 5 liberal..... ( )

64. Print the letter which is the fourth letter to the left of the letter which is midway between O and S in the alphabet..... ( )

65. What number is in the space which is in the rectangle and in the triangle but not in the circle? ( )



66. What number is in the same geometrical figure or figures as the number 8?..... ( )

67. How many spaces are there that are in any two but only two geometrical figures?..... ( )

68. A surface is related to a line as a line is to (?)
1 solid, 2 plane, 3 curve, 4 point, 5 string..... ( )

69. If the first two statements following are true, the third is (?) One cannot become a good violinist without much practice. Charles practices much on the violin. Charles will become a good violinist.
1 true, 2 false, 3 not certain..... ( )

70. If the words below were arranged to make the best sentence, with what letter would the last word of the sentence end? Print the letter as a capital.
sincerity traits courtesy character of desirable and are..... ( )

71. A man who is influenced in making a decision by preconceived opinions is said to be (?)
1 influential, 2 prejudiced, 3 hypocritical, 4 decisive, 5 impartial..... ( )

72. A hotel serves a mixture of 2 parts cream and 3 parts milk. How many pints of cream will it take to make 15 pints of the mixture?..... ( )

73. What is related to blood as physics is to motion?
1 temperature, 2 veins, 3 body, 4 physiology, 5 geography..... ( )

74. A statement the meaning of which is not definite is said to be (?)
1 erroneous, 2 doubtful, 3 ambiguous, 4 distorted, 5 hypothetical..... ( )

75. If a wire 20 inches long is to be cut so that one piece is $\frac{2}{3}$ as long as the other piece, how many inches long must the shorter piece be?..... ( )

BLACKSTONE STENOGRAPHIC PROFICIENCY TESTS

By E. G. BLACKSTONE, Detroit Teachers College, Detroit, Michigan

TYPEWRITING TEST: FORM A

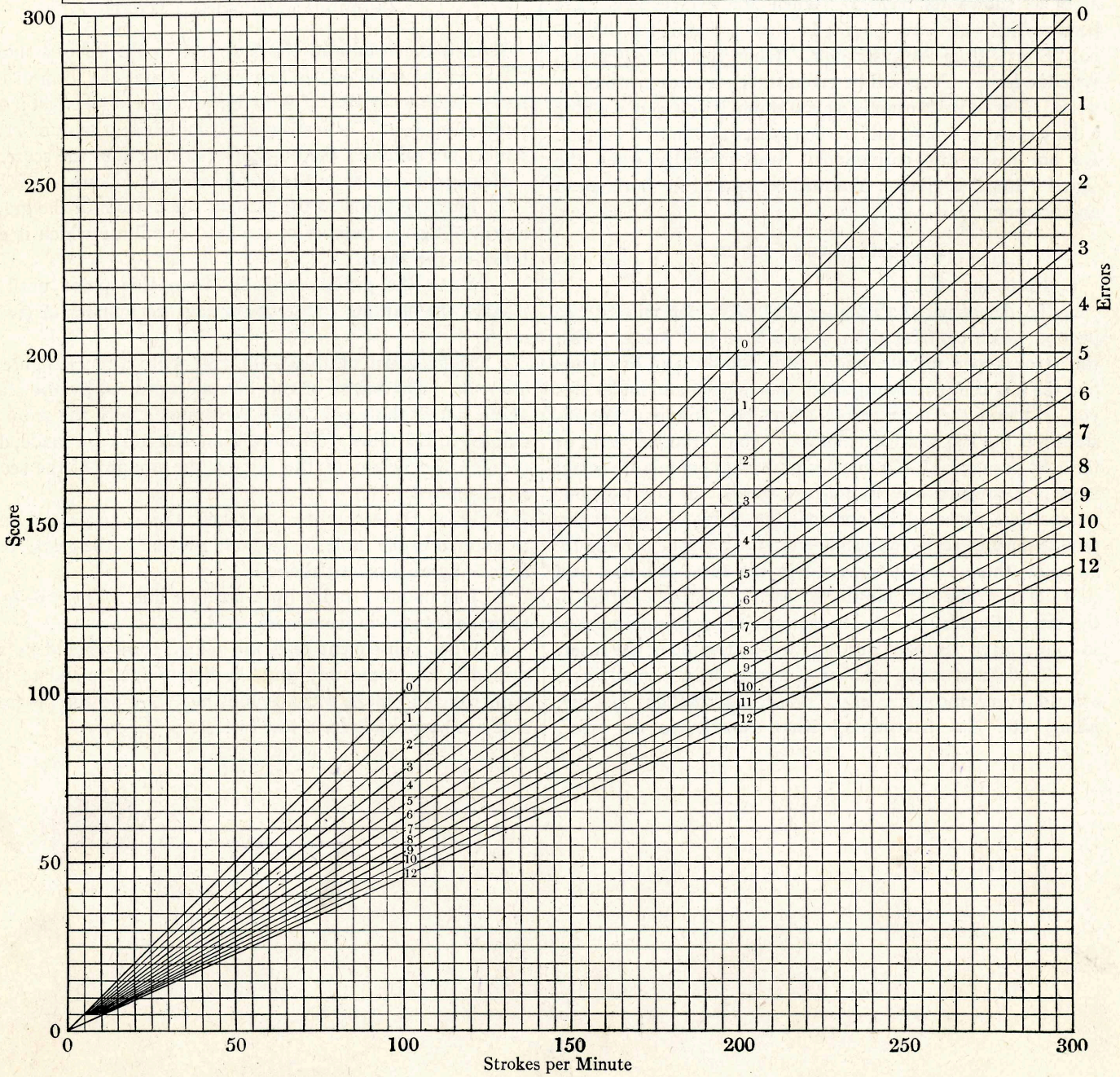
Name..... Date of birth..... 19....

Grade..... Teacher..... Examiner.....

School..... City.....

INDIVIDUAL PROGRESS RECORD

Test	1st	2d	3d	4th	5th	6th	7th	8th	9th	10th
Form Used										
Date										
Months of Instruction										
Strokes per Minute										
Errors										
Score										



Directions for Taking the Test

1. If you have not taken the Blackstone Typewriting Test before, write your name, date of birth, grade, etc., in the spaces provided on the first page. (Use pen or pencil.) Otherwise, make no marks on this folder, as it may be used again.

2. Set the marginal stops at 5 and 75.

3. Set the machine for double spacing.

4. Set the tabulator key at 10.

5. Practice for five minutes on matter other than this test.

6. Place regular typewriting paper in the machine.

7. Begin about an inch from the top of the page and leave an inch margin at the left. (If you use an Elite typewriter, leave an inch and a half margin at the left.)

8. Type the first four lines on page 4, supplying all the information asked for except the blanks in the first line, which will be filled in after the test has been completed.

9. Set the typewriter to begin the words "Dear Sir," exactly as shown on page 4. When above directions have been carried out, leave page 4 in view and wait for the signal "Start" from the instructor. When this order is given, type the letter. You will be given three minutes in which to write. Try to write exactly as you would if you were copying a daily exercise. You will not be expected to finish the letter. Do not make any corrections. Stop instantly when the signal "Stop" is given. You will be marked for both speed and accuracy.

Directions for Scoring

1. Exchange papers.

2. To determine the number of strokes per minute, see page 3, which contains the test you have just written, with the strokes per minute under each word. On this page find the last complete word which was written and under this you will find the number of strokes per minute. For instance, if the last word written was "you" (the last word of the first paragraph), the number of strokes per minute would be 97. Disregard any unfinished words. If any words or letters were repeated or omitted, the count of strokes per minute must be corrected as follows: Add 1 stroke per minute for each three strokes repeated in the three minutes, and subtract 1 stroke per minute for each 3 strokes omitted in the three minutes. Write the number of strokes per minute so found after "Strokes per minute" at the top of the sheet.

3. To determine the number of errors, draw a small circle around every incorrect *letter*, *stroke*, *punctuation*, *spacing*, *piling*, etc. In determining what constitutes an error, use the International Contest Rules. In general, an error is any stroke which is not like the copy, except that it is not necessary to have the same number of words to the line. Be sure to mark every incorrect letter. There may be more than one error in one word; in fact, there may be as many mistakes as there are strokes in the word. Write the number of strokes wrong after "Errors."

4. The measures of speed and accuracy are combined in a single score. Find the score for the paper as follows: Multiply the number of strokes per minute by 10. Divide this product by the number of errors plus 10. Thus,

$$\text{Score} = \frac{\text{Strokes per minute} \times 10}{\text{Errors} + 10}$$

Write the score thus found after "Score" on the test paper.

5. Hand in the papers as the teacher directs.

Directions for Recording Scores on the Individual Progress Record

Record the results of the first test in the column under "1st" in the table on the first page. Enter the form of the test — whether A, B, C, D, or E; the date of the test; the number of months of instruction completed; the number of strokes per minute; the number of errors; and the score.

Next, plot a point in the graph below as follows:

1. Find the point on the scale at the bottom of the graph representing the number of strokes per minute which is entered in the table.

2. Move the pencil vertically from this point until it reaches the slanting line representing the number of errors made.

3. Make a dot at this point and write a small figure 1 above it. The height of this dot, as measured by the scale at the left of the graph, should correspond with the score as entered in the table. (If more than 12 errors are made, determine the height of the dot by the amount of the score as calculated.)

4. When the second test is taken, the same data should be entered in the table, a new point plotted in the graph, and a small figure 2 placed above it.

5. Join points 1 and 2 by a straight line. This will help to make the gain in score more vivid.

6. When subsequent tests are taken, these should be recorded in the same way and the new points joined to the former ones to make a continuous line showing the progress that has been made from test to test.

Dear Sir:

Answering your request, we recently quoted you a low price on our pianos, and not having received your order, we take occasion to inquire whether you have as yet bought. If you have, will you tell us what make you selected and in what respect our offer failed to interest you?

We make this request only as a matter of business, for we are making our plan just as attractive to the customer as we know how, and the rapidly increasing number of orders from all parts of the country is proof that they are regarded favorably in many cases. But if our offer failed to suit you in any respect, we should be very glad to have you tell us, in order that we may, if possible, modify our offer so as to make it more acceptable.

No other manufacturers are building their pianos under more favorable conditions than we, and none are able to offer better inducements in the way of quality, prices, and terms. If you have not yet decided, may we not have your order?

We inclose a stamped envelope for your answers to our questions.

Respectfully yours,

Form A Strokes per minute.....Errors.....Score.....

Name Age

Grade Teacher Date

School City

Dear Sir:

Answering your request, we recently quoted you a low price on our pianos, and not having received your order, we take occasion to inquire whether you have as yet bought. If you have, will you tell us what make you selected and in what respect our offer failed to interest you?

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