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T H E S I S

**A STUDY OF ONE METHOD OF DRILL AS RELATED TO TEST
SCORES ON 160 TERMS IN ELEVENTH GRADE AMERICAN HISTORY
AT SOUTH HIGH SCHOOL**

by

Einar A. Lindberg

Submitted in Partial Fulfillment of the Requirements

for the Degree of Master of Arts

in the

Department of Education

of the

Municipal University of Omaha

1948

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A C K N O W L E D G M E N T

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CHAPTER I

THE PROBLEM AND ITS SCOPE

Statement of the Problem

This study, based on 160 questions of the Pressey Tests¹ includes two numerically equal groups of pupils of eleventh grade American history. Pupils of one group are paired with those of the other group on the basis of the Otis Self-Administering Tests of Mental Ability, Higher Examination². The two groups are designated "the experimental group" and the "control group". Both groups, covering the same material in American history, heard or read each of the 181 terms used in this study. The only known difference being that the experimental group was subjected to one method of drill on the terms, while the control group had no drill. The study attempts to answer the following question: To what extent does one method of drill affect the comparative population estimates of the two groups of test scores?

Aims of the Study

a. This study attempts to find the following coefficients of

-
1. Pressey, Luella Cole, "A Study in the Learning of the Fundamental Vocabulary of History From the Fourth Through the Twelfth Grades", Tests and Measurements in the Social Sciences, pp. 189-204.
 2. Otis, Arthur S., Otis Self-Administering Tests of Mental Ability, Higher Examination: Form A

correlation to determine the degree of relationship between:

- See to drill* →
- (1) The intelligence quotients of experimental and control groups.
 - (2) The intelligence quotients and pre-test scores of each group.
 - (3) The intelligence quotients and final test scores of each group.
 - (4) The pre-test scores of experimental and control groups.
 - (5) The final test scores of experimental and control groups.

b. This study attempts to make population estimates of:

- (1) The pre-test scores of the two groups.
- (2) The final test scores of the two groups.

Setting the limits of the Study

This study is limited to 210 pupils of eleventh grade American history at South High School, Omaha, Nebraska. Excluded from the study are all pupils whose absence was greater than three class periods of the thirty-seven class periods required to complete this study. While this eliminates a number of pupils from the study, it very nearly equalizes the absence between the groups. The total absence of all pupils in the experimental group was twenty-four class periods; that of the control group was twenty-seven class periods. Also excluded from the study are those pupils whose intelligence quotient scores could not be paired to make two numerically equal groups. Thus, of the 355 pupils who took the initial tests of this study, only 210 are included. A final limitation

is that this study attempts to test recognition of words only, as evidenced by the pupils' selection of the correct multiple-choice term for each test question.

Definitions

The term recognition is used in this study as defined by English,³ "the awareness of an object that has previously been experienced."

The terms intelligence quotients mean the scores made by pupils on the "Otis Self-Administering Tests of Mental Ability, Higher Examination: Form A."⁴

The term correlation is here used as defined by Snedecor,⁵ "The correlation coefficient is a measure of co-variation -- the degree to which two variates keep in step as they change."

The term population, as used in this study, is explained by Snedecor,⁶ as the larger group from which the sample is drawn. Thus, the sample under study is used to make inferences about the population from which it is drawn.

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3. English, Horace B., A Student's Dictionary of Psychological Terms, p. 106.
 4. Otis, Arthur S., Otis Self-Administering Tests of Mental Ability, Higher Examination: Form A
 5. Snedecor, George W., Statistical Methods, p. 167.
 6. Ibid, pp. 2, 29, 38.

Limitations of the Study

The writer recognized that this study has a number of limitations. The first of these limitations is that group intelligence tests may not have a high degree of accuracy. Luella Cole⁷ states that intelligence tests were originally devised to measure innate ability. Material specifically learned in school should therefore be eliminated from intelligence tests. Actually, it cannot be if group tests are used, because the pupils must read the questions, and reading skill is a product of teaching.

Another limitation is that this study attempts to test word recognition only, and that as related to one meaning of a word. Obviously, the same term may have a number of quite different meanings. However, the meaning given for each term in the test questions is the same as that used in the textbook for each term.

A third limitation involves the inability to control all of the factors in a study of this type. While the effort was made to keep the groups the same, except that the experimental group had one method of drill, other factors beyond control may have entered the experiment. These factors are as complex as human nature itself. However, it can be stated that the only known difference in the instruction of the

7. Cole, Luella, "Difficulties of Test Construction", Psychology of Adolescence, pp. 437-439.

two groups was that the experimental group had one method of drill.

CHAPTER II

REVIEW OF RELATED RESEARCH

It is the purpose of this chapter to review selected research which appears to be connected with this study. The chapter is divided into two sections. The first section deals with vocabulary research in the fields of history and the social studies, and the second section summarizes the Pressey Vocabulary Investigation of History,¹ used as the basis for the writer's own study.

The terms "social studies" are used in this chapter as defined by Dunn:² "The social studies are those whose subject matter relates directly to the organization and development of human society, and to man as a member of social groups."

The term "history" is used in this chapter as defined by Beard,³ "History is thought about the past, checked and controlled to a certain extent by the known facts of the past."

Since history is one of the social studies, research that applies to the social studies in general might also apply to history.

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1. Pressey, Luella Cole, Op. Cit. pp. 189-204.
 2. Dunn, A. W., The Social Studies in Secondary Education, p. 9.
 3. Beard, Charles A., "The Nature of the Social Studies", Fourteenth Yearbook, Department of Superintendence, Washington, D. C., 1936, p. 59.

Vocabulary Research in History and other Social Studies

Language, spoken and written, and reading, the perusal of written or printed matter, appear to be of vital importance in the social studies. Whether on the elementary or secondary school levels, instruction and learning seem to be centered around them.

Ernest Horn⁴ states that while other media such as pictures, models, maps, charts, statistical tables and the like find a place in the school, language, spoken and written, is the chief medium of teaching and learning in the social studies. Lippman⁵ notes that in the school language is the chief approach to social knowledge. Dewey⁷ concludes that a satisfactory understanding of even a contemporary problem in one's own community is impossible without the use of language.

Carpenter and Young⁸ state that in 1946, an assignment to be read is still the "modus operandi" of most social studies' teachers. While other media such as the radio, the screen, records, trips, and dramatizations are providing worthwhile experiences for pupils, reading, being

4. Horn, Ernest, "The Media Through Which Social Realities are Approached", Methods of Instruction in the Social Studies, p. 127.

5. Lippman, Walter, Public Opinion, p. 76.

6. Dewey, John, Context and Thought, pp. 203-04.

7. Carpenter, Helen M., and Young, Marion, "Reading to Learn History", The Study and Teaching of American History, Seventeenth Yearbook of the National Council for the Social Studies, pp. 285-86.

the most economical as well as the most accessible, still provides the primary means of learning.

Reading, according to Lyman,⁸ is so intimately related to the serious study of the social studies that it is difficult, if not impossible, to determine where reading leaves off and only thought remains. Bird⁹ reports that when words immediately suggest the ideas they symbolize, thinking flows apace; when interpretations, criticism, or conclusions are anticipated, reading is wide and skillful. Wrightstone¹⁰ states that to read understandingly we need to know the meanings of all the words in a passage. Only then do we acquire complete understanding of the thought that the author wishes to transmit to us.

The import of these observations seems to be that reading is a major activity in the social studies; and that intelligent reading requires knowledge of the words used in the reading. Words, then, appear to be of paramount importance in the social studies.

Wrightstone¹¹ states that if we could fix for every word one meaning, and if the meaning of a discourse were simply the sum of the meanings which compose it, interpretation would be easy. But such is

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- 8. Lyman, R. L., The Mind at Work, p. 14.
 - 9. Bird, Charles, Effective Study Habits, p. 113.
 - 10. Wrightstone, Wayne J., "Knowing Words", Basic Social Science Skills, p. 44.
 - 11. Ibid, p. 47.

not the case. Meaning is not that simple. A word may have quite different meanings every time it is used. Here a dictionary definition is of little help to the student, since it cannot define a word in the specific context in which it appears in a passage. In other words, students confronted by the multiplicity of meanings given in a dictionary are bewildered, not knowing which meaning is intended. Krey¹² notes that a student equipped with a dictionary definition alone is like the finder of a ring of keys. He does not know which key will unlock which specific door. To the one who owns the keys, they will unlock many things. So it is with a social idea. It is grasped only if the pupil learns the typical range and limits of the idea. A student may begin his learning of the idea either by meeting it in his experience, whether direct or through reading, or by a verbal statement, a so-called definition. However, he does not possess an inclusive-exclusive knowledge of it until he has met the range of its application, including the limits before which and beyond which it acquires a different meaning designated by a different term.

Fancler and Crawford¹³ note that students often recite glibly, using terms about which they have little or no understanding. They

12. Krey, A. C., "Implications of Studies in Understanding", Tests and Measurements in the Social Sciences, pp. 46-48.

13. Fancler, Della G., and Crawford, Claude C., "Understanding Terms", Teaching the Social Studies, pp. 221-222.

may complete a course in any of the social studies with hazy and erroneous ideas, because such fundamental concepts as state, nation, government, democracy, revolution, league, etc. have not been clarified for them. This practice appears to be prevalent in many of the schools of today, as well as of the past. The American Historical Association¹⁴ reports that verbalism has cursed the schools down through the ages, and continues to corrupt social science instruction in American schools. However, in this connection, Wesley¹⁵ points out that even verbalisms have their utility, since they constitute the first step in the acquisition of an understanding of a word. New words, according to Wesley,¹⁶ upon their initial appearance appear to be only arbitrary names to the pupil who encounters them for the first time. Thus, the word "constitution" is an arbitrary word for pupils of the middle grades, until it becomes more than a mere identification tag. "Imperialism" is a highly abstract idea, perhaps only a sound or a series of letters to the high school boy who encounters it for the first time.

According to Carpenter and Young,¹⁷ the generalized aspect of vocabulary in history concerns those words without particular historical significance that are frequently used by authors of social studies¹

14. The American Historical Association, Conclusions and Recommendations, pp. 78-79

15. Wesley, Edgar B., "Facts or Ideas in the Social Studies", Historical Outlook, 24: pp. 28-30.

16. Ibid, pp. 28-30.

17. Carpenter, Helen M., and Young, Marion, Op. Cit., pp. 286-288.

materials. These include such words as "thrifty", "abolition", "per cent", and "morale". In addition to these words are those special to the subject of history, such as "cabinet", "bill", "frontier", "veto", and "embargo". Ignorance of words belonging to both these classes makes many pages of history unintelligible. Further complicating the problem of vocabulary is the similarity in form of many words, like "capitol" and "capital", "alien" and "allies", "executive" and "execution". In addition to words of these classes are the specialized concepts, standing for a group of ideas for which there is no synonym. Examples of these are "capitalism", "nationalism", and "mercantilism". Similar constellations of relationships are represented by such phrases as "separation of powers", or "division of powers". Concepts of time and space, according to Carpenter and Young,¹⁸ are also sources of difficulty. That the 1800's belong to the nineteenth century is often a bewildering idea to pupils, even when they know the meaning of the word "century". Place relationships may also offer difficulties. Such words as "latitude" and "mountainous", commonly used in history, are difficult and need explanation if reading is to have meaning. Words or phrases representative of each of these classes cannot be assumed

18. Ibid, p. 288

to be known by the student. Historical materials abound in confusing expressions like a "political platform", a "closed shop", and an "open door policy". To the student, who has not had their respective meanings clarified, they could well mean "a wooden stand", "a store", or "an opening in a wall".

Johnson¹⁹ reveals that the past to be reconstructed embraces three general kinds of phenomena: physical human beings and their physical environment; human words and actions; and human feelings, thoughts, and resolutions. The conditions presented by facts of the first type are such that a direct appeal to the senses is possible. The conditions presented by facts of the second type admit to some extent of similar appeals. The third type admits to no such appeals. Thoughts and feelings are revealed, so far as they are revealed at all, in the looks of men, in deeds, and in words. They are the mental states of our own that resemble the mental states of men in the past. Words are symbols only. The images which they call up, the thoughts and feelings which they induce, vary with individual experience. Johnson²⁰ illustrates: "a slave we can imagine, but what was 'slave power in America'?' Opinions we have no doubt expressed, but what is 'public opinion'?' How shall we represent to ourselves a panic, a revolution, the church, the state, society itself, and the laws of social action?"

19. Johnson, Henry, The Teaching of History in Elementary and Secondary Schools, pp. 40-42.

20. *Ibid.*, p. 44.

Johnson²¹ states that within these three general kinds of phenomena there are particular facts and general facts. Elementary history is made up chiefly of particular facts; advanced history is presented in the form of general concepts. Many of the textbooks used on the secondary school level abound in general concepts.

Horn²² indicates that concepts in textbooks and courses of study are not only too difficult but also too numerous to be mastered in the time allotted to the teaching of the social studies. Parker²³ notes that vocabulary difficulties in history textbooks are due, not to the inclusion of necessary technical words, but to the use of uncommon words of no specific historical connotation. Ayer²⁴ states that history texts for the elementary grades have too difficult vocabularies, both as to size and as to concepts involved. The content of many of the widely used fifth-grade histories is sufficiently advanced to cause difficulties for even high school pupils. Van Bibber²⁵ reports that most courses of study undertake too many topics for the time allotted to the social studies.

21. Ibid, p. 49.

22. Horn, Ernest, Op. cit, p. 158.

23. Parker, Cleo, "A Study of the Vocabulary of Modern European History Textbooks Used in Hamilton County", Unpublished Master's Thesis, University of Cincinnati, 1930, Summarized in Wesley, Teaching the Social Studies, p. 611.

24. Ayer, Adelaide M., "Some Difficulties in Elementary School History", Contributions to Education, No. 212., New York: Teachers College, Columbia University, 1926.

25. Van Bibber, Lena C., "An Exploratory Study of Specific Classroom Difficulties in the Teaching of History and Other Social Studies", Second Yearbook (1932), National Council for the Social Studies, Summarized in Wesley, Teaching the Social Studies, p. 608.

Kelty and Moore²⁶ state that it must be of vital concern to the teacher of the social studies to determine whether the student has clear-cut and vivid concepts of the meanings of words. Admittedly, this is a difficult task when one considers the large classes, the wide range of abilities of the pupils, and the limited time devoted to instruction in the social studies.

It appears⁵ then, that emphasis must be placed first on those words which may be deemed vital to an understanding of the social studies. Kelty and Moore²⁷ suggest that the assembling of a list of the more important concepts ought not be left to the individual judgment of each teacher. It should represent a pooling of the judgment of experts. The Pressey List,²⁸ used as the basis for this study, is not the only such list compiled. Though not compiled specifically for the social studies, Thorndike's²⁹ Word Book contains 10,000 of the words found most frequently and widely in general reading for children and young people. The Barr and Gifford List³⁰ of vocabulary contains 1,900 words used in American history. The Stephenson³¹ vocabulary of civics consists of 728 words. These lists, excluding that of Pressey, in the

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26. Kelty, Mary G., and Moore, Nelle E., "Inadequacy of Children's Concepts", Tests and Measurements in the Social Sciences, p. 228.
27. Ibid. pp. 228-229.
28. Pressey, Luella Cole, op. cit., pp. 186-188.
29. Thorndike, Edward L., The Teacher's Word Book
30. Barr, A. S., and Gifford, C. W., "The Vocabulary of American History", The Journal of Educational Research, XX, (September 1929), pp. 103-29.
31. Stephenson, O. W., "The Special Vocabulary of Civics", The Journal of Educational Research, XVIII, (November, 1929), pp. 297-304.

writer's opinion, appear to be too long to be used effectively in the teaching of any one of the social studies in high school. Other investigators have compiled lists and constructed tests to measure student comprehension of words in the social studies. Wesley's³² tests of political and social terms are constructed to measure degrees of comprehension of words. The Kelty Tests³³, designed to measure concepts in the social studies for the intermediate grades, contain terms based principally on Thorndike's List.³⁴

The question as to how vocabulary shall be taught in the social studies appears to be intimately related to the problem of this study.

~~Most of the experimentation in connection with the vocabulary of American history has concerned itself with the development of vocabulary lists or the testing for pupil comprehension of technical vocabulary. So far as the writer is able to determine, little has been done in the attempt to teach technical vocabulary in a controlled experiment. One exception is that of Tormey,³⁵ who concludes that both the specific and the general comprehension of historical content benefit by drill upon important words. Another exception is that of Newburn,³⁶ who measured the effects of drill on pupil comprehension of terms in American history by two methods: the first, when drill was given as the words occurred in their contexts; the other, when isolated from context. He concludes that drill, isolated from context, is of little value;~~

32. Wesley, Edgar B., Tests in Social And Political Terms.

33. Kelty, Mary G., and Moore, Nelle E., Test of Concepts in the Social Studies

34. Thorndike, Edward L., op. cit.

35. Tormey, T. J., The Effect of Drill Upon the Specific and the General Comprehension of Historical Content, Ph. D. Thesis, State University of Iowa, 1932.

36. Newburn, Harry K., The Relative Effect of Two Methods of Vocabulary Drill on Achievement in American History, Ph. D. Thesis, University of Iowa, 1933.

but that drill, when related to context, results in superior comprehension of words.

Summary of the Pressey Vocabulary Study³⁷

Pressey began her experiment by analyzing twenty-three textbooks in history and civics, from the fourth through the twelfth grades, listing what words occurred without noting their frequency. Later she analyzed six history texts in history widely used in high schools, this time keeping count of how many times each special word occurred. Another step was to make use of published results of similar analyses in history and civics. Finally, frequency counts were made of the special words found on the front pages of newspapers, editorials, and in many articles in magazines dealing with current events.

From a combination of word lists culled from these sources, a master list of 1,144 different words was constructed, the frequency of each word appearing after it on the list. Sixty-four teachers of secondary school history and five professors of college history then rated each word in one of three ways: "Essential" if they thought they could not teach without it; "accessory" if they regarded the word as important but not essential; or, "unimportant" if they thought they could teach without it. The entire list was next rated by seven specialists in social science, who expressed their feelings as to the sociological value of each word. Pressey then eliminated any word

37. Pressey, Luella Cole, op. cit. pp. 189-204.

not meeting the described criteria. The selected list contained 414 words, of which only 346 were actually tested, the remaining sixty-nine words being omitted for one reason or another, used in examples, or appearing in unsatisfactory test items.

Tests were then constructed by Pressey. These consisted of 325 questions. Since some of the tests included more than one of the specialized words, there were more words in the list than questions in the tests. Finally, the tests were administered to 11,000 pupils of the fourth, sixth, eighth, tenth, and twelfth grades in various parts of the United States. The tests were presented in four folders, with 85 questions in the first folder, and 80 test questions in each of the other three. There was an average of 4,171 cases per form and per grade.

In analyzing the results, Pressey states that the wide variation of scores indicates the individual difference in attainment among children classified as being of the same educational level. The largest gains were found between the sixth and eighth grades, with smaller gains between the fourth and sixth, the eighth and tenth, and the tenth and twelfth grades. As regards percentages, Pressey states that if one were to consider as really mastered those words

recognized by 90 per cent or more of a class, then there would be no such words in Grade IV, five in Grade VI, fifty-five in Grade VIII, one hundred six in Grade X, and one hundred seventy-two in Grade XII. With this standard almost exactly half the total of 346 words are really known at the end of high school.

It may be pointed out that the Pressey Tests measure recognition of words only, and that as related to one meaning of a word; nor does Pressey attempt to correlate pupil intelligence quotients with scores on the tests.

Summary of the Chapter

The research cited in the first section of this chapter has centered around four questions:

1. Why teach vocabulary in history and other social studies?
2. What are some of the difficulties as regards vocabulary in history and other social studies?
3. By what criteria should specific words be singled out for emphasis in social studies' classrooms?
4. How shall we teach vocabulary in the social studies?

The answer to the first question appears to be that words are of vital importance in the social studies, since the bulk of instruction centers around language, spoken and written. As regards the second question, some of the difficulties are in the nature of the words themselves, in the limitations of the pupils, and in the fact that textbook writers use words too far beyond the pupils' understanding, though

these words may have no specific historical connotation. As regards the third question, every teacher of the social studies should have a list of the terms which research has shown are vital to an understanding of the social studies. These words should be singled out for emphasis, since it is difficult to see how learning can take place without pupil knowledge of them. The question of how these words shall be emphasized, embodied in the last question, is one that research as yet cannot answer. The research thus far seems to indicate that words should be taught as they occur in their contextual setting--that drill isolated from context is of little value. It is with this last question that the writer's own study is concerned.

The last section of this chapter summarizes the Pressy Vocabulary Study of History. As indicated in Chapter III, the Pressy Study is used as a basis for the writer's own study.

CHAPTER III

PLAN OF THE STUDY

The textbooks at South High School in American history were analyzed to determine which text included the words from the Pressey Tests¹ in the order required to fit the plan of the study. It was found that A Unit History of the United States,² by Hamm, Bourne, and Benton, met this requirement. Also, enough copies of this text were available for each student. The study was then set up in thirty-seven daily assignments. Each separate assignment included approximately five words found in the Pressey Tests. All terms and the assignment pages from the text are shown in Tables XV, XVI, and XVII of the Appendix.

An analysis of the Pressey Tests revealed that the entire list could not be used, since the words were not found in the reading matter in the order required to fit the plan of the study. Accordingly, only 160 test questions, consisting of 181 terms, were used. Since twenty-one of the questions contained terms in the questions themselves, not included in the multiple-choice answers, there were more terms used in the vocabulary drills than questions in the tests. These additional terms were also found in the required reading matter. The test was then mimeographed in two sections, labelled Part I and Part II. Each section

1. Pressey, Luella Cole, op. cit. pp. 189-204.

2. Hamm, William A., Bourne, Henry E., Benton, Elbert J., A Unit History of the United States, Pages shown in the Index.

contained eighty questions of the Pressey Tests.³

The next step was the selection of ten classes in eleventh grade American history. These classes, consisting of 355 heterogeneously grouped pupils, were taught by three instructors. Of these classes, four were selected as "experimental" and six as "control" groups. One instructor taught two "experimental" and two "control" group classes, and each of the other two instructors taught one "experimental" and two "control" group classes.

The experiment began during the second week of the 1946-47 school term. Each instructor administered the initial tests to his respective classes. With a copy of the tests and the corresponding answer sheet before each pupil, the instructor read the directions. These consisted of the following sentence: "Write the number of the correct answer to each question on the answer sheet." The mimeographed answer sheets contained brackets corresponding to the numbers of each question. Thus, to answer each question, the pupil simply wrote the number of the answer he thought correct for each question. Part I of the test was administered on the first day and Part II on the succeeding day. The entire test and the answer sheets are shown in the Appendix.

In administering the tests, the instructor read each question twice. This was done because the class period was only thirty-five minutes in length and it was feared that the slow reader might not have time to complete

3. Pressey, Luella Cole, op. cit. pp. 189-204. All test questions used by permission of Charles Scribner's Sons, publishers of Tests and Measurements in the Social Sciences.

all of the eighty questions in the time allotted. At the end of the experiment the tests were administered again in the same manner.

On the day following the administration of Part II of the initial test the first daily assignment began. As indicated in Table XV, the five words were found in the assignment for that day. Each daily assignment was read aloud by members of the classes of both experimental and control groups. This was done to give all pupils of both groups the opportunity to read and hear each word from the Fressy list as it occurred in its contextual setting. The specific meaning for each word in the text corresponded to that used in the tests. In the control group no attention was given to the explanation of the terms. In the experimental group the instructor asked for an explanation of each term as it occurred. If no pupil could give the desired explanation of the word, the instructor explained it. In addition, each pupil in the experimental group was required to write a sentence using the term. This was part of the assignment prepared outside of class by the experimental group. All other assignments for both groups were the same, consisting of writing summarizing statements of each section of reading matter found in the text. The sentences using the daily terms written by the experimental group pupils were graded by the instructors, returned to the students, and corrected by the students, where the terms were used incorrectly. The class time used in explanation of the terms in the

experimental groups was utilized in the control group for general achievement procedures on the assigned lesson. The reading of each daily assignment for both groups required the major portion of the class period.

The experiment covered three units: "The Making of the Constitution", "The Westward Movement", and "The Growth of Democracy". The first unit consisted of fifteen daily assignments, the second of ten assignments, and the third of twelve assignments. All assignments are shown in Tables XV, XVI, and XVII of the Appendix.

At the end of the experiment the tests were graded and the results made known to the pupils. No instructor knew the initial test scores of the tests until the experiment was completed, nor were the pupils informed that they were taking part in an experiment. The tabulation of the paired intelligence quotient scores, the pre-test scores, and the final test scores are found in Table I.

CHAPTER IV
THE EXPERIMENT

Statistical Procedures Used in this Study

The statistical procedures employed in this study are those of Snedecor's¹ Large Sample Methods. The two-way class frequency distribution technique is employed in calculating the coefficients of correlation, the means, and the standard deviations.

Explanation of Formulae and Symbols

- a. For computing the correlation coefficient:

$$r = \frac{\sum S_{xy}}{\sqrt{(\sum S_x^2)(\sum S_y^2)}}$$

Code X = Deviations of the class marks from the assumed mean.

Code Y = Deviations of the class marks from the assumed mean.

S_{xy} = The sum of the products of the deviations of each measure from the central tendency of the X and Y axes.

S_x = \sum deviation of X from the mean.

S_y = \sum deviation of Y from the mean.

r = The coefficient of correlation.

- b. For computing the significance of the difference between two correlation coefficients:

1. Snedecor, George, op. cit., Chapter VIII, pp. 169-187.

$$t = \frac{z_c - z_o}{\sqrt{\frac{1}{n-3} + \frac{1}{n-3}}}$$

t = The measurement of significance.

z = The quantity devised by Fisher,² arrived at by Figure 7.4 of Snedecor.³

n = The number of observations in each group.

c. For computing the mean:

\bar{x} = The mean.

$$\bar{x} = G \ I(SfX) / n$$

G = The assumed mean.

SfX = The sum of the frequency times X .

n = The number of observations in each group.

I = The class interval.

d. For computing the variance.

s^2 = The variance

$$Sx^2 = Sfx^2 - ((Sfx)^2 / n)$$

$(Sfx)^2$ = The sum of the frequency times the code, then squared.

Sfx^2 = The sum of the frequency times the square of the code.

2. Fisher, R. A., Used by Snedecor, op. cit. Figure 7.4, pp. 152-153.

3. Snedecor, George, op. cit. 7.4, pp. 152-153.

$$s^2 = I^2(Sx^2) / n-1$$

e. For computing the standard deviation:

s = the standard deviation

$$s = \sqrt{s^2}$$

f. For computing the standard error:

$s_{\bar{x}}$ = The standard error of the mean

$$s_{\bar{x}} = \sqrt{s^2 / n} \quad \text{or} \quad s_{\bar{x}} = s / \sqrt{n} \quad \text{In this study, the first formula is used for computing the standard error.}$$

g. For computing the significance of the difference between the means:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s_{\bar{x}_1 - \bar{x}_2}}$$

$$s_{\bar{x}_1 - \bar{x}_2} = \sqrt{s_{\bar{x}_1}^2 + s_{\bar{x}_2}^2 - 2r s_{\bar{x}_1} s_{\bar{x}_2}}$$

$s_{\bar{x}_1}$ = The standard error of one group.

$s_{\bar{x}_2}$ = The standard error of the other group.

r = The coefficient of correlation computed from the test scores of experimental and control groups.

$s_{\bar{x}_1 - \bar{x}_2}$ = The standard deviation of the difference of the means of the two groups.

TABLE I. TABULATION OF INTELLIGENCE QUOTIENTS AND SCORES OF PRE-TEST AND FINAL TEST EXPERIMENTAL AND CONTROL GROUPS

<u>Experimental Group</u>				<u>Control Group</u>			
Number	I.Q.	Pre-test	Final Test	Number	I.Q.	Pre-test	Final Test
1.	129	150	160	1.	125	155	155
2.	126	151	160	2.	124	145	153
3.	121	132	149	3.	121	130	136
4.	121	150	159	4.	121	136	146
5.	120	136	147	5.	119	139	141
6.	120	143	158	6.	118	143	146
7.	118	126	140	7.	118	140	143
8.	117	155	159	8.	116	124	134
9.	117	120	139	9.	118	140	147
10.	115	134	149	10.	116	141	150
11.	115	122	148	11.	116	146	152
12.	114	141	154	12.	114	145	151
13.	113	123	140	13.	113	142	151
14.	113	127	152	14.	113	147	152
15.	112	127	141	15.	113	137	146
16.	111	119	149	16.	112	136	137
17.	111	113	143	17.	112	139	143
18.	111	127	145	18.	112	131	131
19.	110	135	150	19.	111	145	155
20.	109	121	137	20.	109	138	147
21.	108	131	153	21.	108	119	120
22.	108	128	139	22.	108	127	138
23.	108	129	139	23.	109	137	144
24.	107	122	135	24.	108	119	130
25.	107	126	142	25.	107	145	149
26.	107	122	138	26.	107	127	136
27.	107	110	134	27.	107	132	139
28.	106	137	149	28.	107	137	138
29.	106	124	145	29.	106	127	131
30.	106	117	145	30.	106	133	139
31.	105	114	151	31.	105	134	137
32.	105	130	151	32.	105	138	144
33.	105	137	149	33.	104	136	141
34.	104	103	125	34.	104	117	126
35.	104	116	126	35.	103	140	146

TABLE I. TABULATION OF INTELLIGENCE QUOTIENTS AND SCORES OF PRE-TEST AND FINAL TEST EXPERIMENTAL AND CONTROL GROUPS

<u>Experimental Group</u>				<u>Control Group</u>			
Number	I.Q.	Pre-test	Final Test	Number	I.Q.	Pre-Test	Final Test
36.	103	136	147	36.	103	127	130
37.	103	126	144	37.	103	123	125
38.	103	114	126	38.	103	122	126
39.	102	93	115	39.	102	133	136
40.	102	125	139	40.	102	120	130
41.	102	130	147	41.	102	127	132
42.	102	127	148	42.	102	137	142
43.	102	121	147	43.	101	112	118
44.	102	122	150	44.	101	134	135
45.	102	104	139	45.	101	110	112
46.	101	116	130	46.	100	117	126
47.	101	124	134	47.	100	112	123
48.	101	120	138	48.	100	114	122
49.	100	123	144	49.	100	103	110
50.	100	124	137	50.	99	90	99
51.	100	114	128	51.	99	120	131
52.	100	91	110	52.	99	106	112
53.	98	94	120	53.	98	93	101
54.	98	122	149	54.	98	117	123
55.	97	128	140	55.	97	106	110
56.	96	114	141	56.	97	114	117
57.	96	111	142	57.	96	93	97
58.	96	115	130	58.	96	119	127
59.	96	122	145	59.	96	112	121
60.	94	92	105	60.	95	101	110
61.	94	103	123	61.	94	112	122
62.	94	91	110	62.	94	116	123
63.	94	92	131	63.	94	105	115
64.	94	111	129	64.	93	112	126
65.	94	99	109	65.	93	92	97
66.	93	106	130	66.	93	105	115
67.	93	99	118	67.	93	110	115
68.	93	103	125	68.	92	93	97
69.	92	103	115	69.	92	93	98
70.	92	107	139	70.	92	118	128

TABLE I. TABULATION OF INTELLIGENCE QUOTIENTS AND SCORES OF PRE-TEST AND FINAL TEST EXPERIMENTAL AND CONTROL GROUPS

<u>Experimental Group</u>				<u>Control Group</u>			
Number	I.Q.	Pre-Test	Final Test	Number	I.Q.	Pre-Test	Final Test
71	92	104	142	71	92	101	108
72	92	118	133	72	92	89	92
73	90	105	125	73	91	110	116
74	90	94	117	74	91	98	109
75	90	100	115	75	90	81	86
76	90	91	133	76	90	117	120
77	90	113	149	77	90	100	106
78	90	85	133	78	90	81	86
79	90	85	102	79	90	104	115
80	89	100	131	80	89	111	118
81	89	75	110	81	89	99	107
82	89	102	110	82	89	80	90
83	88	61	80	83	89	81	81
84	87	84	108	84	88	87	95
85	87	83	133	85	88	81	88
86	87	92	132	86	87	90	99
87	87	84	109	87	87	87	90
88	87	85	115	88	86	90	95
89	87	76	107	89	86	93	97
90	86	83	127	90	86	91	100
91	86	86	110	91	85	89	101
92	85	74	95	92	85	74	80
93	84	73	90	93	84	86	90
94	84	73	90	94	84	84	96
95	84	83	121	95	83	87	97
96	83	84	132	96	83	81	84
97	83	85	103	97	83	81	86
98	83	84	106	98	82	78	82
99	82	83	117	99	82	95	100
100	82	94	107	100	80	81	81
101	81	95	113	101	80	79	82
102	81	69	90	102	80	68	73
103	80	69	98	103	79	69	71
104	80	68	104	104	79	74	77
105	78	81	100	105	79	68	73

TABLE II. COMPUTATION OF CORRELATION COEFFICIENT OF INTELLIGENCE
 QUOTIENTS OF EXPERIMENTAL AND CONTROL GROUPS

f_x	Code X	SXf_x	SX^2f_x	f_y	Code Y	SXf_x	Product $Y(SXf_x)$	SY^2f_y	SYf_y
0	-26	0	0	2	7	41	287	98	14
3	-25	-75	1875	0	6	0	0	0	0
3	-24	-72	1728	2	5	34	170	50	10
0	-23	0	0	5	4	69	276	80	20
2	-22	-44	986	5	3	52	156	45	15
3	-21	-63	1323	6	2	45	90	24	12
2	-20	-40	800	12	1	35	35	12	12
2	-19	-38	722	16	0	-33	0	0	0
3	-18	-54	972	7	-1	-38	38	7	-7
2	-17	-34	578	13	-2	-126	252	52	-26
2	-16	-32	512	14	-3	-189	567	126	-42
4	-15	-60	900	10	-4	-173	692	160	-40
5	-14	-70	980	10	-5	-219	1095	250	-50
2	-13	-26	338	3	-6	-75	450	108	-18
5	-12	-60	720						
4	-11	-44	484	105		-577	4108	1012	-100
3	-10	-30	300						
1	-9	-9	81						
3	-8	-24	192						
2	-7	-14	98						
2	-6	-12	72						
3	-5	-15	75						
4	-4	-16	64						
3	-3	-9	27						
4	-2	-8	16						
4	-1	-4	4						
2	0	0	0						
2	1	2	2						
2	2	4	8						
4	3	12	36						
3	4	12	48						
2	5	10	50						
0	6	0	0						
1	7	7	49						
3	8	24	192						
3	9	27	243						
1	10	10	100						
0	11	0	0						
3	12	36	432						

TABLE II. COMPUTATION OF CORRELATION COEFFICIENT OF INTELLIGENCE QUOTIENTS OF EXPERIMENTAL AND CONTROL GROUPS

f_x	Code X	SXf_x	SX^2f_x
0	13	0	0
3	14	42	588
1	15	15	225
0	16	0	0
2	17	34	578
0	18	0	0
0	19	0	0
1	20	20	400
1	21	21	441
0	22	0	0
0	23	0	0
0	24	0	0
0	25	0	0
<hr/>			
105		-577	17221

$$SXf_x = -577$$

$$SYf_y = -100$$

$$SY^2f_y = 1012$$

$$SX^2f_x = 17221$$

$$(SXf_x)^2 / n = 332929 / 105 = 3170.75 \quad (SYf_y)^2 / n = 10,000 / 105 = 95.24$$

$$Sx^2 = 17221 - 3170.75 = 14050.25 \quad Sy^2 = 1012 - 95.24 = 916.76$$

$$SXY = 4108$$

$$(SXf_x)(SYf_y) / n = (-577)(-100) / 105 = 549.52$$

$$Sxy = 4108 - 549.52 = 3558.48$$

$$r = \frac{Sxy}{\sqrt{(Sx^2)(Sy^2)}} = \frac{3558.48}{\sqrt{(14050.25)(916.76)}} = \frac{3558.48}{3588.97} = .991$$

Significance: By Table 7.3 of Snedecor's Statistical Methods, the null hypothesis, ρ equals 0, is rejected at both the 5% and the 1% level of confidence. Since a plus or minus 1 constitutes a perfect correlation, .991 indicates a very high correlation between the matched intelligence quotients of experimental and control groups.

TABLE III. COMPUTATION OF CORRELATION COEFFICIENT OF PRE-TEST EXPERIMENTAL GROUP TEST SCORES AND INTELLIGENCE QUOTIENTS

f_x	Code X	SXf_x	SX^2f_x	f_y	Code Y	SXf_x	Product $Y(SXf_x)$	SY^2f_y	SYf_y
1	-26	-26	676	0	14	0	0	0	0
0	-25	0	0	0	13	0	0	0	0
2	-24	-48	1152	2	12	38	456	288	24
2	-23	-46	1058	2	11	39	429	242	22
2	-22	-44	968	2	9	26	225	162	18
3	-21	-63	1323	2	8	3	24	128	16
3	-20	-60	1200	4	7	32	224	196	28
1	-19	-19	361	5	6	24	204	180	30
2	-18	-36	648	10	5	33	165	250	50
6	-17	-102	1734	13	4	4	16	208	52
1	-16	-16	256	5	3	7	21	45	15
3	-15	-45	675	9	2	-30	-60	36	18
7	-14	-98	1372	3	1	-15	-15	3	3
0	-13	0	0	3	0	-37	0	0	0
4	-12	-48	576	7	-1	-62	62	7	-7
3	-11	-33	363	4	-2	-50	100	16	-8
6	-10	-60	600	5	-3	-67	201	45	-15
0	-9	0	0	6	-4	-65	260	96	-24
4	-8	-32	256	5	-5	-84	420	125	-25
1	-7	-7	49	9	-6	-179	1074	324	-54
2	-6	-12	72	1	-7	-15	105	49	-7
0	-5	0	0	4	-8	-76	608	256	-32
4	-4	-16	64	2	-9	-47	423	162	-18
3	-3	-9	27	1	-10	-24	240	100	-10
7	-2	-14	28	1	-11	-16	176	121	-11
3	-1	-3	3						
2	0	0	0	105		-561	5358	3039	65
3	1	3	3						
3	2	6	12						
4	3	12	36						
3	4	12	48						
1	5	5	25						
1	6	6	36						
3	7	21	147						
1	8	8	64						
2	9	18	162						
1	10	10	100						

TABLE III. COMPUTATION OF CORRELATION COEFFICIENT OF PRE-TEST
EXPERIMENTAL GROUP TEST SCORES AND INTELLIGENCE QUOTIENTS

f_x	Code X	SXf_x	$SX^2 f_x$
2	11	22	242
0	12	0	0
2	13	26	338
1	14	14	196
0	15	0	0
2	16	32	512
2	17	34	578
0	18	0	0
0	19	0	0
0	20	0	0
0	21	0	0
1	22	22	484
0	23	0	0
0	24	0	0
1	25	25	625
<hr/>			
105		-561	17069

$$SXf_x = -561$$

$$SYf_y = 65$$

$$SX^2 f_x = 17069$$

$$SY^2 f_y = 3039$$

$$(SXf_x)^2 / n = (-561)^2 / 105 = 2997.82 \quad (SYf_y)^2 / n = 65^2 / 105 = 40.24$$

$$Sx^2 = 17069 - 2997.82 = 14071.18 \quad Sy^2 = 3039 - 40.24 = 2998.76$$

$$SXY = 5358$$

$$(SXf_x)(SYf_y) / n = (-561)(65) / 105 = -347.28$$

$$Sxy = 5358 - (-347.28) = 5705.28$$

$$r = \frac{SXY}{\sqrt{(Sx^2)(Sy^2)}} = \frac{5705.28}{\sqrt{(14071.18)(2998.76)}} = \frac{5705.28}{6495.85} = .878$$

Significance: A correlation coefficient of .878 indicates a high degree of relationship between the pre-test experimental group scores and intelligence quotients, by virtue of Table 7.3 of Snedecor's, Statistical Methods.

TABLE IV. COMPUTATION OF MEAN AND STANDARD DEVIATION OF PRE-TEST EXPERIMENTAL GROUP TEST SCORES FROM THE DATA CONTAINED IN TABLE III

G equals 105 Test Points I equals 4 Test Points

$$SfX = 65$$

$$I(SfX) / n = 4(65) / 105 = 2.47$$

$$\bar{x} = G + I(SfX) / n = 105 + 2.47 = 107.47 \text{ Test Points}$$

$$SfX^2 = 3039$$

$$(SfX)^2 / n = 65^2 / 105 = 40.24$$

$$\text{For Code Numbers, } Sx^2 = 3039 - 40.24 = 2998.76$$

$$s^2 = I^2(Sx^2) / n - 1 = (4)^2(2998.76) / 104 = 461.35 \text{ Test Points}$$

$$s = 461.35 = 21.47 \text{ Test Points}$$

$$s_{\bar{x}} = \sqrt{s^2 / n}$$

$$= \sqrt{461.35 / 105} = \sqrt{4.393}$$

$$s_{\bar{x}} = 2.095 \text{ Test Points}$$

TABLE V. COMPUTATION OF CORRELATION COEFFICIENT OF PRE-TEST CONTROL GROUP TEST SCORES AND INTELLIGENCE QUOTIENTS

f_x	Code X	SXf_x	SX^2f_x	f	Code Y	SXf_x	Product Y(SXf_x)	SY^2f_y	SYf_y
0	-26	0	0	0	14	0	0	0	0
3	-25	-75	1875	0	13	0	0	0	0
3	-24	-72	1728	1	12	21	252	144	12
0	-23	0	0	0	11	0	0	0	0
2	-22	-44	968	6	10	61	610	600	60
3	-21	-63	1323	3	9	35	315	243	27
2	-20	-40	800	11	8	61	488	704	88
2	-19	-38	722	7	7	23	161	343	49
3	-18	-54	972	3	6	28	168	108	18
2	-17	-34	578	5	5	6	30	125	25
2	-16	-32	512	3	4	10	40	48	12
4	-15	-60	900	10	3	-43	-129	90	30
5	-14	-70	980	3	2	-21	-42	12	6
2	-13	-26	338	9	1	-78	-78	9	9
5	-12	-60	720	4	0	-23	0	0	0
4	-11	-44	484	4	-1	-39	39	4	-4
3	-10	-30	300	3	-2	-42	84	12	-6
1	-9	-9	81	7	-3	-83	249	63	-21
3	-8	-24	192	6	-4	-95	380	96	-24
2	-7	-14	98	4	-5	-74	370	100	-20
2	-6	-12	72	8	-6	-145	870	288	-48
3	-5	-15	75	3	-7	-61	427	147	-21
4	-4	-16	64	2	-8	-44	352	128	-16
3	-3	-9	27	1	-9	-25	225	81	-9
4	-2	-8	16	2	-10	-49	490	200	-20
4	-1	-4	4	0	-11	0	0	0	0
2	0	0	0						
2	1	2	2	105		-577	5301	3545	147
2	2	4	8						
4	3	12	36						
3	4	12	48						
2	5	10	50						
0	6	0	0						
1	7	7	49						
3	8	24	192						
3	9	27	243						
1	10	10	100						
0	11	0	0						
3	12	36	432						

TABLE V. COMPUTATION OF CORRELATION COEFFICIENT OF PRE-TEST CONTROL GROUP TEST SCORES AND INTELLIGENCE QUOTIENTS

f_x	Code X	SXf_x	SX^2f_x
0	13	0	0
3	14	42	588
1	15	15	225
0	16	0	0
2	17	34	578
0	18	0	0
0	19	0	0
1	20	20	400
1	21	21	441
0	22	0	0
0	23	0	0
0	24	0	0
0	25	0	0
<hr/>			
105		-577	17221

$$SXf_x = -577$$

$$SYf_y = 147$$

$$SX^2f_x = 17221$$

$$SY^2f_y = 3545$$

$$(SXf_x)^2 / n = -577 / 105 = 3170.75 \quad (SYf_y)^2 / n = 147 / 105 = 205.80$$

$$Sx^2 = 17221 - 3170.75 = 14050.25 \quad Sy^2 = 3545 - 205.80 = 3339.20$$

$$SXY = 5301$$

$$(SXf_x)(SYf_y) / n = (-577)(147) / 105 = -807.80$$

$$Sxy = 5301 - (-807.80) = 6108.80$$

$$r = \frac{Sxy}{\sqrt{(Sx^2)(Sy^2)}} = \frac{6108.80}{\sqrt{46916594.80}} = \frac{6108.80}{6849.51} = .891$$

Significance: A correlation coefficient of .891, by reason of Table 7.3 in Snedecor's, Statistical Methods, indicates a high relationship between the pre-test scores and intelligence quotients of the Control group.

TABLE VI. COMPUTATION OF MEAN AND STANDARD DEVIATION OF PRE-TEST CONTROL GROUP TEST SCORES FROM THE DATA CONTAINED IN TABLE V.

G equals 105 Test Points I equals 4 Test Points

$$SfX = 147$$

$$I(SfX) / n = 4(147) / 105 = 5.60 \text{ Test Points}$$

$$\bar{x} = G + I(SfX) / n = 105 + 5.60 = 110.60 \text{ Test Points}$$

$$SfX^2 = 3545$$

$$(SfX)^2 / n = (147)^2 / 105 = 205.80 \text{ Test Points}$$

$$Sx^2 = 3545 - 205.80 = 3339.20 \text{ Test Points}$$

$$s^2 = I^2(Sx^2) / n - 1 = (4)^2(3339.20) / 104 = 513.72$$

$$s = \sqrt{513.72} = 22.66 \text{ Test Points}$$

$$s_{\bar{x}} = \sqrt{s^2/n} = \sqrt{513.72/105} = \sqrt{4.893}$$

$$s_{\bar{x}} = 2.212 \text{ Test Points}$$

FIGURE VI. SCATTERGRAM OF EXPERIMENTAL AND CONTROL GROUP PRE-TEST SCORES

Experimental Group	61	65	69	73	77	81	85	89	93	97	101	105	109	113	117	121	125	129	133	137	141	145	149	153	157	161	Code Y		
161																											0	144	
157																												0	13
153																												1	12
149																												3	11
145																												0	10
141																												2	9
137																												2	8
133																												5	7
129																												4	6
125																												10	5
121																												14	4
117																												4	3
113																												9	2
109																												3	1
105																												3	0
101																												7	-1
97																												4	-2
93																												5	-3
89																												6	-4
85																												5	-5
81																												9	-6
77																												0	-7
73																												5	-8
69																												2	-9
65																												1	-10
61																												1	-11
Σ X	0	3	0	2	3	8	4	7	6	3	4	4	9	4	9	4	3	5	4	6	11	3	6	0	1	0	0	105	
Code X	13	12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13		

TABLE VII. COMPUTATION OF CORRELATION COEFFICIENT OF PRE-TEST SCORES OF EXPERIMENTAL AND CONTROL GROUPS

f_x	Code X	SXf_x	$SX^2 f_x$	f_y	Code Y	SXf_x	Product Y(SXf_x)	$SY^2 f_y$	SYf_y
0	-13	0	0	0	14	0	0	0	0
3	-12	-36	432	0	13	0	0	0	0
0	-11	0	0	1	12	2	24	144	12
2	-10	-20	200	3	11	23	253	363	33
3	-9	-27	243	0	10	0	0	0	0
8	-8	-64	512	2	9	15	135	162	18
4	-7	-28	196	2	8	11	88	128	16
7	-6	-42	252	5	7	30	210	245	35
6	-5	-30	150	4	6	14	84	144	24
3	-4	-12	48	10	5	42	210	250	50
4	-3	-12	36	14	4	28	112	224	56
4	-2	-8	16	4	3	4	12	36	12
9	-1	-9	9	9	2	17	34	36	18
4	0	0	0	3	1	-2	-2	3	3
9	1	9	9	3	0	-2	0	0	0
3	2	6	12	7	-1	-23	23	7	-7
5	3	15	45	4	-2	-16	32	16	-8
4	4	16	64	5	-3	-22	66	45	-15
6	5	30	150	6	-4	-12	48	96	-24
11	6	66	396	5	-5	-31	155	125	-25
3	7	21	147	9	-6	-69	414	324	-54
6	8	48	384	0	-7	0	0	0	0
0	9	0	0	5	-8	-34	272	320	-40
1	10	10	100	2	-9	-24	216	162	-18
0	11	0	0	1	-10	-10	100	100	-10
0	12	0	0	1	-11	-8	88	121	-11

105

-67 3401 105

-67

2574

3051

65

TABLE VII. COMPUTATION OF CORRELATION COEFFICIENT OF PRE-TEST SCORES OF EXPERIMENTAL AND CONTROL GROUPS

$$\begin{aligned} SXf_x &= -67 & SYf_y &= 65 \\ SX^2f_x &= 3401 & SY^2f_y &= 3051 \\ (SXf_x)^2 / n &= (-67) / 105 = 42.73 & (SYf_y)^2 / n &= (65) / 105 = 40.24 \\ Sx^2 &= 3401 - 42.73 = 3358.27 & Sy^2 &= 3051 - 40.24 = 3010.76 \end{aligned}$$

$$SXY = 2574$$

$$(SXf_x)(SYf_y) / n = (-67)(65) / 105 = -41.48$$

$$Sxy = 2574 - (-41.48) = 2615.48$$

$$r = \frac{Sxy}{\sqrt{(Sx^2)(Sy^2)}} = \frac{2615.48}{\sqrt{(3358.27)(3010.76)}} = \frac{2615.48}{3179.77} = .822$$

Significance of the Difference between the Correlation Coefficients of Pre-Test Experimental and Control Groups

The test of the difference of these two correlation coefficients is made by converting each "r" to its corresponding "z", and employing the following formula:

$$t = \frac{z_c - z_e}{\sqrt{\frac{1}{n-3} + \frac{1}{n-3}}} \quad \text{By Figure 7.4 of Snedecor},$$

the corresponding z for the r of the pre-test experimental group is 1.371. The corresponding z for the r of the pre-test control group is 1.427. "n" indicates the number, which in each case is 105.

Substituting, we have:

$$t = \frac{1.427 - 1.371}{\sqrt{\frac{1}{n-3} + \frac{1}{n-3}}} = \frac{.056}{.140} = .400$$

By Table 3.8, page 65, of Snedecor's, Statistical Methods, there is no evidence to indicate that the two z's and their corresponding r's are not significantly different between themselves. The t score indicated above is well below the 1.984 and 2.626 for the confidence limits at the 5% and 1% levels.

Significance of the Difference between the Means of the Pre-Test Scores of Experimental and Control Groups

$$\bar{x}_c = 110.60 \quad (\text{Table VI})$$

$$\bar{x}_e = 107.47 \quad (\text{Table IV})$$

$$s_{x_c} = 2.212 \quad (\text{Table VI})$$

$$s_{x_e} = 2.095 \quad (\text{Table IV})$$

$$r = .822 \quad (\text{Table VII})$$

The following formula is used to find the significance of the difference between the means:

$$s_{\bar{x}_c - \bar{x}_e} = \sqrt{s_{x_c}^2 + s_{x_e}^2 - 2r s_{x_c} s_{x_e}}$$

Substituting the numbers for the symbols, we have:

$$\begin{aligned} s_{\bar{x}_c - \bar{x}_e} &= \sqrt{(2.212)^2 + (2.095)^2 - (2)(.822)(2.212)(2.095)} \\ &= \sqrt{4.892 + 4.389 - (1.644)(4.634)} \\ &= \sqrt{9.281 - 7.618} \\ &= \sqrt{1.663} \\ &= 1.289 \end{aligned}$$

$$t = \frac{\bar{x}_c - \bar{x}_e}{s_{\bar{x}_c - \bar{x}_e}}$$

By substitution, we have:

$$t = \frac{110.60 - 107.47}{1.289} = 2.428$$

From Table 3.8 of Snedecor, for 100 degrees of freedom, the

confidence limits at the 5% level and the 1% level are respectively 1.984 and 2.626. Since 2.428 is less than the 1% level, the statement can be made that the means of these scores are from the same population at the 1% level of confidence. However, since 2.428 is greater than 1.984, it cannot be said that the means are from the same population at the 5% level of confidence. The experiment begins, then, with a bias in favor of the control group.

TABLE IX. COMPUTATION OF CORRELATION COEFFICIENT OF FINAL EXPERIMENTAL GROUP TEST SCORES AND INTELLIGENCE QUOTIENTS

f_x	Code X	SXf_x	SX^2f_x	f_y	Code Y	SXf_x	Product $Y(SXf_x)$	SY^2f_y	SYf_y
1	-26	-26	676	0	14	0	0	0	0
0	-25	0	0	5	13	93	1209	845	65
2	-24	-48	1152	2	12	14	168	288	24
2	-23	-46	1058	10	11	32	352	1210	110
2	-22	-44	968	12	10	24	240	1200	120
3	-21	-63	1323	8	9	-15	-135	648	72
3	-20	-60	1200	13	8	22	176	832	104
1	-19	-19	361	7	7	-54	-378	343	49
2	-18	-36	648	8	6	-95	-570	288	48
6	-17	-102	1734	7	5	-48	-240	175	35
1	-16	-16	256	2	4	-30	-120	32	8
3	-15	-45	675	4	3	-53	-159	36	12
7	-14	-98	1372	5	2	-68	-136	20	10
0	-13	0	0	7	1	-89	-89	7	7
4	-12	-48	576	6	0	-103	0	0	0
3	-11	-33	363	3	-1	-59	59	3	-3
6	-10	-60	600	2	-2	-50	100	8	-4
0	-9	0	0	1	-3	-19	57	9	-3
4	-8	-32	256	3	-4	-63	252	48	-12
1	-7	-7	49	0	-5	0	0	0	0
2	-6	-12	72	0	-6	0	0	0	0
0	-5	0	0	0	-7	0	0	0	0
4	-4	-16	64	0	-8	0	0	0	0
3	-3	-9	27	0	-9	0	0	0	0
7	-2	-14	28	0	-10	0	0	0	0
3	-1	-3	3	0	-11	0	0	0	0
2	0	0	0						
3	1	3	3	105		-561	786	5992	642
3	2	6	12						
4	3	12	36						
3	4	12	48						
1	5	5	25						
1	6	6	36						
3	7	21	147						
1	8	8	64						

TABLE IX. COMPUTATION OF CORRELATION COEFFICIENT OF FINAL EXPERIMENTAL GROUP TEST SCORES AND INTELLIGENCE QUOTIENTS

f_x	Code X	SXf_x	SX^2f_x
2	9	18	162
1	10	10	100
2	11	22	242
0	12	0	0
2	13	26	338
1	14	14	196
0	15	0	0
2	16	32	512
2	17	34	578
0	18	0	0
0	19	0	0
0	20	0	0
0	21	0	0
1	22	22	484
0	23	0	0
0	24	0	0
1	25	25	625
<hr/>			
105		-561	17069

$$SXf_x = -561$$

$$SYf_y = 642$$

$$SX^2f_x = 17069$$

$$SY^2f_y = 5992$$

$$(SXf_x)^2 / n = (-561)^2 / 105 = 2997.81$$

$$(SYf_y)^2 / n = 642^2 / 105 = 3925.37$$

$$Sx^2 = 17069 - 2997.81 = 14071.19$$

$$Sy^2 = 5992 - 3925.37 = 2066.63$$

$$SXY = 786$$

$$(SXf_x)(SYf_y) / n = (-561)(642) / 105 = -3430.11$$

$$Sxy = 786 - (-3430.11) = 4216.11$$

$$r = \frac{Sxy}{\sqrt{(Sx^2)(Sy^2)}} = \frac{4216.11}{\sqrt{(14071.19)(2066.63)}} = \frac{4216.11}{5392.65} = .782$$

Significance: By Table 7.3 of Snedecor, a high degree of relationship is shown between final experimental group test scores and intelligence quotients.

TABLE X. COMPUTATION OF MEAN AND STANDARD DEVIATION OF FINAL EXPERIMENTAL GROUP TEST SCORES FROM THE DATA CONTAINED IN TABLE IX.

Q equals 105 Test Points

I equals 4 Test Points

$$SfX = 642$$

$$I(SfX) / n = 4(642) / 105 = 24.45$$

$$\bar{x} = Q + I(SfX) / n = 105 + 24.45 = 129.45 \text{ Test Points}$$

$$SfX^2 = 5992$$

$$(SfX)^2 / n = (642)^2 / 105 = 3925.37$$

$$\text{For Code Numbers, } Sx^2, 5992 - 3925.37 = 2066.63 \text{ Test Points}$$

$$s^2 = I(Sx) / n - 1 = 16(2066.63) / 104 = 17.83$$

$$s = \sqrt{17.83} = 4.23 \text{ Test Points}$$

$$s_{\bar{X}} = \sqrt{s / n} = \sqrt{317.94/105} = \sqrt{3.02}$$

$$s_{\bar{X}} = \sqrt{3.02} = 1.740 \text{ Test Points}$$

FIGURE V. SCATTERGRAM OF FINAL CONTROL GROUP TEST SCORES AND INTELLIGENCE QUOTIENTS

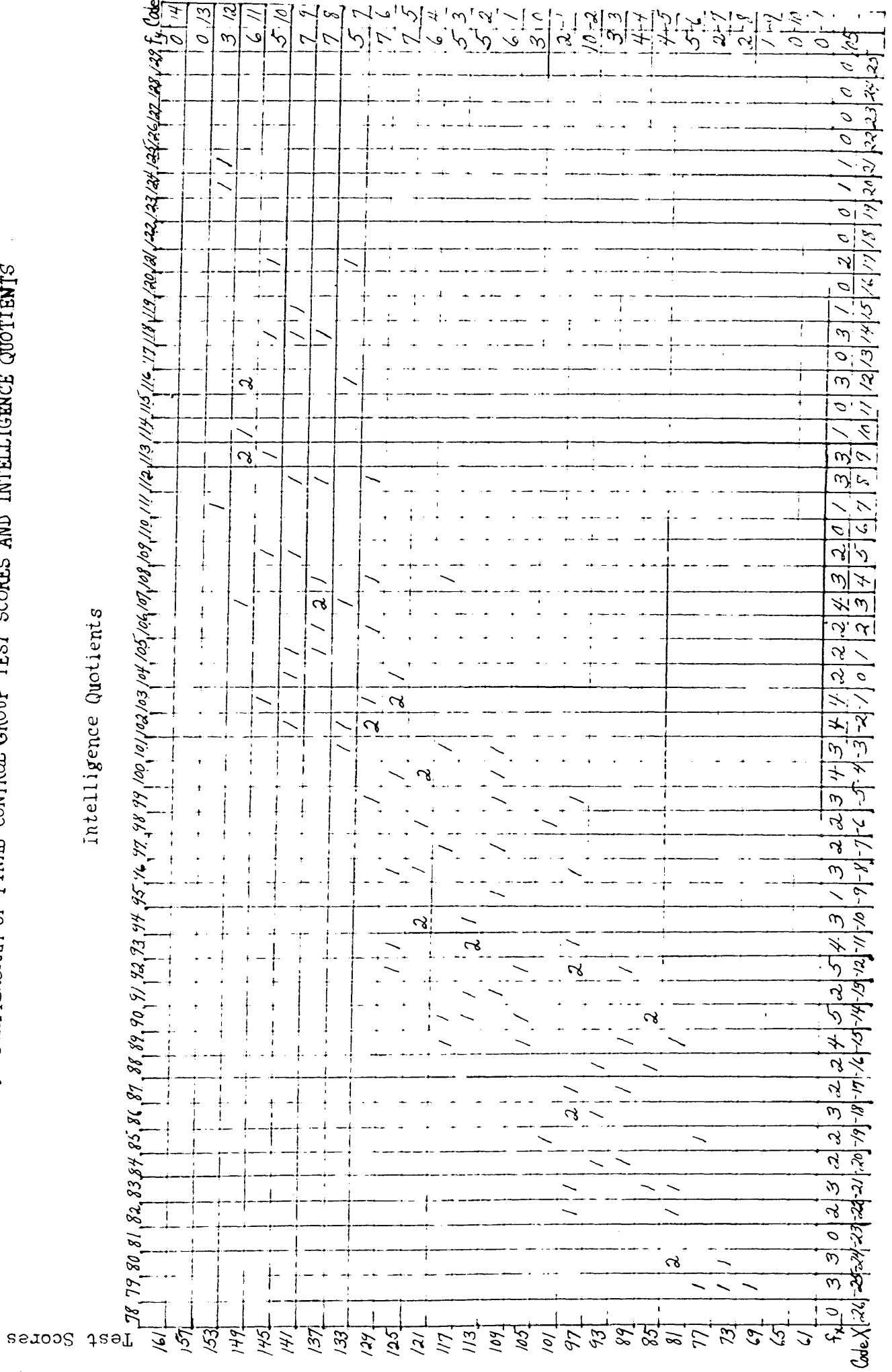


TABLE XI. COMPUTATION OF CORRELATION COEFFICIENT OF FINAL CONTROL GROUP TEST SCORES AND INTELLIGENCE QUOTIENTS

f_x	Code X	SXf_x	SX^2f_x	f_y	Code Y	SXf_x	Product $Y(SXf_x)$	SY^2f_y	SYf_y
0	-26	0	0	0	14	0	0	0	0
3	-25	-75	1875	0	13	0	0	0	0
3	-24	-72	1728	3	12	48	576	432	36
0	-23	0	0	6	11	55	605	726	66
2	-22	-44	968	5	10	44	440	500	50
3	-21	-63	1323	7	9	41	369	567	63
2	-20	-40	800	7	8	35	280	448	56
2	-19	-38	722	5	7	27	189	245	35
3	-18	-54	972	7	6	4	24	252	42
2	-17	-34	578	7	5	-37	-185	175	35
2	-16	-32	512	6	4	-42	-168	96	24
4	-15	-60	900	5	3	-35	-105	45	15
5	-14	-70	980	5	2	-59	-118	20	10
2	-13	-26	338	6	1	-41	-41	6	6
5	-12	-60	720	3	0	-41	0	0	0
4	-11	-44	484	2	-1	-25	25	2	-2
3	-10	-30	300	10	-2	-144	288	40	-20
1	-9	-9	81	3	-3	-54	162	27	-9
3	-8	-24	192	4	-4	-64	256	64	-16
2	-7	-14	98	4	-5	-65	325	100	-20
2	-6	-12	72	5	-6	-106	636	180	-30
3	-5	-15	75	2	-7	-44	308	98	-14
4	-4	-16	64	2	-8	-49	392	128	-16
3	-3	-9	27	1	-9	-25	225	81	-9
4	-2	-8	16	0	-10	0	0	0	0
4	-1	-4	4	0	-11	0	0	0	0
2	0	0	0						
2	1	2	2	105		-577	4483	4232	302
2	2	4	8						
4	3	12	36						
3	4	12	48						
2	5	10	50						
0	6	0	0						
1	7	7	49						
3	8	24	192						
3	9	27	243						

TABLE XI. COMPUTATION OF CORRELATION COEFFICIENT OF FINAL CONTROL GROUP TEST SCORES AND INTELLIGENCE QUOTIENTS

f_x	Code X	SXf_x	SX^2f_x
1	10	10	100
0	11	0	0
3	12	36	432
0	13	0	0
3	14	42	588
1	15	15	225
0	16	0	0
2	17	34	578
0	18	0	0
0	19	0	0
1	20	20	400
1	21	21	441
0	22	0	0
0	23	0	0
0	24	0	0
0	25	0	0

105 -577 17221

$$SXf_x = -577$$

$$SYf_y = 302$$

$$SX^2f_x = 17221$$

$$SY^2f_y = 4232$$

$$(SXf_x)^2 / n = 332929 / 105 = 3170.75$$

$$(SYf_y)^2 / n = 91204 / 105 = 868.60$$

$$Sx^2 = 17221 - 3170.75 = 14050.25$$

$$Sy^2 = 4232 - 868.60 = 3363.40$$

$$SXY = 4483$$

$$(SXf_x)(SYf_y) / n = (-577)(302) / 105 = -1659.52$$

$$Sxy = 4483 - (-1659.52) = 6142.52$$

$$r = \frac{Sxy}{\sqrt{(Sx^2)(Sy^2)}} = \frac{6142.52}{\sqrt{(14050.25)(3363.40)}} = \frac{6142.52}{6874.34} = .893$$

Significance: By Table 7.3 of Snedecor, a high degree of relationship is shown between final control group test scores and intelligence quotients.

TABLE XII. COMPUTATION OF MEAN AND STANDARD DEVIATION OF FINAL CONTROL GROUP TEST SCORES FROM THE DATA CONTAINED IN TABLE XI.

G equals 105 Test Points

I equals 4 Test Points

$$SfX = 302$$

$$I(SfX) / n = 4(302) / 105 = 11.50$$

$$\bar{x} = G + I(SfX) / n = 105 + 11.50 = 116.50 \text{ Test Points}$$

$$(SfX)^2 / n = (302)^2 / 105 = 868.60$$

$$\text{For Code Numbers, } Sx^2 = 4232 - 868.60 = 3363.40 \text{ Test Points}$$

$$s^2 = I^2(Sx^2) / n - 1 = (16)(3363.40) / 104 = 517.44$$

$$s = \sqrt{517.44}$$

$$s = 22.75 \text{ Test Points}$$

$$s_{MI} = \sqrt{s / n} = \sqrt{517.44 / 105} = \sqrt{4.928}$$

$$s_{MI} = 2.219 \text{ Test Points}$$

FIGURE VII. SCATTERGRAM OF EXPERIMENTAL AND CONTROL GROUP
FINAL TEST SCORES

Experimental Group	61	65	69	73	77	81	85	89	93	97	101	105	109	113	117	121	125	129	133	137	141	145	149	153	157	161	Code	
																											0	
																												14
																												13
																												12
																												11
																												10
																												9
																												8
																												7
																												6
																												5
																												4
																												3
																												2
																												1
																												0
																												105
																												10
																												11
																												12
																												1

Code

TABLE XIII. COMPUTATION OF CORRELATION COEFFICIENT OF FINAL TEST SCORES OF EXPERIMENTAL AND CONTROL GROUPS

f_x	Code X	SXf_x	$SX^2 f_x$	f_y	Code Y	SXf_x	Product Y(SXf_x)	$SY^2 f_y$	SYf_y
0	-13	0	0	0	14	0	0	0	0
0	-12	0	0	5	13	40	520	845	65
1	-11	-11	121	2	12	10	120	288	24
2	-10	-20	200	12	11	69	759	1452	132
2	-9	-18	162	10	10	108	1080	1000	100
5	-8	-40	320	8	9	21	189	648	72
4	-7	-28	196	12	8	45	360	768	96
4	-6	-24	144	8	7	1	7	392	56
3	-5	-15	75	8	6	-2	-12	288	48
10	-4	-40	160	7	5	10	50	175	35
2	-3	-6	18	2	4	-2	-8	32	8
3	-2	-6	12	4	3	-8	-24	36	12
6	-1	-6	6	5	2	-19	-38	20	10
5	0	0	0	7	1	-20	-20	7	7
5	1	5	5	5	0	-26	0	0	0
6	2	12	24	3	-1	-16	16	3	-3
7	3	21	63	2	-2	-21	42	8	-4
8	4	32	128	1	-3	-9	27	9	-3
4	5	20	100	3	-4	-21	84	48	-12
6	6	36	216	0	-5	0	0	0	0
7	7	49	343	0	-6	0	0	0	0
6	8	48	384	1	-7	-8	56	49	-7
7	9	63	567	0	-8	0	0	0	0
2	10	20	200	0	-9	0	0	0	0
0	11	0	0	0	-10	0	0	0	0
0	12	0	0	0	-11	0	0	0	0

105

92

3444 105

92

2608

6068

636

TABLE XIII. COMPUTATION OF CORRELATION COEFFICIENT OF FINAL TEST SCORES OF EXPERIMENTAL AND CONTROL GROUPS

$$SXf_x = 92$$

$$SYf_y = 636$$

$$SX^2f_x = 3444$$

$$SY^2f_y = 6068$$

$$(SXf_x)^2 / n = 8464 / 105 = 80.61 \quad (SYf_y)^2 / n = 404496 / 105 = 3852.34$$

$$Sx^2 = 3444 - 80.61 = 3363.39$$

$$Sy^2 = 6068 - 3852.34 = 2215.66$$

$$SXY = 2608$$

$$(SXf_x)(SYf_y) / n = (92)(636) / 105 = 58512 / 105 = 557.25$$

$$Sxy = 2608 - 557.25 = 2050.75$$

$$r = \frac{Sxy}{\sqrt{(Sx^2)(Sy^2)}} = \frac{2050.75}{\sqrt{(3363.39)(2215.66)}} = \frac{2050.75}{\sqrt{7452128.6874}}$$

$$= \frac{2050.75}{2729.87} = .751$$

Significance of the Difference Between the Correlation Coefficients
of Final Test Scores and Intelligence Quotients of Experimental
and Control Groups

From Figure 7.4 of Snedecor, the "z" corresponding to the "r" of the final control group test scores and intelligence quotients (Table XI, $r = .893$) is 1.346. For the experimental group (Table IX, $r = .782$) the corresponding "z" is 1.047.

$$\begin{aligned}
 t &= \frac{z_1 - z_2}{\sqrt{\frac{1}{n-3} + \frac{1}{n-3}}} \\
 &= \frac{1.346 - 1.047}{\sqrt{\frac{1}{102} + \frac{1}{102}}} \\
 &= \frac{.389}{\sqrt{.0196}} \\
 &= \frac{.389}{.140} \\
 &= 2.778
 \end{aligned}$$

From Table 3.8 of Snedecor, this "t" is outside the confidence limits at both the 5% and the 1% levels. We can state, then, that the evidence supports the statement that they are not drawn from the same population.

Significance of the difference between the Means of the Final Test Scores of Experimental and Control Groups

$$\bar{M}_e = 129.45 \quad (\text{Table X})$$

$$\bar{M}_c = 116.50 \quad (\text{Table XII})$$

$$s_{\bar{M}_e} = 1.740 \quad (\text{Table X})$$

$$s_{\bar{M}_c} = 2.219 \quad (\text{Table XII})$$

$$r = .751 \quad (\text{Table XIII})$$

The following formula is used to find the significance of the difference between the means:

$$s_{\bar{M}_c - \bar{M}_e} = \sqrt{s_{\bar{M}_c}^2 + s_{\bar{M}_e}^2 - 2r s_{\bar{M}_c} s_{\bar{M}_e}}$$

Substituting the numbers for the symbols, we have:

$$\begin{aligned} s_{\bar{M}_c - \bar{M}_e} &= \sqrt{(2.219)^2 + (1.740)^2 - (2)(2.219)(1.740)} \\ &= \sqrt{4.923 + 3.027 - (1.502)(3.861)} \\ &= \sqrt{7.950 - 5.799} \\ &= \sqrt{2.151} \\ &= 1.466 \end{aligned}$$

$$t = \frac{\bar{x}_e - \bar{x}_c}{s_{\bar{M}_c - \bar{M}_e}}$$

By substitution, we have:

$$t = \frac{129.45 - 116.50}{1.466} = 8.833$$

The evidence here, by reason of Table 3.8 of Snedecor, indicates that the groups are not part of the same population at the 5% or the 1% level of significance.

CHAPTER V

INTERPRETATION OF THE DATA FROM CHAPTER IV

From the evidence contained in Table II, a highly significant relationship is shown between the paired intelligence quotients of experimental and control groups. It must be pointed out that these scores on the Otis test were deliberately matched for purposes of this study.

Table III shows a correlation coefficient of .878 between pre-test scores and intelligence quotients for the experimental group. Table V reveals a correlation coefficient of .891 between the pre-test scores and intelligence quotients of the control group. These coefficients of correlation are both highly significant, indicating a close relationship between intelligence and the ability to select the correct word on the multiple choice tests. The computation of the difference between these two correlation coefficients indicates that the two groups are drawn from the same population at both the 5% and the 1% confidence levels. The evidence contained in Table III and Table V seems to bear out the discovery made long ago by Binet, that knowledge of general vocabulary is the best single measure of intelligence.

The computation of the significance between the means of experimental and control group pre-test scores indicates that the means

of the two groups are drawn from the same population at the 1% level of confidence. However, they cannot be said to be from the same population at the 5% level. Table IV reveals a mean of 107.47 for the experimental pre-test group. Table VI shows a mean of 110.60 test points for the control pre-test group. This indicates that the control group scored 3.13 test points higher than the experimental group on the initial tests on the basis of the means. Thus, at the beginning of the study, the control group was superior to the experimental group in the number of words recognized. While it cannot be said that the means of the two groups are from the same population at the 5% level of significance, it may be pointed out that the means show a balance in favor of the control group at the beginning of the study.

Table IX reveals a correlation coefficient of .782 between the intelligence quotients and final test scores of the experimental group. Table XI indicates a correlation coefficient of .893 between the intelligence quotients and final test scores of the control group. These correlation coefficients both show a significant relationship between intelligence and final test scores. However, the computation of the difference between the two correlation coefficients indicates that the two r 's are not drawn from the same population at either the 1% or the 5% levels of confidence.

The computation of the significance of the difference between the

means of final experimental and control group test scores indicates a highly significant difference in the means of the two groups. A "t" of 8.833 is far outside the limits at either the 1% or the 5% level of significance. Table X shows a mean of 129.45 test points for the experimental group final test scores; Table XII reveals a mean of 116.50 test points for the control group final test scores. This represents a mean gain of 12.95 test points for the experimental group over the control group.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

As related to the aims of the study, listed in Chapter I, the writer has found:

1. A correlation coefficient of .991 between the paired intelligence quotients of experimental and control groups. (Table II)
2. A correlation coefficient of .878 between the experimental group pre-test scores and intelligence quotients. (Table III)
3. A correlation coefficient of .891 between the control group pre-test scores and intelligence quotients. (Table V)
4. A correlation coefficient of .822 between the pre-test scores of experimental and control groups. (Table VII)
5. A correlation coefficient of .782 between the final experimental group test scores and intelligence quotients. (Table IX)
6. A correlation coefficient of .893 between the final control group test scores and intelligence quotients. (Table XI)
7. A correlation coefficient of .751 between the final test scores of experimental and control groups. (Table XIII)

As regards population estimates, the writer has found:

1. That the correlation coefficients of pre-test scores of experimental and control groups are from the same population at both the 1% and the 5% levels of significance.

2. That the means of the pre-test scores of experimental and control groups are from the same population at the 1% level, but not at the 5% level of significance, with a bias in favor of the control group.

3. That the correlation coefficients of final test scores and intelligence quotients of experimental and control groups are not drawn from the same population at either the 1% or the 5% level of significance.

4. That the means of the final test scores of experimental and control groups are not drawn from the same population at either the 1% or the 5% level of significance.

CONCLUSIONS

On the basis of the evidence contained in this study, the writer concludes:

1. One method of drill benefits the group having had the drill to the extent that the test scores, when compared with those having had no drill, show a highly significant population difference. A t score of 8.833 is far outside the confidence limits at either at either the 1% or the 5% level of significance. This is even more significant when one remembers that the experiment began with a bias in favor of the control group.

2. That a highly significant relationship exists between the Otis Intelligence Test scores and recognition of 160 words of the Pressy Tests, as indicated by the correlation coefficients of pre-test scores of both experimental and control groups.

3. As indicated by the difference in the correlation coefficients of the final test scores, no significant relationship exists between the intelligence quotients and the test scores of the two groups. Since the only known difference in the instruction of the two groups was the employment of one method of drill, the change in relationship must be attributed to the factor of drill.

RECOMMENDATIONS

On the basis of the evidence contained in this study, the writer recommends that drill on vocabulary become a "must" in the teaching of the social studies. All the evidence in this study shows conclusively that tremendous gains in word recognitions result from drill.

The writer believes that this study has improved the quality of his own social studies' teaching in three ways: 1. It has caused him to become acquainted with lists of "strategic words", which research has shown are vital to pupil understanding. 2. It has revealed the vocabulary limitations of eleventh grade pupils of American history. 3. It has shown that tremendous gains in word recognition result from drill.

It is the writer's sincere hope that other teachers of the social studies, who read this study, will gain new insight into the problem of vocabulary. Since knowledge of words is the very essence of learning in the social studies, drill on important words is unquestionably of great value.

revert back
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A P P E N D I X

TABLE XV. DAILY ASSIGNMENTS AND VOCABULARY FOR UNIT I.
 *THE MAKING OF THE CONSTITUTION*¹
 TEXT: A UNIT HISTORY OF THE UNITED STATES

<u>Assignment Pages</u>	<u>Vocabulary</u>	<u>Page in Text</u>
1. Page 140 to Section III, Page 145.	colony	140
	committee	140
	league	141
	charter	141
	revolution	141
2. Section III, Page 145 through Page 151.	king	147
	monarchy	147
	anarchy	147
	radical	148
	assembly	149
3. Page 152 to Section H, Page 156.	government	152
	tyranny	153
	parliament	153
	compromise	154
	article	155
4. Page 156 through Page 161.	President	156
	amendment	157
	session	160
	ratify	160
	unanimous	160
5. Page 163 to Section II, Page 167.	restriction	163
	jurisdiction	165
	appropriation	166
	federal	166
	self-government	166
6. Section II, Page 167 to Section B, Page 171.	ambassador	167
	consul	167
	minister	167
	nullify	168
	prime minister	171

1. Hamm, William A., Bourne, Henry E., Benton, Elbert J., A Unit History of the United States, pp. 140-210.

<u>Assignment Pages</u>	<u>Vocabulary</u>	<u>Page in Text</u>
7. Section B, Page 171 through Page 177.	legislation	171
	impeach	171
	executive	173
	judicial	173
	interstate	174
8. Page 178 to Section III, Page 183.	doctrine	179
	democracy	179
	precedent	180
	tradition	180
	administration	182
9. Section III, Page 183 through Page 188	tariff	183
	protective tariff	183
	domestic	184
	internal	185
	enforce	186
10. Page 189 to Section D, Page 192.	conservative	189
	conference	190
	proclamation	191
	authority	191
	peace	192
11. Section D, Page 192 through Page 195.	treasury	193
	arbitration	194
	commission	194
	concede	195
	issue	196
12. Page 196 through Page 200.	union	196
	authorize	197
	declaration	197
	department	198
	rebellion	201
13. Page 201 to Section E, Page 205.	county	203
	constitution	203
	town	203
	political party	204

<u>Assignment Pages</u>	<u>Vocabulary</u>	<u>Page in Text</u>
14. Section E. Page 205 to Section E. Page 209.	Republican	206
	caucus	207
	primary	207
	alien	208
	sedition	208
15. Section E. Page 209 through/ Page 213.	resolution	209
	majority	209
	ticket	209
	deadlock	210
	ballot	210

TABLE XVI. DAILY ASSIGNMENTS AND VOCABULARY FOR UNIT II,
 "THE WESTWARD MOVEMENT"
 TEXT: A UNIT HISTORY OF THE UNITED STATES¹

<u>Assignment Pages</u>	<u>Vocabulary</u>	<u>Page in Text</u>
16. Page 328 to Section II, Page 331	inauguration	328
	vote	328
	Democrat	328
	nominate	329
	secretaries	330
17. Section II, Page 331 to Section III, Page 335.	province	331
	migration	331
	Senate	332
	international	333
	conspiracy	333
18. Section III, Page 335 to Section IV, Page 339.	foreign	336
	diplomatic	336
	expansion	337
	capital	337
	authorities	338
19. Section IV, Page 339 through Page 341.	campaign	339
	hostile	339
	boundary	339
	nation	339
	document	340
20. Page 696 to Section IV, Page 699.	alliance	696
	continent	696
	empire	697
	powers	697
	territory	698

1. Hays, William A., Bourne, Henry E., Benton, Elbert J.,
 op. cit., pp. 328-340, 696-728.

<u>Assignment Pages</u>	<u>Vocabulary</u>	<u>Page in Text</u>
21. Section IV, Page 699 through Page 703.	independence	700
	reciprocity	700
	delegate	701
	act	702
	duty	702
22. Page 704 through Page 710.	official	704
	insurrection	705
	negotiations	708
	despotism	709
	treaty	709
23. Page 711 through Page 714.	imperialism	711
	platform	712
	annex	713
	bill	713
	embargo	714
24. Page 715 to Sec- tion VI, Page 722.	legislature	716
	citizen	716
	appoint	717
	revenue	717
	immigration	717
25. Page 722 through Page 730.	policy	722
	diplomatic	724
	possession	725
	naval	726
	strategic	728

TABLE XVII. DAILY ASSIGNMENTS AND VOCABULARY FOR UNIT III,
 "THE GROWTH OF DEMOCRACY"
 TEXT: A UNIT HISTORY OF THE UNITED STATES¹

<u>Assignment Pages</u>	<u>Vocabulary</u>	<u>Page in Text</u>
26. Page 214 to Section II, Page 218.	republic	214
	debt	215
	tax	215
	policy	216
	community	218
27. Section II, Page 218 through Page 226.	secession	224
	confederacy	224
	governor	224
	finance	225
	election	225
28. Page 227 to Section II, Page 231.	emperor	227
	decree	228
	confiscate	229
	repeal	230
29. Section II, Page 231 to Section III, Page 234.	House of Representatives	232
	neutral	232
	inhabitant	232
	blockade	233
	referendum	233
30. Section III, Page 234 through Page 240.	veto	236
	abdicate	237
	Congress	237
	representatives	239
	states' rights	238
31. Page 241 through Page 245.	emancipation	241
	commodity	242
	monopoly	242
	imports	243

1. Hamm, William A., Bourne, Henry E., Benton, Elbert J.,
 op. cit., pp. 214-248, 300-321, 684-693.

<u>Assignment Pages</u>	<u>Vocabulary</u>	<u>Page in Text</u>
32. Page 246 through Page 255.	pioneer	246
	census	246
	emigration	246
	immigration	246
	state	248
33. Page 299 to Sec- tion III, Page 305.	enemy	300
	cabinet	300
	verdict	301
	candidate	302
	opponent	303
34. Section III, Page 305 through Page 314.	oppression	310
	currency	311
	speculation	312
	panic	312
	vice-president	313
35. Page 315 to Sec- tion D, Page 321.	city	316
	prohibition	317
	local	319
	nationality	321
36. Page 683 to Sec- tion C, Page 687.	proposal	684
	legislative	684
	suffrage	684
	civil service	686
	poll	686
37. Section C, Page 687 through Page 695.	law	690
	senator	691
	lobbying	692
	propaganda	693

VOCABULARY TEST¹Part I.

1. Who of the following represents the United States officially in a foreign country? (1) an ambassador, (2) a senator, (3) a patriot, (4) a governor
2. What is meant by the "authorities"? (1) high officials, (2) foreigners, (3) heads of corporations, (4) inventors
3. Which is a representative of the government in a foreign country? (1) consul, (2) sovereign, (3) vice-president, (4) banker
4. Of what is a governor the head? (1) a country, (2) a city, (3) a state, (4) a town
5. Who is the official head of a monarchy? (1) a king, (2) a president, (3) a dictator, (4) a judge
6. Which is a diplomatic agent? (1) a president, (2) a jury, (3) a minister, (4) a priest
7. Which term is applied to a person who holds a position of authority in the government? (1) principal, (2) lawyer, (3) official, (4) servant
8. Which name is given to the head of a ministry? (1) prime minister, (2) governor, (3) consul, (4) ambassador
9. Who is the head of the United States government? (1) the Governor, (2) the Secretary, (3) the President, (4) the King
10. Which are members of the House? (1) delegates, (2) senators, (3) mayors, (4) representatives
11. What are heads of departments in the United States government called? (1) consuls, (2) premiers, (3) secretaries, (4) senators
12. What is the title of a member of the higher branch of Congress of the United States? (1) representative, (2) senator, (3) delegate, (4) judge

1. Used by permission of Charles Scribner's Sons, Publishers of Tests and Measurements in the Social Sciences.

13. What are people when they first enter a foreign country? (1) citizens, (2) laborers, (3) aliens, (4) peasants
14. Who succeeds a president dying in office? (1) a secretary of state, (2) the speaker of the House, (3) the chief justice of the supreme court, (4) the vice-president
15. What is an assembly? (1) the allies in a war, (2) a group of people, (3) a high tariff, (4) a set of laws
16. Which is a form of conspiracy against one's country? (1) sedition, (2) criticism, (3) opposition, (4) immigration
17. Which group contains the official advisers to the president? (1) House of Representatives, (2) Senate, (3) Supreme Court, (4) Cabinet
18. What does the President sometimes appoint when he wants some matter investigated? (1) a company, (2) an embassy, (3) a commission, (4) a delegate
19. What name is given to a small organized group of persons with certain work to do? (1) a committee, (2) an assemblage, (3) a parliament, (4) a congress
20. What do nations do when they disagree, but want to find some friendly way out of their difficulties? (1) declare war, (2) hold a conference, (3) get out propaganda, (4) elect new officials
21. Of what bodies is Congress composed? (1) Parliament and Assembly, (2) Prime Minister, (3) House of Representatives and Senate, (4) House of Lords and House of Commons
22. What are people permanently located in a country called? (1) inhabitants, (2) foreigners, (3) emigrants, (4) capitalists
23. What are heads of departments in the United States government called? (1) consuls, (2) premiers, (3) cabinet members, (4) senators
24. Of what body is the lower house of Congress composed? (1) Senate, (2) House of Representatives, (3) supreme court, (4) parliament

25. What is a league? (1) a decree, (2) a confederacy, (3) a treaty, (4) a petition
26. What is the law-making body of every State in the United States called? (1) parliament, (2) congress, (3) judiciary, (4) legislature
27. What name is given to the chief legislative body of England? (1) parliament, (2) congress, (3) estates-general, (4) reichstag
28. Of what body is the upper house of Congress composed? (1) House of Lords, (2) the Senate, (3) House of Commons, (4) House of Representatives
29. Which word means the period during which a legislature is in meeting? (1) defeat, (2) epoch, (3) session, (4) congress
30. What is the condition when there is no government? (1) slavery, (2) freedom, (3) expansion, (4) anarchy
31. What does secession mean? (1) to combine, (2) to cooperate, (3) to withdraw, (4) to capture
32. What is a confederacy? (1) a decree, (2) a league, (3) a treaty, (4) a petition
33. Which word means those who enter a country to live there? (1) middle-class, (2) immigrants, (3) patriots, (4) business men
34. What is meant by democracy? (1) government by a king, (2) government by a dictator, (3) government by the people, (4) government by the nobility
35. Which name is given to the countries ruled by an emperor? (1) state, (2) alliance, (3) commonwealth, (4) empire
36. What is a federal government? (1) a union of states, (2) a constitution, (3) a realm, (4) a province
37. Which word means the constituted authorities of a nation? (1) the banks, (2) the president, (3) the government, (4) the supreme court
38. What does migration mean? (1) a primitive society, (2) a kind of law, (3) a journeying from place to place, (4) a form of industry

39. In which form of government do the people have the greatest power? (1) an absolute monarchy, (2) a republic, (3) an oligarchy, (4) an embassy
40. Which is the result of independence, in a governmental sense? (1) unlimited freedom, (2) self-government, (3) control by others, (4) lack of initiative
41. Which word is most similar in meaning to despotism? (1) anarchy, (2) tyranny, (3) confederation, (4) union
42. What is another name for the United States government? (1) the Confederacy, (2) the Union, (3) the President, (4) the Conference
43. What name is given to a place where thousands of people live? (1) a house, (2) a city, (3) a village, (4) a school
44. What do you call a more or less permanent settlement in a new country? (1) a democracy, (2) a colony, (3) a tariff, (4) a continent
45. Which is a small political division for local government? (1) section, (2) region, (3) county, (4) territory
46. What is the largest group of people living under the same government? (1) city, (2) nation, (3) county, (4) province
47. What name is given to an area of partly settled land belonging to a country? (1) province, (2) nation, (3) republic, (4) investment
48. What is a state? (1) a political community, (2) a proposal, (3) a political slogan, (4) an item in a platform
49. What name is given to large areas before they become states? (1) cities, (2) factories, (3) territories, (4) jungles
50. Which usually has the smallest number of people in it? (1) nation, (2) city, (3) state, (4) town
51. When two countries make an agreement to help each other what is it called? (1) competition, (2) disarmament, (3) alliance, (4) election
52. What term may be used to describe the peaceful settlement of disagreements? (1) arbitration, (2) annexation, (3) nullification, (4) proclamation

53. What is the purpose of diplomacy? (1) to carry on affairs within a country, (2) to elect governmental officers, (3) to conduct relations between countries, (4) to increase industrial output
54. Which word describes any country in which a person is not a citizen? (1) foreign, (2) native, (3) domestic, (4) continental
55. To which does international refer? (1) relations within a country, (2) relations between a country and its possessions, (3) relations between two dependent states, (4) relations between an independent and a foreign country.
56. What are dealings of one country with another called? (1) amendments, (2) documents, (3) restorations, (4) negotiations
57. What term explains the position of a country which does not take sides in a war between two other countries? (1) democratic, (2) honest, (3) partial, (4) neutral
58. Which word means freedom from disturbance? (1) treaty, (2) peace, (3) hostility, (4) law
59. What are the strongest nations of the world often called? (1) empires, (2) league of nations, (3) powers, (4) democratic
60. What word means an agreement between two countries to give each other trade privileges? (1) reciprocity, (2) emancipation, (3) finance, (4) conspiracy
61. What is the name of a formal agreement between two or more countries? (1) a treaty, (2) an edict, (3) a resolution, (4) a statute
62. What name is given to additions to the constitution? (1) doctrines, (2) amendments, (3) assemblies, (4) declarations
63. Which are parts of the constitution? (1) articles, (2) treaties, (3) vetoes, (4) verdicts
64. What is given to people to prove their ownership of the land they settle on? (1) petition, (2) charter, (3) doctrines, (4) amendment

65. What gives the people the "fundamental law" by which they are governed? (1) constitution, (2) manifesto, (3) assembly, (4) parliament
66. When a legislature has voted for something what is it called? (1) an idea, (2) an act, (3) a crime, (4) a proposal
67. Which word means something to be voted on? (1) bill, (2) credit, (3) diplomacy, (4) proclamation
68. How did the early Americans state their independence from England? (1) by a riot, (2) by a treaty, (3) by a political party, (4) by a declaration
69. Which word means a method of influencing people to agree with you? (1) revolt, (2) election, (3) victory, (4) propaganda
70. Which word means an official written statement? (1) empire, (2) document, (3) conference, (4) committee
71. Which is something to be obeyed? (1) law, (2) proposition, (3) report, (4) celebration
72. What is meant by legislation? (1) the passing of laws, (2) the convicting of criminals, (3) the collecting of money, (4) the enforcing of laws
73. Which name is given to the movement of people from the eastern parts of the United States to the Western? (1) secession, (2) expansion, (3) conservation, (4) precedent
74. Which is a public statement? (1) assembly, (2) imperialism, (3) proclamation, (4) exposition
75. What does one nation sometimes make to another? (1) a commodity, (2) a census, (3) a constitution, (4) a proposal
76. What do you do when you pass a resolution? (1) vote, (2) nullify, (3) annex, (4) veto
77. What is the result of a restriction? (1) you refuse to do something, (2) you are prevented from doing something, (3) you are encouraged to break a law, (4) you are put in jail
78. Which people are hostile? (1) citizens, (2) employees, (3) enemies, (4) allies
79. What is a person called who locates in an unsettled section of his own country? (1) emigrant, (2) pioneer, (3) slave, (4) proprietor

80. What is the policy of extending national power by the addition of new territories called? (1) isolation, (2) imperialism, (3) democracy, (4) reclamation

VOCABULARY TEST

Part II.

81. Which is annexed? (1) revolt, (2) credits, (3) land, (4) neutrality
82. Which is a way of filling certain public offices? (1) application, (2) resignation, (3) endorsement, (4) appointment
83. Which word means to give another person the power to do something? (1) enforce, (2) refuse, (3) authorize, (4) excommunicate
84. What do two nations have to do if they want quite different things but do not want to go to war about their difficulties? (1) repeal, (2) ratify, (3) compromise, (4) mobilize
85. Which word means to give in to some other person's ideas? (1) enforce, (2) nullify, (3) concede, (4) veto
86. What word means about the same as revolution? (1) extradition, (2) administration, (3) penalty, (4) rebellion
87. What does a census usually count? (1) resources, (2) capital, (3) expenditures, (4) people
88. What usually determines your nationality? (1) the people you live with, (2) the school you attend, (3) the country you were born in, (4) the government of your city
89. What happens when a law is put into effect? (1) it is legislated, (2) it is decreed, (3) it is sanctioned, (4) it is enforced
90. Who may be impeached? (1) a business man, (2) a criminal, (3) a reporter, (4) a president
91. What is the official ceremony that marks the beginning of the President's term called? (1) nomination, (2) coronation, (3) convention, (4) inauguration
92. What happens when a law is nullified? (1) it is enacted, (2) it is ratified, (3) it is no longer in effect, (4) it becomes a decree

93. What action is taken on a treaty if those voting approve it? (1) it is consumed, (2) it is dissolved, (3) it is ratified, (4) it is annexed
94. When a law is repealed, what is always the result? (1) it is enforced more rigidly, (2) it is amended, (3) it is no longer in effect, (4) it is a source of dissatisfaction
95. What do you do when you leave your own country to settle in another? (1) emigrate, (2) retreat, (3) surrender, (4) abdicate
96. Which is a continent? (1) Panama, (2) London, (3) Asia, (4) France
97. What is a veto? (1) a compromise, (2) a political party, (3) a demand for funds, (4) a refusal by the president
98. What is the chief business of the executive department of the government? (1) to abolish laws, (2) to make laws, (3) to interpret laws, (4) to enforce laws
99. Which of the following is a legislative assembly? (1) empire, (2) congress, (3) world court, (4) bureau of education
100. What term is used in referring to the entire system of courts? (1) legislative, (2) administrative, (3) supervision, (4) judicial
101. How does the navy get money to build a new ship? (1) by annulment, (2) by appropriation, (3) by acquisition, (4) by invention
102. What word means a place where people live? (1) a monopoly, (2) a court, (3) a community, (4) a decade
103. What does "jurisdiction" mean? (1) to obey, (2) to refuse loyalty, (3) to defend, (4) to have power over
104. With what is finance chiefly concerned? (1) farms, (2) money, (3) people, (4) rights
105. Which is a form of currency? (1) a pound of sugar, (2) a college degree, (3) a museum, (4) a silver dollar
106. Which word means open revolt against authority? (1) diplomacy, (2) agriculture, (3) debate, (4) insurrection

107. What is money called that one country borrows from another? (1) a debt, (2) a dividend, (3) a premium, (4) a treaty
108. What is the tax put upon things brought into a country? (1) bonus, (2) discount, (3) duty, (4) income
109. When a government wishes to punish people, what does it often do with their property? (1) defends it, (2) subordinates it, (3) makes it into efforts, (4) confiscates it
110. What is the exclusive right or privilege of engaging in a particular business called? (1) competition, (2) monopoly, (3) capital, (4) confiscates it
111. What is a tariff which seeks to help home industries? (1) a tariff for revenue only, (2) international tariff, (3) free trade, (4) protective tariff
112. What is the money which the government collects for public use called? (1) appropriation, (2) currency, (3) allotment, (4) revenue
113. On what is there a tariff? (1) things manufactured in a country, (2) things sent out of a country, (3) things invented in a country, (4) things sent into a country
114. Which is a method by which a government raises money? (1) rebates, (2) diplomacy, (3) taxes, (4) salaries
115. Where is the government's money kept? (1) in the House, (2) in the Senate, (3) in the mint, (4) in the treasury
116. Which is an expression of the government's opinion on something important? (1) doctrine, (2) empire, (3) budget, (4) commerce
117. Which word is used to describe some important problem that needs to be settled? (1) an edict, (2) a decision, (3) an issue, (4) a sanction
118. Which word indicates the government's attitude on some important question? (1) policy, (2) issue, (3) patronage, (4) crisis

119. What policy is opposed to that of centralization in government? (1) states' rights, (2) competition, (3) public opinion, (4) magna charta
120. To what is a panic often due? (1) too much capital, (2) too little bankruptcy, (3) too much speculation, (4) too little trade
121. From what are precedents often derived? (1) cabinet, (2) campaigns, (3) tradition, (4) temperature
122. Which word refers to the affairs relating to one's own country? (1) foreign, (2) international, (3) domestic, (4) diplomatic
123. What are affairs within a country called? (1) restricted, (2) financial, (3) manufacture, (4) internal
124. What does interstate mean? (1) within a state, (2) between cities, (3) between states, (4) within a country
125. Which word refers to the conditions in the place where you live? (1) religious, (2) universal, (3) national, (4) local
126. What is a court's decision called? (1) a tariff, (2) a verdict, (3) a proposal, (4) a prohibition
127. What exists when one group of people is unfair and cruel to another group? (1) independence, (2) tolerance, (3) treason, (4) oppression
128. What name is given to the President's term of office? (1) decade, (2) panic, (3) campaign, (4) administration
129. What is the nation's capital? (1) the largest city, (2) the chief seaport, (3) the seat of its government, (4) the center of its wealth
130. Which is a commodity? (1) wheat, (2) people, (3) scenery, (4) education
131. Which laws refer to the manufacture, sale, or transportation of liquor? (1) sedition laws, (2) naturalization laws, (3) prohibition laws, (4) corporation laws

132. Which action closes ports to navigation? (1) naval battle, (2) embargo, (3) civil war, (4) aviation
133. Which of the following is a process by which the people may express themselves directly on some question? (1) bureaucracy, (2) paternalism, (3) referendum, (4) propaganda
134. When does a political campaign take place? (1) just before a session of congress, (2) just before a war, (3) just before an election (4) just before a law is passed
135. What is an individual called when he has announced his intention of running for a certain office? (1) an opponent, (2) a delegate, (3) a candidate, (4) an officer
136. What is a caucus for? (1) to elect a candidate, (2) to defeat a candidate, (3) to decide upon a candidate, (4) to punish an unwilling candidate
137. Which party is at present opposed to the Republicans? (1) Democratic, (2) Federalist, (3) Liberal, (4) Abolitionist
138. What does majority mean? (1) a minority, (2) an officer in the army, (3) more than fifty per cent of the votes, (4) a successful candidate
139. If fifty people vote unanimously for a certain officer, how many votes does he get? (1) 25 (2) 49 (3) 0 (4) 50
140. What do you cast at an election? (1) a policy, (2) an official, (3) a promise, (4) a ballot
141. By what method is the governor's office filled? (1) by initiative, (2) by election, (3) by recall, (4) by endorsement
142. Which word is most similar in meaning to tyranny? (1) anarchy, (2) confederation, (3) union, (4) despotism
143. What is likely to result when all parties in the government have equal strength? (1) imperialism, (2) massacre, (3) amendment, (4) deadlock
144. What are the representatives at political conventions called? (1) commissioners, (2) delegates, (3) visitors, (4) democrats
145. How does a person become a candidate for office? (1) by defeat, (2) by nomination, (3) by election, (4) by appointment

146. If you and someone else both want to be elected President, what do you call the other person? (1) opponent, (2) ally, (3) vice-president, (4) democrat
147. What kind of people abdicate? (1) traitors, (2) employees, (3) kings, (4) slaves
148. What is a poll? (1) a place to vote, (2) a ballot, (3) an unfair election, (4) a type of violence
149. What is a "ticket"? (1) the candidate who has been nominated, (2) a president before election, (3) a list of people to be voted on (4) a type of violence
150. Which is a political party? (1) Puritan, (2) Republican, (3) Episcopal, (4) Gentile
151. Which word means freedom from slavery? (1) pardon, (2) agitation, (3) emancipation, (4) exemption
152. What is the line that shows where one country stops and another begins? (1) monument, (2) compass, (3) boundary, (4) ocean
153. Which term means the closing of the ports of one's country by the naval forces of another? (1) embargo, (2) naval battle, (3) decisive, (4) blockade
154. What is the opposite of radical? (1) social, (2) illegal, (3) conservative, (4) political
155. By whom are examinations held for the filling of many positions in the government? (1) party politics, (2) public opinion, (3) League of Nations, (4) civil service
156. What is the name given to the activities of any group for the purpose of getting a certain bill through the legislature? (1) lobbying, (2) electioneering, (3) voting, (4) secret service
157. When a fort is especially well placed what is it called? (1) strategic, (2) colonial, (3) conservative, (4) patriotic

158. What is a primary? (1) a method of choosing the men to be voted on, (2) a political convention, (3) a group of foreign officials, (4) a law dealing with capital crimes
159. What does suffrage mean? (1) to suffer punishment, (2) to endure suffocation, (3) the right to vote, (4) a method of appointment
160. Which is the final act in electing a president? (1) voting, (2) petition, (3) compromise, (4) nomination

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