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# An index test for intermediate grades on social studies books.

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BOSTON UNIVERSITY  
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Thesis

AN INDEX TEST FOR INTERMEDIATE GRADES  
ON SOCIAL STUDIES BOOKS

Submitted by

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(A.B. Boston College, 1951)

In Partial Fulfillment of Requirements for  
the Degree of Master of Education

1954

Boston University  
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STATEMENT OF THE PROBLEM

CHAPTER I

STATEMENT OF THE PROBLEM

The intent of this study is to revise an index test by Kempton et altera<sup>1</sup> and to administer this revised test at the fourth, fifth, and sixth grade levels. It is intended that this be a diagnostic test as to indicate what aspects of the index skill have been acquired and what aspects need further instruction.

Social studies today in its problem-unit teaching emphasizes the use of many books. Certain skills such as that of the use of the index are needed if one is to know how to locate pertinent information in reference books. In order to solve a problem or to locate answers to questions in satisfying the requirements of a unit, the pupil must consult a variety of reference materials. Educators in the social studies and the other content fields point out the need for intensive instruction in the skill of locating materials by the use of the index.

In the middle grades the need for the skill of locating information increases. With this demand for additional material necessarily encouraging the development of the skill of using an index, Witty<sup>2</sup> points out, "The ability to locate materials becomes an important reading objective since the field of social studies has so many reference materials of its own."

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<sup>1</sup> Esther Kempton, James McDonough, and Ethelyn Stoutermire, "An Index Test for Intermediate Grades on Social Studies Books," Unpublished Master's Thesis (Boston: Boston University School of Education, 1953).

<sup>2</sup> Paul Witty, Reading in Modern Education, (Boston: D. C. Heath and Company, 1949), p. 169.

According to Wesley<sup>1</sup> :

No skill is more frequently needed in the social studies than that which enables the pupil to find expeditiously the desired information. This skill involves a thorough knowledge of various parts of a book. The one who possesses such a skill will use the index to find an item rather than page through a book.

Walraven and Quest<sup>2</sup> recommend that boys and girls be taught to find the parts of books since pupils often enter high school without this essential knowledge. When a book is placed into their hands, they are unable to locate the required information.

This test should serve as a guide in diagnosing individual weaknesses in the various aspects of the skill of using the index to locate information; the teacher should then be able to discern those aspects of the skill the pupil performs well and those aspects the pupil is deficient in.

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<sup>1</sup> Edgar Bruce Wesley, "Diagnosis in the Social Studies," Educational Diagnosis. Thirty-Fourth Yearbook of the National Society for the Study of Education, (Bloomington, Illinois: Public School Publishing Company, 1935), p. 309.

<sup>2</sup> Margaret K. Walraven and Alfred L. Hall-Quest, Teaching Through the Elementary School Library, (New York: The H. W. Wilson Company, 1948), p. 117.

REVIEW OF LITERATURE

## CHAPTER II

## REVIEW OF LITERATURE

Specialists in the social studies<sup>1</sup> recognize the need in encouraging the development of the skill in using an index. Research has shown that the development of security is an essential responsibility of the school. A pupil who knows how to work, to use a tool or skill, becomes confident and secure.

Importance of Index.

Educators view the index as one of the most important parts of a book.

McKee<sup>2</sup> emphasizes that an analysis of the correct use of each part of a book can assist the teacher's task by noting the understandings, skills, and attitudes which the pupils must acquire in order to locate information for a specific purpose. He offers the results of analyses in the following list of items necessary for using the index of a book:

1. An understanding of the content, purpose and value of the index of a book
2. An understanding of the location of the index
3. Skill in finding a word in an alphabet list
4. An understanding of the different forms in which the material in the index may be arranged
5. Skill in determining which word or words are best to use as key words to look up in the index as leads to the needed information
6. Skill in choosing the proper subtopic in the index

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<sup>1</sup>Alice Miel, et al., Toward Better Teaching. 1949 Yearbook, Association for Supervision and Curriculum Development of the National Education Association. (Washington, D. C.: National Education Association, 1949), p. 5.

<sup>2</sup>Paul McKee, The Teaching of Reading in the Elementary School. (Boston: Houghton Mifflin Company, 1948), p. 427.

7. Understanding the meaning of punctuation marks and other signs such as bold faced type and the dash, as used in the index
8. Skill in using cross references
9. Skill in locating quickly on the page information to which the index refers
10. The attitude of "squeezing" from an index all of the references it gives on the problem at hand

Chase<sup>1</sup> has constructed a list of nine activities or essential skills indispensable for gathering information. The effectiveness of the index is among the essential skills.

Brown<sup>2</sup> states:

The index is the greatest time saver a student has in using books and yet it is amazing how much time people waste groping through a book for what they want instead of turning first to the index.

Gray<sup>3</sup>, in a list of the important types of skills required for locating information and in selecting and evaluating pertinent material includes the ability to use the index effectively.

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<sup>1</sup>W. Linwood Chase, Reporting Activities, Discussion Activities, Maps. (Boston: Unpublished Material, School of Education, Boston University), p. 1.

<sup>2</sup>Zaidee Brown, The Library Key, (New York: The H. W. Wilson Company, 1949), p. 13.

<sup>3</sup>William S. Gray, "The Nature and Organization of Basic Instruction in Reading," The Teaching of Reading: A Second Report. Thirty-Sixth Yearbook of the National Society for the Study of Education, Part I, (Bloomington, Illinois: Public School Publishing Company, 1937), p. 7.

Index fulfills a social studies objective.

The Department of Superintendence<sup>1</sup> states that one of the general objectives of social studies is: "To help pupils acquire information and skill which will be of value to them in continuing their education."

Morse<sup>2</sup> finds that the skills teachers are most often concerned with are the techniques of obtaining information.

Klee<sup>3</sup> stresses that if skills are to be justified as essential parts of the social studies, they should be looked upon as tools for the acquisition of information.

Problem-Unit Teaching Demands This Skill.

A curriculum with its stress on problem solving and unit procedure demands the development of the skill in the use of the index. Gray<sup>4</sup>, in a discussion of the rapid increase in the demands made upon the child in the modern curriculum, states that: "The ability to use the index effectively is one of the most important skills to be emphasized in the fourth-fifth-sixth grades."

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<sup>1</sup> Department of Superintendence, "The Social Studies," The Nation at Work on the Public School Curriculum. Fourth Yearbook of the National Education Association. (Washington, D. C.: National Education Association, 1926), p. 347.

<sup>2</sup> Horace T. Morse and George H. McCune, Selected Items for the Testing of Study Skills. Revised Edition. (Washington, D. C.: National Council for the Social Studies, 1949), p. 12.

<sup>3</sup> Loretta E. Klee, "An Analysis of Some of the Issues," Social Studies for Older Children. (Washington, D. C.: National Council for the Social Studies, 1953), p. 28.

<sup>4</sup> Gray, op. cit. p. 117.

Snedaker<sup>1</sup>, recognizing that social studies today emphasize the use of books and how to handle the sources as the index of a book, writes:

Social Studies programs which provide practice in the problem solving techniques are training boys and girls in the habits of work that are basic to effective action as members of a democracy.

The unit or problem situation demands that pupils use many sources of information that relate to the problem being considered, use various references effectively, and appraise and select pertinent data that offer themselves to the learner's purpose.<sup>2</sup>

On this same topic, Goodykoontz<sup>3</sup> and Uhl<sup>4</sup> find that the increase in the use of large units of work in the curriculum of grades four, five, and six is so large that a great need for reading skills arises. These authors consider the use of the index as one of these skills which will determine the success of the pupil in other subjects.

#### Necessity of Direct Teaching.

There is a recognized necessity for direct classroom teaching of the specific skills and abilities needed to develop competence in the process

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<sup>1</sup>Mabel Snedaker, "Development of Basic Skills," Social Studies for Older Children. (Washington, D. C.: National Council for the Social Studies, 1953), p. 107.

<sup>2</sup>Ernest Horn, Methods of Instruction in the Social Studies. (New York: Charles Scribner's Sons, 1937), p. 151.

<sup>3</sup>Bess Goodykoontz, "The Place of Reading in the Curriculum," The Teaching of Reading: A Second Report. Thirty-Sixth Yearbook of the National Society for the Study of Education, Part I, (Bloomington, Illinois: Public School Publishing Company, 1937), p. 47.

<sup>4</sup>Willis L. Uhl, "The Materials of Reading," The Teaching of Reading: A Second Report. Thirty-Sixth Yearbook of the National Society for the Study of Education, Part I, (Bloomington, Illinois: Public School Publishing Company, 1937), p. 213.

of locating information pertaining to a definite subject. In McKee's<sup>1</sup> judgment, the elementary school program should include a direct and systematized plan of instruction in locating information. He points out that much of this teaching should consist of definite drill exercises to develop this skill.

Preston<sup>2</sup> states: "The skill for obtaining specific information should be taught, including thumbing through a book and using chapter, titles, table of contents, and an index."

Howell<sup>3</sup> conducted an experiment to measure the progress of a year's work on the work study skills of children from grade four to grade eight inclusive. He reports that intensive work in teaching proper work-study habits should begin at least in grade four and that the techniques of teaching work-study skills must be incorporated into all lesson plans each day.

Yoakam<sup>4</sup>, advocating the direct teaching of study skills, writes:

Although in the assignment and recitation period the teacher incidentally gives much information to the children about how to study, special periods are needed for teaching the use of the table of contents and the index.

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<sup>1</sup> Paul McKee, Reading and Literature in the Elementary School. (Boston: Houghton Mifflin Company, 1934), p. 333.

<sup>2</sup> Ralph C. Preston, Teaching Social Studies in the Elementary School. (New York: Rinehart and Company, 1950), p. 260.

<sup>3</sup> Wallace J. Howell, "Work Study Skills of Children in Grades IV to VIII," The Elementary School Journal, 50: 384, 389, March, 1950.

<sup>4</sup> Gerald A. Yoakam, Reading and Study. (New York: The Macmillan Company, 1929), p. 377.

The Department of Superintendence<sup>1</sup> considers definite training in knowing how to efficiently locate information is an essential part of a social studies program. Skill in using the various parts of a book and in particular the index are phases of this training.

Authorities in this field take exception to the programs of indirect or no teaching of the index. Wesley<sup>2</sup> finds that poorly developed skills are the reason in many instances for unsatisfactory progress in the social studies. The lack of skill in locating material by the use of the index is so named.

Anderson<sup>3</sup>, in a discussion on the skill of locating information, states:

The pupil not only should be able to understand what he reads, he also should be able to use effectively the textbook. It is no exaggeration to say that some pupils have never learned how to use even an index.

Aluinas<sup>4</sup> and Morse<sup>5</sup> have concluded from their findings, testing, and experience that high school students do not have adequate social study skills and in many classes there are pupils who have not mastered the skill of using an index.

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<sup>1</sup>Department of Superintendence, "The Teacher and Classroom Technics," The Social Studies Curriculum. Fourteenth Yearbook of the National Education Association. (Washington, D. C.: National Education Association, 1936), p. 288.

<sup>2</sup>Edgar B. Wesley, "Diagnosis in the Social Studies," Educational Diagnosis. Thirty-Fourth Yearbook of the National Society for the Study of Education, (Bloomington, Illinois: Public School Publishing Company, 1935), p. 321.

<sup>3</sup>Howard R. Anderson, "The Development of Basic Skills in the Social Studies," The Social Studies, 27:100, February, 1936.

<sup>4</sup>Leo Aluinas, "Do Students Have Adequate Social Study Tools?" Social Education, 6:167, April, 1942.

<sup>5</sup>Morse, loc. cit. p. 12.

There is a necessity for teaching the purposes and use of the printed parts of a book which help to find specific information within the book.

For Wesley and Adams<sup>1</sup> maintain that:

The number of adults who leaf through a book to find a passage, forgetting the existence of an index, is obvious proof that teachers of the past did not convince students of the value of the index.

The Department of Superintendence<sup>2</sup> indicates that the training in locating information, if developed, is a skill which will be used for a lifetime and not just during the school year.

#### Testing in the Use of Index.

The Iowa Every-Pupil Tests of Basic Skills<sup>3</sup> include a page on the use of the index of the geography book. The items of this test number twenty-two and it is arranged with index in a single column consisting of seventeen main topics.

Kempton, McDonough and Stoutermire<sup>4</sup> conducted a study on the use of the index at the intermediate grade level. Their test was divided into three sections; namely, alphabetizing, use of history index, and the use of the geography index. Section one consisted of forty-seven items, section two had thirty-two items, and section three had twenty items.

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<sup>1</sup> Edgar B. Wesley and Mary A. Adams, Teaching Social Studies in Elementary Schools. (Boston: D. C. Heath and Company, 1946), pp. 285-286.

<sup>2</sup> Department of Superintendence, loc. cit. p. 288.

<sup>3</sup> Iowa Every-Pupil Tests of Basic Skills, Test B, New Edition, (a) Elementary Battery (Grades 3-5), (b) Advanced Battery (Grades 5-9). (Boston: Houghton Mifflin Company, Form L 1940, Form M 1941, Form N 1942, Form O 1943, Manual 1945, Battery Manual 1947).

<sup>4</sup> Esther Kempton, James McDonough, and Ethelyn Stoutermire, "An Index Test for Intermediate Grades on Social Studies Books," Unpublished Master's Thesis (Boston: Boston University School of Education, 1953).

A mean score of 65.70 was arrived at for the fourth grade; the fifth grade mean was 70.00; and the sixth grade mean was 75.12. When a critical ratio was made between the means of grades four and five, it did not show a statistically significant difference. But the critical ratio computed on the difference of the means between the fifth and sixth grades showed a significant difference of 3.90 in favor of the sixth grade. No statistical difference was determined by computing the means of the boys and girls at the fifth grade level. In an item analysis of the fifth grade, some twenty items were found to be needing revision or discarding. A correlation was made at the fifth grade level between the scores on the history and geography sections of the test. The resultant low correlation of .50 was proof that both sections were needed in the test; however, as the authors<sup>1</sup> noted, the geography section was not of equal strength in terms of number of items.

A review of the literature concerning the skill of using an index has shown that educators and social study specialists view the index as:

- (1) satisfying a social studies objective,
- (2) being necessary in problem-unit teaching,
- (3) existing as one of the very important sections of a book,
- (4) needing direct, systematic instruction.

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<sup>1</sup>Kempton, op. cit., p. 33.

PROCEDURE

## CHAPTER III

## PROCEDURE

There is a need and a necessity for a test for teaching pupils to use efficiently the index to obtain information in the social studies.

All available literature was reviewed so that areas for testing could be defined. Experts in the social studies emphasize the need for diagnostic tests on the use of the index.

A selection was made of the index skills to be tested. Deducted from the review of the literature was much assistance from McKee and from Snedaker and Horn. McKee<sup>1</sup> listed the important items required in the use of an index and also several exercises illustrating the use of the index. Snedaker and Horn<sup>2</sup> offered an illustrative exercise to develop skill in the use of the index which consisted of drill on alphabetical order, drill in using the key word and the ability to discover topics and subtopics. Such items were of great help in making the test exercises.

The test items are based on the following points from the list of McKee<sup>3</sup> which are related to the index as follows:

1. An understanding of the content, purpose and value of the index of a book

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<sup>1</sup>Paul McKee, The Teaching of Reading in the Elementary School. (Boston: Houghton Mifflin Company, 1948), pp. 427-428, 433-452.

<sup>2</sup>Mabel Snedaker and Ernest Horn, "Reading in the Various Fields of the Curriculum," The Teaching of Reading: A Second Report. Thirty-Sixth Yearbook of the National Society for the Study of Education, Part I, (Bloomington, Illinois: Public School Publishing Company, 1937), pp. 172-173.

<sup>3</sup>McKee, loc. cit.

2. Skill in finding a word in an alphabet list
  - a. An understanding of the relative position of the letters in the alphabet
  - b. Understanding what element in a word determines where the word is placed in an alphabet list
3. An understanding of the different forms in which the material in an index may be arranged. (This refers to the nature of the different types of indexes, main topics only and subtopics in relation to the main topic, and to the different ways in which subtopics are arranged.)
4. Skill in determining which word or words are best to use as key words to look up in the index as leads to the needed information
5. Skill in using the proper subtopic in the index
6. Understanding the meaning of punctuation and other signs used in the index
7. Skill in using cross references
8. The attitude of "squeezing" from an index all of the references it gives on the problem at hand

The test consists of three sections, each of which requires one-half hour to do. The first testing area was on alphabetizing and it included six exercises beginning with an easy exercise and progressing to more difficult ones. It concluded with the arrangement of items as an index. This section of the test was selected from number two of McKee's outline. Directions for exercise one were completely revised with new illustrative examples to provide clarity. Five new items were added. Six new items were added to exercise two and in exercise three the eight items were rearranged. The entire format of page two of the test was altered as to provide greater range of difficulty. In exercise six, items 38, 39, 41, 42, 43, and 44 were new test items. The directions for this exercise were altered for reasons of clarity and the word "example" was written out to avoid confusion. In all the test exercises the word "example" was similarly handled. There were 45 items in this section of the test.

The second section of the test was to test the pupil's ability to use a history index. History books of the fourth, fifth, and sixth grade level were the source of information for the compilation of these test items. The items to be tested were the use of key words, subtopics, cross references, and the dash and the comma. It was the intention of the writer that the history index be of sufficient sampling so that the ability of the student in each area could be discovered. In exercise seven, items 46, 47, 48, 51, and 52 were new; in exercise eight, items 53, 56, 57, and 58 were new. The directions to the pupil were completely altered in exercises 7, 8, 9, and 10. There were 25 items in this section of the test. The sample history index was revised as to include topics for the new items.

The third section was a test on a geography index compiled from the same sources as that of the history section. These items were to test the same skills as that of the history section. In exercise eleven, the directions were changed and the new items 71, 73, 75, and 76 were added. Directions to the pupil were revised in exercise twelve and the items 79, 80, 81, 82, and 83 were new. Likewise in exercise thirteen, the directions were changed and the new items were 84 to 90 inclusive. Exercise fourteen consisted of a new set of directions only. The geography index was revised to include topics for the new items and was compressed on to one page with a rearrangement in the format. Both the geography and the history sections were revised as to consist of the same type of exercises with an equal number of items in both sections. Items used in the revised test not mentioned above were items taken from the Kempton group and selected on the basis of possessing a critical ratio of 2.58 or better. The key was so arranged that it would provide an easier method of scoring and it is placed

in the appendix.

The test was administered to one hundred and nine pupils in the fourth grades, one hundred and twelve pupils in the fifth grades, and ninety-nine pupils in the sixth grades. Due to pupil absences from school, there were only one hundred usable tests from the fourth grades, ninety-six usable tests from the fifth grades, and ninety-five usable tests from the sixth grades. The town in which the test was administered is a semi-industrial and residential community. The children who took the test could be generally classified as an average group with a fair sampling from each socio-economic section of the population.

The letter of explanation to the teachers of the pupils taking the test explained the diagnostic purpose of the test in that it shows the abilities the pupils have mastered and those that need to be attained in making an efficient use of the index.

ANALYSIS OF DATA

## CHAPTER IV

## ANALYSIS OF DATA

The intent of measurement is to systematically measure the achievement of two or more individuals in a given test. The valuable items in a test are those that discriminate among the students of above average, average, and below average in attainment.

Wesley<sup>1</sup> states:

And so it is with individual test items. An item that is consistently answered by those who have a larger total understanding and which is missed by those of inferior total attainment is a good item and is said to have a high power of discrimination.

There were 291 usable tests from a total of 320. Absences of pupils accounted for the 29 unused tests.

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<sup>1</sup>Edgar B. Wesley, Teaching the Social Studies, (Boston: D. C. Heath and Company, 1942), p. 580.

Table I shows statistical data from the index test in grades 4, 5, and 6.

Table I. Statistical Data from Index Test in Grades 4, 5, and 6

| Grade | Range   | Number |       |       | Mean  |       |       | Standard Deviation |       |       |
|-------|---------|--------|-------|-------|-------|-------|-------|--------------------|-------|-------|
|       |         | Boys   | Girls | Total | Boys  | Girls | Total | Boys               | Girls | Total |
| 4     | 8 - 82  | 49     | 51    | 100   | 56.71 | 60.00 | 58.41 | 13.18              | 17.09 | 15.69 |
| 5     | 19 - 87 | 53     | 43    | 96    | 62.51 | 67.67 | 64.82 | 11.09              | 14.68 | 13.49 |
| 6     | 48 - 90 | 39     | 56    | 95    | 76.44 | 80.86 | 79.04 | 8.08               | 6.64  | 7.70  |

The range of scores in the fourth grade was from 8 to 82, a range of 74 points. The mean for boys was 56.71 and the mean for the girls was 60.00. The mean for the entire grade was 58.41. The standard deviation was 13.18 for the boys and 17.09 for the girls. For the grade, the standard deviation was 15.69.

In the fifth grade, the scores varied from 19 to 87, a range of 68. The mean for the boys was 62.51 and the mean for the girls was 67.67, a difference of 5.16. The standard deviation in grade 5 was 11.09 for the boys and 14.68 for the girls, and 13.49 for the grade.

For the sixth grade, the scores varied from 48 to 90, a range of 42. The mean for the sixth grade boys was 76.44, for the girls 80.86, and 79.04 for the grade. The difference between the mean for the boys and for the girls was 4.42 which was significant. The standard deviation for grade 6 was 6.64 for the girls and 8.08 for the boys, and 7.70 for the entire grade.

The critical ratio technique was used for a comparison between the means of grades and the means of boys and girls. A level of significance of 2.58 was used for the critical ratio. In referring to the critical ratio and what it implies, Wert<sup>1</sup> says:

Whenever the ratio is unity, the chances are 68 to 100 that the difference is too great to be the result of sampling fluctuations; whenever this ratio is two, the chances are 95 out of 100 that the difference is too great to be the result of sampling fluctuations; and, whenever the ratio is three or more, it is a practical certainty that the difference is too great to be the result of sampling fluctuations.

Table II shows the critical ratio between grades in the Index Test.

Table II. Critical Ratio Between Grades in the Index Test

| Grade | Mean  | S.D.  | S.E.m. | Diff. | S.E.Diff. | C.R. |
|-------|-------|-------|--------|-------|-----------|------|
| 4     | 58.41 | 15.69 | 1.569  |       |           |      |
| 5     | 64.82 | 14.60 | 1.49   | 6.41  | 2.16      | 2.97 |
| 6     | 79.04 | 7.70  | .79    | 14.22 | 1.69      | 3.79 |

A comparison was made between the means of grades four and five and a critical ratio was arrived at. The critical ratio of 2.97 shows a statistically significant difference between the means of the two grades since the criterion of 2.58 at the 1% level of acceptance is being used in this study. In the comparison between the means of grade five and grade six, the critical ratio was 3.79, indicating also a statistically significant difference between the mean scores of the grades.

<sup>1</sup> James E. Wert, Educational Statistics. (New York: McGraw Hill Book Company, Incorporated, 1938), p. 145.

A critical ratio was determined between the boys and girls of grade 5, but it did not show a statistically significant difference. This is evident in Table III. The critical ratio, however, was 1.90 in favor of the girls.

Table III shows the critical ratio between the boys and girls in grade five.

Table III. Critical Ratio Between Boys and Girls in Grade 5

|       | Mean  | S.D.  | S.E.m. | S.E.Diff. | C.R. |
|-------|-------|-------|--------|-----------|------|
| Girls | 67.67 | 14.68 | 2.24   |           |      |
| Boys  | 62.51 | 11.09 | 1.52   | 2.71      | 1.90 |

An item analysis was performed on the tests of grade five to determine which items had been proven good in the tests and which needed revision or omission from the test.

The analysis was based on the formula to find the critical ratio between the percentage of correct responses given by the upper twenty-seven percent of grade five and the correct answers given by the lower twenty-seven percent of the group. There were twenty-six pupils in both the upper twenty-seven per cent and in the lower twenty-seven percent.

The formula employed is:

$$\text{Critical Ratio} = \frac{\text{Difference } P_1P_2}{\text{S.E.Difference } P_1P_2}$$

$$\text{when S.E.Difference} = \sqrt{\text{S.E.}P_1^2 + \text{S.E.}P_2^2}$$

The Edgerton<sup>1</sup> tables were used to determine the squares of the standard errors of the percentages.

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<sup>1</sup>Harold A. Edgerton and Donald G. Paterson, "Tables of Standard Errors and Probable Errors of Percentages for Varying Numbers of Cases," Journal of Applied Psychology, 10:378-391, September, 1926.

Table IV shows the percentages of correct answers in both the upper and lower groups, the difference between these percentages, the standard error of the differences, and the critical ratio for each item in the test.

Table IV. Item Analysis of the Index Test in Grade 5

| Item No. | % of Upper<br><u>27%</u> | % of Lower<br><u>27%</u> | Diff.<br><u>P1 - P2</u> | S.E.<br><u>Diff.</u> | <u>C.R.</u> |
|----------|--------------------------|--------------------------|-------------------------|----------------------|-------------|
| 1        | 100*                     | 85                       | 15                      | 7.27                 | 2.06        |
| 2        | 100                      | 85                       | 15                      | 7.27                 | 2.06        |
| 3        | 100                      | 85                       | 15                      | 7.27                 | 2.06        |
| 4        | 100                      | 85                       | 15                      | 7.27                 | 2.06        |
| 5        | 100                      | 88                       | 12                      | 6.71                 | 1.79        |
| 6        | 100                      | 81                       | 19                      | 7.96                 | 2.39        |
| 7        | 100                      | 81                       | 19                      | 7.96                 | 2.39        |
| 8        | 100                      | 77                       | 23                      | 8.54                 | 2.69        |
| 9        | 100                      | 69                       | 31                      | 9.32                 | 3.33        |
| 10       | 100                      | 58                       | 42                      | 9.90                 | 4.24        |
| 11       | 96                       | 62                       | 34                      | 10.23                | 3.32        |
| 12       | 96                       | 46                       | 50                      | 10.51                | 4.76        |
| 13       | 100                      | 42                       | 58                      | 9.90                 | 5.85        |
| 14       | 100                      | 65                       | 35                      | 9.61                 | 3.64        |
| 15       | 100                      | 77                       | 23                      | 8.54                 | 2.69        |
| 16       | 100                      | 73                       | 27                      | 8.93                 | 3.02        |
| 17       | 100                      | 69                       | 31                      | 9.32                 | 3.33        |
| 18       | 100                      | 77                       | 23                      | 8.54                 | 2.69        |
| 19       | 100                      | 69                       | 31                      | 9.32                 | 3.33        |
| 20       | 100                      | 54                       | 46                      | 10.00                | 4.60        |
| 21       | 100                      | 46                       | 54                      | 10.00                | 4.60        |
| 22       | 96                       | 58                       | 38                      | 10.42                | 3.65        |
| 23       | 92                       | 50                       | 42                      | 11.14                | 3.77        |
| 24       | 100                      | 50                       | 50                      | 10.00                | 5.00        |
| 25       | 96                       | 58                       | 38                      | 10.42                | 3.65        |
| 26       | 96                       | 62                       | 34                      | 10.23                | 3.32        |
| 27       | 96                       | 54                       | 42                      | 10.51                | 4.00        |
| 28       | 100                      | 62                       | 38                      | 9.71                 | 3.91        |
| 29       | 100                      | 62                       | 38                      | 9.71                 | 3.91        |
| 30       | 100                      | 58                       | 42                      | 9.90                 | 4.24        |
| 31       | 100                      | 65                       | 35                      | 9.61                 | 3.64        |
| 32       | 96                       | 62                       | 34                      | 10.23                | 3.32        |
| 33       | 96                       | 65                       | 31                      | 10.14                | 3.06        |
| 34       | 100                      | 62                       | 38                      | 9.71                 | 3.91        |
| 35       | 100                      | 62                       | 38                      | 9.71                 | 3.91        |
| 36       | 96                       | 62                       | 34                      | 10.23                | 3.32        |
| 37       | 96                       | 54                       | 42                      | 10.51                | 4.00        |

\*100% is slightly underestimated as 99% had to be used in order to use the Edgerton Tables.

Table IV. Item Analysis of the Index Test in Grade 5

| Item No. | <u>% of Upper<br/>27%</u> | <u>% of Lower<br/>27%</u> | <u>Diff.<br/>P1 - P2</u> | <u>S.E.<br/>Diff.</u> | <u>C.R.</u> |
|----------|---------------------------|---------------------------|--------------------------|-----------------------|-------------|
| 38       | 100                       | 100                       | 0                        | 0.00                  | 0.00        |
| 39       | 100                       | 96                        | 4                        | 4.29                  | 0.93        |
| 40       | 100                       | 65                        | 35                       | 9.61                  | 3.64        |
| 41       | 100                       | 62                        | 38                       | 9.71                  | 3.91        |
| 42       | 96                        | 65                        | 31                       | 10.14                 | 3.06        |
| 43       | 96                        | 62                        | 34                       | 10.23                 | 3.32        |
| 44       | 88                        | 50                        | 38                       | 11.70                 | 3.25        |
| 45       | 88                        | 42                        | 46                       | 11.62                 | 3.96        |
| 46       | 96                        | 77                        | 19                       | 9.13                  | 2.08        |
| 47       | 73                        | 58                        | 15                       | 13.03                 | 1.15        |
| 48       | 96                        | 62                        | 34                       | 10.23                 | 3.32        |
| 49       | 85                        | 58                        | 27                       | 11.96                 | 2.26        |
| 50       | 96                        | 69                        | 27                       | 9.86                  | 2.74        |
| 51       | 23                        | 04                        | 19                       | 9.13                  | 2.08        |
| 52       | 04                        | 08                        | -04                      |                       |             |
| 53       | 88                        | 50                        | 38                       | 11.70                 | 3.25        |
| 54       | 50                        | 08                        | 42                       | 11.14                 | 3.77        |
| 55       | 96                        | 62                        | 34                       | 10.23                 | 3.32        |
| 56       | 81                        | 35                        | 46                       | 12.15                 | 3.79        |
| 57       | 77                        | 38                        | 39                       | 12.62                 | 3.21        |
| 58       | 81                        | 58                        | 23                       | 12.38                 | 1.94        |
| 59       | 23                        | 04                        | 19                       | 9.13                  | 2.08        |
| 60       | 85                        | 27                        | 58                       | 11.17                 | 5.19        |
| 61       | 19                        | 08                        | 11                       | 9.35                  | 1.18        |
| 62       | 73                        | 15                        | 58                       | 11.17                 | 5.19        |
| 63       | 54                        | 31                        | 23                       | 13.37                 | 1.70        |
| 64       | 04                        | 0                         | 4                        | 3.80                  | 1.05        |
| 65       | 58                        | 0                         | 58                       | 9.70                  | 5.98        |
| 66       | 96                        | 35                        | 61                       | 10.14                 | 6.02        |
| 67       | 50                        | 04                        | 46                       | 10.51                 | 4.38        |
| 68       | 96                        | 23                        | 73                       | 9.13                  | 8.56        |
| 69       | 100                       | 19                        | 81                       | 7.96                  | 10.19       |
| 70       | 100                       | 19                        | 81                       | 7.96                  | 10.19       |
| 71       | 92                        | 46                        | 46                       | 11.14                 | 4.13        |
| 72       | 46                        | 38                        | 8                        | 13.65                 | 0.59        |
| 73       | 31                        | 12                        | 19                       | 11.13                 | 1.71        |
| 74       | 73                        | 23                        | 50                       | 12.02                 | 4.17        |
| 75       | 54                        | 38                        | 16                       | 13.65                 | 1.72        |
| 76       | 77                        | 31                        | 46                       | 12.32                 | 3.73        |
| 77       | 85                        | 58                        | 27                       | 11.96                 | 2.26        |
| 78       | 92                        | 38                        | 54                       | 10.88                 | 4.96        |
| 79       | 77                        | 35                        | 42                       | 12.54                 | 3.35        |
| 80       | 88                        | 35                        | 53                       | 11.37                 | 4.66        |

Table IV. Item Analysis of the Index Test in Grade 5

| Item No. | % of Upper<br><u>27%</u> | % of Lower<br><u>27%</u> | Diff.<br><u>P1 - P2</u> | S.E.<br><u>Diff.</u> | <u>C.R.</u> |
|----------|--------------------------|--------------------------|-------------------------|----------------------|-------------|
| 81       | 92                       | 35                       | 57                      | 10.79                | 5.38        |
| 82       | 88                       | 31                       | 57                      | 11.13                | 5.12        |
| 83       | 69                       | 35                       | 34                      | 13.08                | 2.60        |
| 84       | 96                       | 35                       | 61                      | 10.14                | 6.02        |
| 85       | 88                       | 42                       | 46                      | 11.62                | 3.96        |
| 86       | 77                       | 58                       | 19                      | 12.72                | 1.42        |
| 87       | 27                       | 27                       | 0                       | 12.30                | 0.00        |
| 88       | 96                       | 46                       | 50                      | 10.51                | 4.76        |
| 89       | 19                       | 0                        | 19                      | 7.70                 | 2.47        |
| 90       | 96                       | 42                       | 54                      | 10.41                | 5.19        |
| 91       | 88                       | 31                       | 57                      | 11.13                | 5.12        |
| 92       | 100                      | 46                       | 54                      | 10.00                | 5.40        |
| 93       | 92                       | 42                       | 50                      | 11.05                | 4.52        |
| 94       | 96                       | 23                       | 73                      | 9.13                 | 8.00        |
| 95       | 92                       | 46                       | 46                      | 11.14                | 4.13        |

A critical ratio of 2.58 would indicate that a chance of the difference being a true difference would be 100 to 1. An item showing a critical ratio below 2.58 should be omitted or further revised. Items 1, 2, 3, 4, 5, 6, 7, 38, 39, 46, 47, 49, 51, 58, 59, 61, 63, 72, 73, 75, 77, 86, 87, and 89 would need to be altered or omitted from the test as shown by the critical ratio.

As found in the Kempton<sup>1</sup> study, although many of the items were revised, the children of both groups did so well that there was not a large enough difference to discriminate between the upper and lower groups. This was especially evident in the first seven items; however, it was felt advisable to retain some easy items in the beginning of the test because of the spread of the grades.

<sup>1</sup>Kempton et altera, op. cit. p. 29

The responses expected from the items on both the geography and history sections were parallel. Hence it was thought that there would not need to be both kinds of an index in an index test. A correlation was run between the scores of the individuals on each history and geography section. The resultant correlation of .70 would seem to indicate that it was not necessary to include both sections.<sup>1</sup>

The formula<sup>2</sup> used was:

$$r_{xy} = \frac{\sum fd_x d_y}{N - c_x \cdot c_y} \cdot \frac{s_x \cdot s_y}{s_x \cdot s_y}$$

---

<sup>1</sup> Henry E. Garrett, Statistics in Psychology and Education, (New York: Longmans, Green and Company, 1948), p. 333.

<sup>2</sup> Lee J. Cronbach, Essentials of Psychological Testing, (New York: Harper and Brothers, 1949), p. 41.

SUMMARY AND CONCLUSIONS

## CHAPTER V

### SUMMARY AND CONCLUSIONS

The purpose of this study was to construct, administer and evaluate the results of an index test in grades four, five, and six. Literature on the teaching of the index was read and analyzed to determine what kind of exercises should be in an index test. The sample indexes in both the history and geography sections were selected from books with copyrights of 1945 or later.

The phases of the index that were tested were alphabetizing, main topics or key words, subtopics, cross references, and the use of the dash and comma. In the first section there were forty-five items on alphabetizing. The second section consisted of 25 items on the use of the history index. There were 25 items in the third section, testing on the use of the geography index. These conclusions were based upon the test results of 291 pupils.

In analyzing the test data, means and standard deviations were computed for each grade. The fourth grade had a mean score of 58.41; the fifth grade mean was 64.82; and the sixth grade had a mean of 79.04. The critical ratio of 2.97 computed between the means of grades four and five showed a statistically significant difference. When a critical ratio was computed on the difference of the means between the fifth and sixth grades, it showed a significant statistical difference, 3.79 in favor of the sixth grade. In order to discover if there was any significant statistical difference between the boys and girls, a critical ratio was determined from the means of each group at the fifth grade level. The resultant critical

ratio of 1.90 was not significant although it did favor the girls.

An item analysis on the fifth grade population was made using the procedure of finding the critical ratio on the difference between percentages of the number of pupils having the item correct in the upper twenty-seven percent of the population and the number of pupils having the item correct in the lower twenty-seven percent. At the one percent level of significance about three-fourths of the items in the test had a critical ratio of 2.58 or more. The following items did not attain to that level of significance; items 1, 2, 3, 4, 5, 6, 7, 38, 39, 46, 47, 49, 51, 58, 59, 61, 63, 64, 72, 73, 75, 77, 86, 87, and 89. Item 52 was the only item in the test in which the lower group scored higher than the upper group. The group of items that did not show significant critical ratio should probably be dropped from the test or a few could be possibly revised.

At the fifth grade level a correlation was made between the scores achieved on the history index with the scores on the geography index of the test. The resultant correlation of .70 would seem to indicate that both sections need not be in an index test. The careful construction and balance of the number of items in each section of this revised test probably made this possible.

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APPENDIX A

LETTER TO THE TEACHER

TO THE TEACHER: I am asking your cooperation in giving this test which I have prepared as part of the research study for my thesis. As you will see, it is a test on the skills used in locating information in the Social Study books by means of the index. The test has been planned to be of diagnostic value in that it will show the processes involved that the pupil performs well and some of the practices he still needs to learn for making more efficient use of the index.

In order to have the test given as uniformly as possible, I am asking that it be given in three sections and one-half hour allowed for each section. The first section would include pages one, two, and three; the second would include the History Index, and pages four and five; the third would include the Geography Index, and pages six and seven. I would like to have the last part (the geography section) given on a different day.

N. B. It is most important for the validity of the test that the pupils put their names on all three sections of the test.

Mr. Gibbons has very kindly given his permission that the test be used in the Town of Stoughton.

Thank you for your cooperation.

Lawrence J. Boyle

APPENDIX B

THE TEST

TEST OF SKILL IN USING AN INDEX

PLEASE READ THIS CAREFULLY:

You find an index in the back of a book. A good index contains a list of all the important topics on which the book gives information. The topics in an index are placed in alphabetical order; that is, in the order of the A B C's. Topics that begin with A come first. Topics that begin with B come next, those with C come next and so on through the alphabet. Topics that begin with the same letter, but do not have the same second letter, are arranged according to the second letter.

For example, basket comes before brother.

Topics that have the same first two letters but not the same third letter are arranged alphabetically according to the third letter.

For example, glass comes before globe.

EXERCISE 1

DIRECTIONS: Under Column I you will find six words which are not listed in the order in which you would find them in an index. Now see if you can write these words under Column II in the order in which you would find them in an index. The first word under Column II is done for you.

| Column I | Column II              |
|----------|------------------------|
| Bacon    | Example: <u>Africa</u> |
| Silk     | (1) _____              |
| Africa   | (2) _____              |
| Ant      | (3) _____              |
| Food     | (4) _____              |
| Lion     | (5) _____              |

EXERCISE 2

DIRECTIONS: Arrange the following as you would find them in an index.

| Column I     | Column II              |
|--------------|------------------------|
| Shipbuilding | Example: <u>Canada</u> |
| Columbus     | (6) _____              |
| Europe       | (7) _____              |
| Oil          | (8) _____              |
| Rabbit       | (9) _____              |
| Canada       | (10) _____             |

EXERCISE 3

DIRECTIONS: Arrange the following as you would find them in an index.

| Column I    | Column II                 |
|-------------|---------------------------|
| Asia        | Example: <u>Airplanes</u> |
| Weather     | (11) _____                |
| Atlantic    | (12) _____                |
| Automobiles | (13) _____                |
| Winds       | (14) _____                |
| America     | (15) _____                |
| Water       | (16) _____                |
| Wyoming     | (17) _____                |
| Woolworth   | (18) _____                |
| Airplanes   | (19) _____                |

EXERCISE 4

DIRECTIONS: Arrange the following as you would find them in an index.

| Column I    | Column II             |
|-------------|-----------------------|
| Fertilizers | Example: <u>Cabot</u> |
| Civil       | (20) _____            |
| Climate     | (21) _____            |
| Flax        | (22) _____            |
| Fruit       | (23) _____            |
| Cabot       | (24) _____            |
| Canal       | (25) _____            |
| Fisheries   | (26) _____            |
| Flood       | (27) _____            |
| Canadian    | (28) _____            |

EXERCISE 5

DIRECTIONS: Arrange the following as you would find them in an index.

| Column I  | Column II              |
|-----------|------------------------|
| Parcel    | Example: <u>Beaver</u> |
| Boundary  | (29) _____             |
| Leather   | (30) _____             |
| Gold      | (31) _____             |
| Beaver    | (32) _____             |
| Butter    | (33) _____             |
| Revere    | (34) _____             |
| Buffalo   | (35) _____             |
| Factories | (36) _____             |
| Lumber    | (37) _____             |

## EXERCISE 6

DIRECTIONS: Here are some words below taken from an index. Write the words in the correct order in the blank spaces. The first one is done for you.

|                           |                       |
|---------------------------|-----------------------|
| Bell, Alexander G., 74-76 | Example: <u>Arabs</u> |
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| South America, 10, 216    | (41) _____            |
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   Ethan Allen and the Green Mountain  
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   not a separate colony, 174;  
   illus., 193  
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   his great speeches, 161f  
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   cattle range, 379,  
   Homesteaders in, 382;  
   soft coal in, 384

EXERCISE 7

DIRECTIONS: In finding the answer to a question, it is important that you choose the right word in the index. To choose the right word in the index, you must find the most important word in the question. This is called the key word.

Draw a line under the key word or words in each of the following questions.

EXAMPLE: Where could you find a map of Cabot's route?

- 46. Who was Columbus?
- 47. When did Lindbergh fly the first flight over the Atlantic?
- 48. Where was gold discovered?
- 49. Could you name all the states in the New England group?
- 50. When did Vermont become a state?
- 51. Of what were pioneer homes made?
- 52. For how many years was Theodore Roosevelt president?

EXERCISE 8

DIRECTIONS: Read each question and then look at the History Index to find the answer. Write the page number or numbers which answer the question in the blank space. The first one is done for you.

EXAMPLE: On what pages would you find information about  
Democracy in New England? Example: 177, 194

- 53. What page tells about early fur trading? \_\_\_\_\_
- 54. On what page could you find a picture of Father Marquette? \_\_\_\_\_
- 55. On what page is Philadelphia mentioned as the capital of  
the United states of America? \_\_\_\_\_
- 56. Where is the story of the California Gold Rush? \_\_\_\_\_
- 57. What page has a story on it about life on the frontier? \_\_\_\_\_
- 58. Where would you find the story of slavery? \_\_\_\_\_

## EXERCISE 9

DIRECTIONS: A subtopic shows what the book tells about the main topics. When you read a subtopic, keep the main topics in mind. Here are some questions on subtopics. Use the index to find the answers. Write the answers on the lines below. The first one is done for you.

EXAMPLE: On how many pages is there information  
about democracy?

Example: 10

59. How many subtopics can you find under frontier? \_\_\_\_\_
60. What page tells about the capture of Philadelphia? \_\_\_\_\_
61. How many different pages tell about pioneer homes? \_\_\_\_\_
62. How many different pages have illustrations of the frontier? \_\_\_\_\_
63. How many different pages tell about Philadelphia? \_\_\_\_\_
64. What comes after a reference that means the pages following? \_\_\_\_\_
65. On what page is there an illustration of Benjamin Franklin and  
the mail? \_\_\_\_\_

## EXERCISE 10

DIRECTIONS: Sometimes when you look under a key word it says see or see also another key word. This is called a cross reference in the index. See how many of the following references you can find cross references for. Use the index to find the words written below so that you may discover what other word has information that you need. The first one is done for you.

Example: Explorers      Example: see separate names, as Henry Hudson

66. Erie Canal \_\_\_\_\_
67. Gold \_\_\_\_\_
68. Maine \_\_\_\_\_
69. Negroes \_\_\_\_\_
70. Public Schools \_\_\_\_\_

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- Africa (af ri-ka), 4, 6, 31, 39, 42, 45, 98, 175, 187-216, (198), 202;  
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 Southeastern Asia, 277-228, Map, 228;  
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 See also Petroleum  
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EXERCISE 11

DIRECTIONS: Remember that the key word is the most important word in the question.

Draw a line under the key word or words in the following sentences.

The first one is done for you.

EXAMPLE: Is irrigation used in Argentina?

- 71. What people use reindeer as food?
- 72. What is the northernmost latitude of the Pacific Ocean?
- 73. How do ships use gasoline?
- 74. Where is the Republic of Panama located?
- 75. What is the largest port in the Gulf of Mexico?
- 76. How do goats live in the desert?
- 77. In what hemisphere do we find Italy?

EXERCISE 12

DIRECTIONS: Read each question and then look into the index to find the answer.

Write the page number or numbers which answer the question in the blank space. The first one is done for you.

EXAMPLE: How many different pages would give you information  
about oils from vegetables? Example: 5

- 78. What page tells about trade in Italy? \_\_\_\_\_
- 79. On what page would you find a map of mining? \_\_\_\_\_
- 80. Where would you look to find something about cheese making  
in Norway? \_\_\_\_\_
- 81. Where will you find maps of Argentina? \_\_\_\_\_
- 82. What pages tell about the discovery of the trail of Oregon? \_\_\_\_\_
- 83. On what pages would you look to discover stories about life  
in the Nile Valley? \_\_\_\_\_

## EXERCISE 13

DIRECTIONS: Here is an exercise about subtopics. See if you can find them by using the Geography Index. Write the answers on the lines below. The first one is done for you.

EXAMPLE: What page tells about oil from whales? Example: 75

84. What pages tell about the wood exports to Europe? \_\_\_\_\_
85. Where would I find a story about explorers at the North Pole? \_\_\_\_\_
86. How many pages tell about diamonds? \_\_\_\_\_
87. On what pages would there be information about food the Chinese eat? \_\_\_\_\_
88. Where would you look to find information about Tokyo Bay? \_\_\_\_\_
89. On what pages is the longest discussion of ways of travel? \_\_\_\_\_
90. On what page is there a definition of the word Downstream? \_\_\_\_\_

## EXERCISE 14

DIRECTIONS: Sometimes when you look under a key word it says see or see also another key word. This is called a cross reference in the index. See how many of the following references you can find cross references for. Use the index to find the words written below so that you may discover what other word has information that you need. The first one is done for you.

EXAMPLE: Under what item in the index would you find more information about altitude? Example: Elevation

91. What item in the index would give information about the continents of the Americas? \_\_\_\_\_
92. Where would you look to find more information about the East Indies? \_\_\_\_\_
93. What is another word that is a reference to boats? \_\_\_\_\_
94. What other word in the index would help you to find out about life around the Nile Valley? \_\_\_\_\_
95. What other reference would help you find out about interstate commerce? \_\_\_\_\_

APPENDIX C

THE KEY

## KEY TO THE TEST OF SKILL IN USING AN INDEX

## EXERCISE 1

1. Ant
2. Bacon
3. Food
4. Lion
5. Silk

## EXERCISE 2

6. Columbus
7. Europe
8. Oil
9. Rabbit
10. Shipbuilding

## EXERCISE 3

11. America
12. Asia
13. Atlantic
14. Automobiles
15. Water
16. Weather
17. Winds
18. Woolworth
19. Wyoming

## EXERCISE 4

20. Canadian
21. Canal
22. Civil
23. Climate
24. Fertilizers
25. Fisheries
26. Flax
27. Flood
28. Fruit

## EXERCISE 5

29. Boundary
30. Buffalo
31. Butter
32. Factories
33. Gold
34. Leather
35. Lumber
36. Parcel
37. Revere

## EXERCISE 6

38. Bell, Alexander G.
39. Delaware
40. Iron
41. Louisiana
42. Mints
43. Mississippi
44. Snipe
45. South America

## EXERCISE 7

46. Columbus
47. Lindbergh
48. Gold
49. New England
50. Vermont
51. Homes
52. Roosevelt

## EXERCISE 8

53. 203
54. 152
55. 154
56. 344-345
57. 287
58. 175, 185

## EXERCISE 9

59. 4
60. 122
61. 5
62. 3
63. 8
64. f.
65. 395

## EXERCISE 10

66. See Canals
67. See also mining
68. See also New England
69. See also slavery
70. See education

## EXERCISE 11

71. Reindeer
72. Pacific Ocean
73. Ships
74. Panama
75. Mexico
76. Goats
77. Italy

## EXERCISE 12

78. 303
79. 172
80. 40-42
81. 320, 321
82. 79-80
83. 20, 54-55

## EXERCISE 13

84. 140, 155, 157
85. 38
86. 3
87. 154-156
88. 192
89. 174-177
90. 8

## EXERCISE 14

91. North America and South America
92. Indonesia
93. Ships
94. Egypt
95. Trade