

THE
Measurement of Achievement
in Geography

By

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TO
MY FATHER AND MOTHER

PREFACE

The province of geography is to discover and interpret the interacting relations between man and his physical environment. The progress of man is dependent on his ability to utilize earth resources. These resources are unequally distributed. Some regions have dense populations; other regions are practically uninhabited. People everywhere are coming to want the same kinds of products. This has led to the building up of elaborate transportation systems and the exchange of commodities. Geography is a comprehensive subject. It includes a countless number of places, facts, and interpretations.

Substantial progress has been made in evaluating geographic content and in discovering appealing methods of presenting the material. Slight emphasis has been placed on geography tests and scales. The teacher of geography should place suitable emphasis on (1) the selection of content, (2) methods through which content is taught, *and* (3) tests to discover whether educational outcomes are being realized.

It has been difficult to devise suitable tests in geography because the objectives have not been clearly and definitely established. The progress that has been made in the field of measurements makes possible the measuring of all definite educational objectives. The general acceptance of definite aims to be realized through geographic instruction will lead to the formulation of adequate tests,

which, in turn, will lead to a careful reëvaluation of content and methods.

Tests which can be measured only by the subjective judgment of the teacher, are very unsatisfactory because of the variable human factor that enters in. Different teachers place a different stamp of value on the same paper. Objective tests, which, barring clerical inaccuracy, can be graded by pupils as readily as by teachers, should be devised. Teacher and pupils can then work together for the realization of a common goal with the assurance that the degree of success or failure can be accurately determined.

Geography tests should measure achievement both on a memoriter and a problem level. They should stress the distribution of places, facts about regions, and interpretations of discovered relations. Some phases of geography can be measured without giving the pupil any assistance in memory recall. Other phases require the giving of assistance through the control of answers.

Practice tests, which may be interwoven as an integral part of the daily work of the child, should be provided. These tests should challenge the ability of the pupil to secure and interpret the printed page, diagrams, maps, and statistical tables. They should provide for the selection and organization of content. Practice tests should have definite teaching values.

Completion tests should be provided for the larger units of work. They should be given, not primarily to inform the child, but to discover the extent to which the objectives have been realized. They should reduce mechanical

work to a minimum, and permit the pupil to register many reactions in a short period of time.

Teachers should acquire skill in devising objective tests to meet their needs. In addition, use should be made of some of the standardized tests. The purpose of testing has not been realized until a careful analysis of results is made with the idea of improving instruction.

The author has measured the achievement of numerous classes with objective tests. This book has been written with the hope that other teachers will be assisted to realize the many advantages that come from the use of properly devised tests.

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THE MEASUREMENT OF ACHIEVEMENT IN GEOGRAPHY

CHAPTER ONE

THE USE AND VALUE OF TESTS IN GEOGRAPHY

The purpose of testing. Practically every teacher confronts her pupils with challenges in the form of written tests. The teacher plans to give tests; the pupils come to expect tests. Why are tests given?

The teacher discovers the extent to which she has realized the aims of instruction with each pupil. She can evaluate her work to determine why she has failed or succeeded. Further plans may be made according to her findings. The tests should reveal the pupils who need individual attention in order that they may meet the minimum requirements and the pupils who may be expected to go beyond the minimum requirements in their work.

The pupil discovers the extent to which he has mastered the work and perhaps compares his achievement with that of other members of the class, with the class median, or with a standardized median. The effect of the test on the pupil is important. Success without much effort may encourage the pupil to continue to depend on native talent or luck. Success because of faithful preparation of work may lead to a determination to con-

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tinue to do superior work. Failure may leave the pupil in a hopeless state of mind or lead to a determination to increase his efforts to succeed.

The teacher uses tests in an attempt (1) to determine the standing of pupils, (2) to evaluate the effectiveness of instruction, (3) to secure the stimulus that will enable her to discover more effective methods of teaching, and (4) to impart to the pupil a stimulus that will prompt him to adopt more effective methods of learning.

Tests require the time of teacher and pupils. If the values of testing can be secured without the giving of tests, the work of the classroom is facilitated. If tests are justified, they must contribute something to the progress of the work that is not secured through class preparation and discussions. An analysis of the various kinds of tests that are given will be helpful in deciding whether the test is a necessary tool of the classroom teacher.

Written *versus* oral tests. Every class discussion is a form of testing. First one pupil, then another, contributes to the class discussion. Maximum group achievement may be tested in this way. But the class discussion cannot, except by a very haphazard method, indicate the exact achievement of each individual of the class. It is customary, however, to teach in groups. Pupils must also be tested in groups to conserve time. Group testing requires that written rather than oral tests shall be provided.

Judgment grades. Through class discussions, a teacher comes to have an opinion concerning the achievement of each pupil. This impression is cumulative. It is con-

stantly being modified according to the satisfactory or unsatisfactory reactions of each pupil. The standing of a pupil, as thus determined, may be thought of as the "judgment grade" of the teacher.

The larger the class the greater the possibility that the judgment grade of the teacher will be unreliable. For example, if there are ten pupils in a class, during a class period of thirty minutes, each pupil has an average of three minutes; if there are thirty pupils, each pupil has an average of only one minute. In either case a single pupil will be permitted to respond to only a small per cent of the questions. Moreover, the class discussion inevitably involves both difficult and easy questions. The teacher can hardly make due allowances for the varying nature of the questions so that all pupils will be fairly judged.

The following study illustrates the unreliability of grades given on the basis of haphazard oral questions:

An assignment on Argentina was made. The teacher prepared ten key-questions that she desired to place before the class. At the beginning of the recitation period, the pupils were asked to answer each of these questions on paper. The teacher, during the discussion, had no knowledge of what the pupils had written. She asked the questions and called on different members of the class of twenty-four pupils. The teacher recorded grades on the basis of oral recitations, and later recorded grades on the basis of the written work. The questions were asked and answered as follows:

1. How does the use of the land in the western part of the pampas differ from that in the eastern part?

In the written test, there were 8 correct, 12 partly correct, and 4 wrong answers. In the oral test, the first pupil called on was given a grade of 60%, although his grade on the

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written work of ten questions was 80%. The second pupil called on succeeded in completing the discussion satisfactorily and was given a grade of 100%, although in the written test his grade was only 75%. The pupil who had the better grasp of the assignment, as indicated by the written test, received the lower grade in class. Eight students presumably would have received a grade of 100%, if they had been called on, while four students would have been given zero.

2. Contrast the climate of northern Argentina with that of Patagonia.

In the written test, there were 6 correct, 15 partly correct, and 3 wrong answers. In the oral test, the first pupil called on was given a grade of 70%, although his grade on the written test was 80%. The second pupil called on was given a grade of only 50%, although his grade on the written test was 95%. In the written test, the second pupil answered the question more satisfactorily than the first pupil, but he could not make the additional contribution expected in the oral recitation and so was given a lower grade.

3. What product is important around Tucuman?

In the written test, there were 18 correct and 6 wrong answers. In the oral test, the first pupil called on was given a grade of 100%, and his grade on the written test was only 50%. Eighteen pupils could have made a grade of 100% on this question. Both pupils who were called on to answer question two and secured grades of only 70% and 50% respectively would have secured 100% on this question.

4. In what part of Argentina is the grape industry most important?

In the written test, there were 24 correct answers. In the oral test, the first pupil called on was given a grade of 100%, and his grade on the written test was 100%. The two grades here show perfect correlation.

5. How does Argentina rank in sheep production?

In the written test, there were 24 correct answers. In the oral test, the first pupil called on was given a grade of 100%, although his grade on the written test was only 50%. Every pupil could have secured 100% on this question.

6. Of what value is quebracho wood?

In the written test, there were 10 correct and 14 wrong answers. In the oral test, the first pupil called on was given a grade of only 30%, although his grade on the written test was 70%.

7. Name the largest city of Argentina.

In the written test, there were 24 correct answers. In the oral test, the first pupil made 100%, although his grade on the written work was only 40%.

8. What is meant by triangular voyages?

In the written test, there were 6 correct, 9 partly correct, and 9 wrong answers. In the oral test, the first pupil called on made a grade of 100%, and his grade on the written work was 100%.

9. How does Argentina rank in South America in immigration?

In the written test, there were 22 correct, and 2 wrong answers. In the oral test, the first pupil called on made a grade of 100%, although in the written test he had made a grade of 70%.

10. To what extent are Italians found in Argentina?

In the written test, there were 12 correct, 8 partly correct, and 4 wrong answers. In the oral test, the first pupil called on made a grade of 80%, although his grade on the written test was only 70%.

At the close of the discussion the teacher had recorded grades for only 14 pupils. There were 10 pupils, which included over 40% of the class, for whom no grades had been recorded. It will be noticed that pupils with a

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grade range of from 50% to 100% on the written test received 100% in the oral tests. The chance factor was too great to discover the achievement of pupils through the oral tests. The poorest student called on stood four chances in ten of being called on for the answer to a question he knew. He happened to be called on for one of these four questions. This study indicates that grades recorded for oral recitations are not very satisfactory. Class grades of this sort are merely suggesters to help the teacher form a judgment grade of the worth of each pupil's work. The judgment grade, taken by itself, is not sufficient to determine accurately the achievement of a pupil. It should be supplemented and checked by other suitable tests. There is an acute need for the devising of tests that will demand the same sort of reaction from every pupil.

Written tests during the class period. To overcome the weaknesses of the oral discussion, written exercises, at irregular intervals, may be given as a part of classroom procedure. The teacher may select one or two questions for a five-minute written exercise, or she may select ten or more questions that can be answered in a word or two. The pupils in this way all recite at the same time. Each pupil is confronted with the same mental challenge. In the oral recitation, some pupils are able to conceal their shortcomings while other pupils may give the false impression that they have mastered the assignment. The written test helps the pupils to feel that only faithful preparation of work is a guarantee of a favorable record.

Completion tests. From time to time, as the teacher completes large units of work, completion tests are given.

A similar test may also be given at the end of the term. The short recitation test reveals immediate achievement; the completion test reveals the residuum which promises to carry over as a part of the pupil's permanent equipment. The completion test, dealing with large units, indicates the extent to which the pupil can select the particular facts, from among a large number, necessary to meet the conditions of the questions. The "carry-over" of instruction in the form of usable knowledge is much more important than immediate achievement which involves few permanent values. Pupils who make a poor showing on recitation tests may make a much more favorable showing on completion tests. In fairness to the pupil, both types of tests should be given.

Announced tests. The formal test is duly announced in advance of the time that it is to be given. Each pupil has an opportunity to place himself in a state of preparation. The test is a stimulus which prompts the pupil to study, for the results of study will be necessary to meet the conditions of the test. If the test is to be based on a particular assignment, a high proportion of the students will attempt to master the assignment. The duly announced completion test may also have a similar general effect in raising the tone of class endeavor.

The formally announced tests, however, do not distinguish sharply between "cram achievement" and genuine achievement. Some pupils may assimilate the subject matter so that it becomes permanently interwoven into their mental lives; other students, at the last moment, may cram their minds with details merely to meet the test

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challenge. The formal test does not necessarily indicate how the knowledge was acquired but merely the extent to which the knowledge was in the possession of the student at the time the test was given. Perhaps the chief value of the announced test, in terms of educational processes, is the mental awakening that just precedes the giving of the test.

Unannounced tests. The informal test is "sprung" on the class. The test comes unexpectedly like a bolt of lightning out of a clear sky. From day to day, the pupils have been studying assignments and entering into class discussions. Perhaps they have studied because of their inherent interest in the subject, because of their desire to participate in the discussion, or even because of the compelling magnetism of the teacher, or the urge of parents at home. Whatever the motive, neither the fear of, nor the love for, a particular impending test has entered in.

The pupils come to the classroom expecting the usual discussion. The teacher may ask the class to write on some part of the assignment. This type of test indicates the extent to which the pupils are taking the assignments seriously, or the extent to which they are able to master the assignments. Slackers in the daily work are more readily singled out than in an announced test. The level of achievement on which the class is working is readily discovered. The pupils may come to accept informal tests as a part of the work. The uncertainty of their occurrence may help to hold the pupils to a more effective mastery of content.

The unannounced test may relate to a large unit of work

that has just been completed or that was completed some time earlier in the child's training. The "cram" factor is thus eliminated. The nervous strain which may come from worrying about an announced test is avoided. The pupil is tested for knowledge that has been assimilated rather than for knowledge that makes a passing impression. The spread in grades between the faithful student and the indifferent pupil who crams before a test is widened.

The unannounced test may be used to discover the proportion of content that is forgotten, or, to look at the question from the positive viewpoint, the proportion of content that is remembered. An announced test will reveal the maximum temporary retention of knowledge. The teacher may then proceed to other topics. Later on, when the first unit has passed into the margin of consciousness the teacher may give the pupils an unannounced test on the same teaching unit. The distribution of students, e.g. whether upper, middle, or lower third of class, through these tests, is another important means of discovering relative standing. Moreover, a comparison of the grades made in the two types of tests will help to reveal the ultimate efficiency of instruction.

If the unannounced test, involving remote recall, is as difficult as the announced test, involving immediate recall, a lower range of grades should be expected. Inevitably pupils will forget a certain proportion of their past experiences. An easier test may result in even a higher range of grades than was made on the test for immediate retention.

Assignment and recitation tests. The time allotted

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pupils for the study of geography is frequently divided between study periods and recitation periods. Tests help to reveal the extent to which pupils have mastered assignments during the study periods.

A teacher, without any prior announcement, gave the pupils five minutes to write on a sample question based on the assignment. The question was, "In what ways did the continental glacier form lakes in New England?" 13 of 28 students could not answer the question even in part correctly. The average grade of the class was 41.3%. The next day she gave a similar test using the question, "What advantages for manufacturing has New England?" 8 of the students could not answer the question even in part correctly and the average grade of the class was only 50.1%. The third day a similar test was given, the questions being, "What is the nature of the metal manufactures of New England? Name cities in which special products are important." This time the pupils had begun to understand that they could meet the requirements only by studying the assignments. Only two of the pupils could not answer the question in part, and the average grade of the class was 68.2%. The fourth day the teacher gave the question, "Name two ways that wood pulp is made from pulp wood." The pupils were now sure that they had to study the assignment to make a satisfactory record. Every pupil could write something on this topic, and the average grade of the class was 78.3%. In only four days, the average grade for mastery of assignment had been raised 37 points. Pupils will tend to master assignments for which they *know* they will be held responsible. If the