BULLETIN OF THE UNIVERSITY OF WISCONSIN

No. 382: High School Series, No. 10

THE HIGH SCHOOL COURSE IN GEOGRAPHY

BY

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MADISON

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I

INTRODUCTION

Geography as at present taught in the high schools is principally physical geography, or, as it is often called—physiography. It may be well at the outset to point out the relationships between geology and physiography, and between physiography and geography.

Sir Charles Lyell defined geology as "the science which investigates the successive changes that have taken place in the organic and inorganic kingdoms of nature, * * * inquires into the causes of these changes and the influence which they have exerted in modifying the surface and external structure of our planet." A modern text-book calls it "the study of the structure, history and development of the earth, as revealed in the rocks." Another speaks of it as "earth history." Geography has been conceived of as the latest chapter in earth history, and all geology has been thought of as made up of an infinite series of paleogeographies. Geography, according to this conception, is the geology of to-day and physical geography is merely its inorganic side. In ordinary usage, physiography, as presented in modern text-books and as taught in most high schools, has included much beside the inorganic phase, as is shown in a later section on The Trend of Geography.

This introduction of the life side into physiography has grown rapidly. Commercial geography, which describes the world in its relations to man as a producer and as a trader, covers only one phase of the organic side of geography.

At the present time (1910) there are 300 high schools in Wisconsin. Of this number about 90 per cent teach physical geography. Geology is taught in comparatively few schools. Of the schools offering physical geography, less than half give a whole year to the subject, the others giving one-half, two-thirds or three-fourths of a year. In the latter schools botany or physiology usually is taught the balance of the year. Commercial geography is taught in a considerable number of high schools of the state. No school in Wisconsin offers a course throughout the year in what may be called general geography. As will be seen later, the present trend of geography is toward a course which shall combine both physical geography and the more general phases of general geography and commercial geography. The widespread ignorance of location among pupils who enter normal schools and colleges leads to the conviction that somewhere in the high school there should be woven into the teaching a review of the important facts usually taught in locational geography.

II

THE PRESENT TREND OF GEOGRAPHY

Early Status of Physical Geography

In the decade of 1880 to 1890, there were a half dozen American text books of Physical Geography in use, more or less alike. They consisted of a number of unconnected chapters on astronomy, on geology, on meteorology, and on phases of zoology and botany. There were chapters describing the main physical features of the continents, a treatment of magnetism, of glaciers, of the distribution of the races of men, and some other topics. Then, as now, the prevailing character of the text books determined the nature of the subject matter which was taught in the schools.

In looking over those earlier text books, one is impressed with this fact; in their makeup there is no unifying principle. Each separate chapter is like a separate monograph. The books might almost have been a collection of chapters borrowed bodily from ten or twelve text books on the various sciences, with a limited amount of strictly geographical material added. The study was not a real science. Perhaps it was more truly an introduction to the general field of science as it is today in England. When well taught it was interesting, informing, and as useful as most school studies are, but it was almost wholly a book study and a memory study. Few, if any, teachers considered physical geography as a laboratory science in those days.

Report of the National Educational Association's Committee in 1893

Twenty years ago, some leaders of thought in the field of earth science, began to voice mild protests against this kind of physical geography. A reform movement started, and in 1893 took shape in the epoch-making report of the Committee of Ten, or rather, the report of the sub-committee known as the Geography Conference. The recommendations of this committee were so manifestly sane that they appealed to the thoughtful teachers in high schools and the colleges the country over. This report recommended, among other things, a closer delimiting of the field of physical geography, particularly emphasizing the treatment of physiographic processes, and of the origin, development, and classification of land forms. Field and laboratory work were called for, and it was recommended that the subject be given an entire year of time, preferably the first year of the high school course. (A fourth-year elective course was also recommended.)

Extracts from the report of the Conference on Geography to the Committee of Ten of the National Educational Association, 1893

"*General Elementary Geography.* There are important reasons for devoting the work of the earlier and intermediate years to those features of geography which will be most serviceable to the majority of pupils without regard to any sharp classification, because these are the only years during which many pupils remain in school. The earlier courses should, therefore, treat broadly of the earth and its environment and inhabitants. * * * It should deal not only with the face of the earth but with elementary considerations in astronomy, meteorology, zoology, botany, history, commerce, governments, races, religions, etc., so far as these are connected with geography. Unless this admixture of subjects is included under the elementary courses of geography many scholars will not gain a knowledge of even the outlines of these important subjects.

Physical Geography and Physiography. The special subject of geography should take on a more advanced form and should relate more specifically to the features of the earth's surface, the agencies that produce and destroy them, the environing conditions under which these act, and the physical influences by which man and all the creatures of the earth are so profoundly affected. This has usually been designated physical geography. * * *

* * * The majority of the Conference wish to impress upon the attention of teachers the fact that there has been developed within the past decade a new and most important phase of the subject, and to urge that they hasten to acquaint themselves with it and bring it into the work of the schoolroom and of the field.

The ground to be covered by physiography, when introduced as a high school study, may be indicated by the following topics: The wasting of the land surfaces, the transportation of the waste to the sea, and its deposition on the marginal sea bottoms; a brief account of the more common minerals and rocks in their relation to wasting; the changes of river action during the progress of land denudation; the relations of lakes, waterfalls, divides and their migration, flood-plains, deltas, etc., to the stage of river-development in which they are observed; the development of shore lines and the variation of their features under the long continued action of the shore waves; the interruptions of the normal progress of denudation and shore action by depression, elevation, or deformation; and by volcanic action or by climatic change, including briefly the effects of glacial action. The various kinds of land forms, as plains, plateaus, mountains, volcanoes, should be considered in accordance with the constructional processes involved in their origin and with the system of development above outlined; and their distribution over the earth should be briefly sketched. * * * Sufficient account of climate should be given to introduce an intelligent consideration of the conditions that determine the distribution of life; but this should be made relatively subordinate to the main theme, namely, the geography of the lands.

The associated study of the oceans should be relatively brief. It should give a condensed account of the ocean basins, recognizing the deep continuous basins of the great oceans, the enclosed mediterraneans, and the continental shelves; of the conditions of the ocean bottoms; of the composition and deep currents of the sea, and of the tides. The relation of these conditions to the distribution of oceanic life may be briefly introduced.

Unless an additional course on meteorology is offered, a sufficient practical use of the weather maps should be introduced into the course in physiography to furnish the scholars with a knowledge of the general principles of weather changes and forecasts.

* * * Each step should be satisfactorily taken before the next is attempted. A rigid system which forces a class over a given ground in a given time without regard to their ability

to cover it properly will not be helpful to the best results. * * * The work should move on earnestly and at a pace that makes the progress obvious to the scholars. Interest lags when the advance is too slow. Dawdling and dwelling on trivialities are among the great mistakes of the schoolroom. They are especially vicious when mistaken for thoroughness.

* * * The Conference offer, by way of suggestion, the following scheme. * * * Reduced to a sentence the scheme is: first, see; next, reproduce; then study the productions of others, and, meanwhile, ponder and reason on all.

1. *Observational Geography.* In the judgment of the Conference, observation should go before all other forms of geographical study and prepare the way for them; its object being (1) to develop the power and habit of geographic observation, (2) to give the pupils true and vivid basal ideas, (3) to arouse a spirit of inquiry and a thirst for geographical knowledge. This work of observation should begin with those features that lie immediately about the pupils and so fall easily within the reach of their direct study and ready comprehension. * * * Pupils should observe the agencies that produce surface changes, such as winds, rains, floods, thawing, freezing, cultivation, etc. The temporary streams that follow heavy rains represent on a small scale many of the natural processes by which surface features are produced. From these immediate agencies, the observations should extend to the phenomena of the weather and the climate, such as temperature, winds, clouds, seasons, * * * the shifting of the sun north and south with the seasons and to measure the amount of this by the length of shadows at noonday in the different months of the year. * * * The pupils should be encouraged to observe the differences of plants on uplands, lowlands, marshes, etc., and upon sandy, clayey, gravelly or stony ground, and to note the habitual dispersal of animals and insects in the neighborhood, and also their relations to each other, as in forming or frequenting forests, prairies, meadows, etc. As a step toward the study of the human elements in geography, observations should be made upon the population and its distribution, upon home occupations and productions. * * *

Observation should not only begin the work in geography but should continue throughout the entire course and beyond. * * * Every opportunity for observational work in geography should be eagerly embraced. Excursions for the special purpose should be made as frequently as practicable, formally or informally, in school hours and out of school hours, by classes and by individuals.

2. *Representative Geography.* Immediately after the making of observations should come their reproduction in the

form of descriptions, sketches, maps, models, etc. * * * The great end of education is to create productive ability.

3. *Derivative or Descriptive Geography.* * * * In this, the observational and representative work of others than themselves is made the basis of study. * * * The pupils cannot carry their own observations over more than a very small fraction of the earth's surface. * * * Their great dependence must, therefore, be upon the work of others, the work of geographical experts, and hence descriptive geography must embrace much the largest portion of their attention. The common mistake is that it embraces too nearly all of it, and the observational and reproductive efforts which are necessary to give the study of descriptions its greatest serviceability are neglected.

4. *Rational Geography.* * * * This phase of the subject which leads the pupils into the reason of things, should be assiduously cultivated, for it is the soul of the science. It should, however, be carefully adapted to the capabilities of the pupils, particularly in the earlier stages of the study. * * * The reasonings should be such as they can follow understandingly, if not work out themselves. * * * It may not be wholly without value in some cases to give to children a statement of the cause of phenomena even though they are unable to understand the methods of their operation, but it should be clearly understood that this is not teaching the scholars to reason concerning phenomena. * * *

Methods of Teaching. We urge that at all stages and in all parts of the study of geography the teacher, rather than the textbook, should lead the class. A good textbook is necessary. * * * It should give a better presentation of the subject than teachers can usually be expected to command. So, also, recitations based on textbooks are indispensable in order to secure precision of understanding and of statement on the part of the scholars. * * *

It is scarcely necessary to say that the simple memorizing, or the slavish following, of the textbook should be avoided. * * * In departing from the textbook, however, the opposite mistake of consuming undue time in giving the scholars what the textbook would give them in better form * * * should be avoided. * * *

Modelling, drawing, and other graphic modes of expression are fully recognized as indispensable means of aiding the imagination, intensifying thought, and strengthening memory. But these means should be kept subordinate to the study of the subject itself. * * *

Topical recitation and study should be used as freely as practicable. * * *

We urge upon teachers the free use of the crayon and blackboard. The simplest illustrations are of the greatest help. * * *

The greatest care should be given to secure clearness of ideas. For this reason, we recommend again that observational study should form the beginning of every new division of the subject, if it can be done. * * *

In order to secure the successful application and illustration of the principles of physiography in the home district, we advise that the teacher of this subject should, if possible, have had some outdoor experience in geological field work, as it is only through such experience that local illustrations can be utilized to the fullest advantage and a sufficiently practical turn can be given to the study."

The Progress of the Movement and the Present Reaction

Fortunately this report was soon followed by a very acceptable text book constructed on the lines laid down by the Committee. In a case such as we are considering, a report of a committee, no matter how sane and convincing, will bear little fruit in the field of actual teaching unless the teachers can have a text book embodying the principles and the subject matter recommended by that report. The success of this first modern American Physical Geography brought forth other books of the same general character, and by 1903, the new type of Physical Geography was being generally taught. We have been at it long enough to give it a fair trial. We have a large and varied collection of laboratory manuals. We have had much discussion of the subject in educational gatherings. The Journal of Geography has collected and published opinions of a considerable number of interested men, who have set forth very positively their views. We have had a round-table discussion among the foremost geographers of the country, at the Baltimore meeting of the Association of American Geographers in December, 1908, followed by the appointment by that body of a committee to make a report upon Secondary School Geography. We had the appointment by the National Educational Association at the Cleveland meeting in 1908 of a similar committee, whose report was made at Denver in the summer of 1909.

Professor R. E. Dodge, then editor of the Journal of Geography, felt the pulse of the movement in the questionnaire which he sent out in 1908 to a score of leading geographers and teachers in various parts of the country. The answers were published in the issues of March and April of the same year. (Vol. VI, pp. 241–254, and 273–285.) The general criticism of high school physical geography as revealed in these answers may be summarized as follows:

First: It is too closely restricted to the description and classification of land forms, is somewhat too geological, and has a tendency to include unusual and unimportant land forms and water forms in order that classification may be complete. For example, it is not uncommon in a textbook to find six, eight, or ten different kinds of lakes, or plains or mountains described, even though, perhaps, one-third of these are relatively rare forms.

Second: There is dissatisfaction with the kind of laboratory work which is being done, and with the results of that laboratory work.

Third: There is a growing belief that geography in secondary schools should not be simply *physical* geography, but should be based upon a preliminary study of physical geography, followed by a study of geography in its broader aspects; that is, geography in which the human element is more conspicuous.

Below are six of the eight questions whch were sent out by The Journal of Geography in the early part of 1908, together with a resume of the answers received. These answers will indicate something of the trend of opinion. The group of men who submitted these answers is a very thoroughly representative group, and their opinions are entitled to as much weight as the opinions of any group of men that could be secured in this country. The questions were as follows:

(1) Do you believe that secondary school geography for students not preparing to enter college should be restricted to physical geography as outlined in the modern text books?

Nineteen persons answered the question. Everyone said no.

(2) Do you favor a continuation and development of the modern practice of emphasizing the detailed, systematic classification of land forms?

Nine said unqualifiedly, no. Three said no, with some qualification. Four said yes, with some qualification.

(3) Do you believe that secondary school geography would be equally valuable as a subject for pupils not proposing to enter college, if it included more of a study of selected regions of the world?

Eight answered yes, without qualification. Six, yes, with qualification, and three, no, with qualification.

(4) Could a course along these lines (the study of selected regions of the world) be as disciplinary and strong as the present generally followed course?

Ten said yes, and four others, yes, with certain qualifications. Two said no, with qualifications.

(5) Should commercial geography be included in non-technical high schools? If so, should it be as a separate course or as an important phase of some systematic regional treatment?

Of those who answered, eight favored the introduction of some commercial geography into the high school course, and nine objected to commercial geography, at least as a separate study in non-technical high schools.

(6) Is the content of the modern course too much influenced by our belief in the necessity of laboratory treatment?

On this question opinions are equally divided. Seven answered in the affirmative with some qualification, and seven in the negative with some qualification.

Upon four points the agreement was so complete as to be absolutely convincing:

(1) That high school geography should not be restricted to the subject matter as outlined in the present modern text books.

(2) That we should not continue the practice of emphasizing the detailed, systematic classification of land forms.

(3) That the introduction of the study of selected regions of the world into secondary school geography is desirable.

(4) That such a course could be as disciplinary and as strong as the present generally followed course.

On the question of the proper place of commercial geography and the value of laboratory exercises there was a division of opinion. Certainly then, the trend of opinion as indicated by this investigation is clear. It is toward the humanizing of the study.

Extracts from the Report of the 1909 Committee of the National Education Association, on Secondary School Geography

There has been marked advance in the subject of physical geography during the past sixteen years. * * *

In spite of this great advance there has been for several years a growing dissatisfaction with the course as at present organized. It is becoming increasingly evident that it does not meet existing needs. * * * The next step in the evolution of the subject, a step to be taken in the near future, will be of greater importance than that inaugurated sixteen years ago.

Although the economic and commercial phases of geography are receiving an increasing amount of attention, secondary school geography is to-day practically physiography. * * * The following are the more important reasons for considering a change in the nature of the course imperative:

1. The course, as at present organized, places too much emphasis upon the detailed study and classification of land forms, and too little upon human response to those forms. The amount of space devoted to the lands by the various physical geographies varies from forty per cent to seventy-six per cent of the total. The criticism here made. however, is not that too much space is devoted to the lands, as one of the four great divisions of physical geography, but that the lands are not sufficiently studied from the geographic point of view, namely, the human.

2. A concrete study of human response to its environment does not receive sufficient attention.

3. * * * Secondary school geography should aim to render the greatest possible service in preparing the student to meet successfully the opportunities and obligations of life. The fulfilling of college entrance requirements—a matter which now receives serious attention— should receive practically no consideration. * * * Practically *all* graduates of secondary schools enter at once upon some business, some profession, or the duties of home life. It is to these students. more than ninety per cent of the total number, that the secondary school should devote itself heart and soul. * * *

4. Secondary school geography does not give the student a grasp of the natural resources, the industries and the commerce of the world. This condition is, of course, inevitable so long as the geography in the secondary school is almost exclusively physical geography. * * *

5. Geography in the secondary school does very little as a preparation for the teaching of that phase of the subject which, in the elementary school, receives chief attention. * * *

6. Secondary school geography, as at present constituted, can not give the student that knowledge of the regions and peoples of the world which intelligent participation in the affairs of life requires. If broadly interpreted, this encompasses all of its weaknesses. * * *

* * * The lack of a knowledge of place relations, and of regional geography in a broad sense, is a weakness so universally shown by students in the entering classes of both normal schools and colleges as almost to discourage teachers of geography in those institutions. It is this knowledge which the average person, no matter in what walk of life, most needs. * * *

We present the following as essentials of a course in geography for secondary schools:

1. Those parts of mathematical geography which show most clearly how human life is influenced by the relations between the earth and other members of the solar system. Such points as the arrangement of the mathematical and heat zones and the varying boundaries of the latter; the change of seasons; latitude and longitude; standard time and the International Date Line are important. Facts as to the size of the members of the solar system, their distances from the earth or sun, and their periods of rotation and revolution are not considered essentials.

2. First in importance among the factors influencing life is climate. Therefore, atmospheric phenomena should receive careful attention. The principles should be applied as fully as time and the ability of the students permit. The topics which should receive chief attention are the following: (*a*) The conditions determining the temperature, pressure and humidity of the atmosphere. (*b*) The great atmospheric movements. (*c*) Storms, especially temperate latitude cyclones, studied by means of the weather maps, and their relations to crops, floods and transportation. (*d*) Precipitation; its causes and distribution; and its influence upon occupations and habits of life generally. (*e*) Weather changes, such as the effect of unseasonable frosts upon crops, and the efforts of man to prevent the damage. The influence of blizzards upon stock on the western ranges, and telegraph and railroad business in many parts of the country. The effects of storms upon wheat, oats, hay and other crops. (*f*) We urge the importance of a study of the work of the Weather Bureau, having students present specific illustrations of the value of its work. Comparatively few r alize the multitude

of human interests that are advanced through the operations of this bureau.

3. A brief study of the ocean as a modifier of climate, as an agent in the destruction and construction of land forms, as the source of certain commodities, and as a medium for the transmission of the commerce of the world.

A detailed study of ocean depths, of temperatures at various levels, of tides, of the character and distribution of ocean life may well be omitted.

While our texts treat the ocean as a separate division of physical geography, we favor an incidental treatment, with a brief summary. The influence of the ocean upon climate—the topic of chief importance—should be considered in connection with the study of climate. Erosion and sedimentation along shore lines should be treated under these topics. The commodities obtained from the ocean, as well as the commerce which it bears, would naturally receive attention as a part of commercial geography.

4. The larger geographic forms such as plains, plateaus, mountains, valleys, rivers, falls, lakes and glaciers should receive careful study. Human interests and activities are largely confined to the lands, but it is obviously of far greater importance that we should understand our relations to geographic forms than that we should have a thorough knowledge of their evolution, or be able accurately to classify them.

Graduates of secondary schools should know the location of the great plains of the world, and how they are related to the production of food, to occupations, to transportation and the distribution of population. Whether or not these students can name the six or eight classes of plains given in our text books is a matter of very little importance. Students should understand how certain mountains influence climate, the distribution of plant life, human occupation of their areas, the construction of railroads, the use of streams for transportation and the development of water and electric power, how they served as national boundaries and have helped to mold national characteristics. The ability to name the different types of mountains, and to classify faults and folds is of little value to the average person, however. In other words, it is the human point of view that is important as applied to every topic.

Students should be encouraged to discover human response to its environment in the home area, as this gives reality to the subject and prepares them to work out and appreciate these relations in remote areas.

The amount of emphasis placed upon the study of various geographic forms and processes will depend, in part, upon the location of the individual school. A school situated in a mountainous region would very properly devote more time to the consideration of the influence of the mountains upon life than would one in the prairie section. In the first-named area the relation which mountains bear to climate, industries, settlement, and road building are relatively of greater importance than in the second, because they are at hand and are therefore more meaningful.

5. A study of the larger features of the resources of our country, such as its soils, waterways, water powers, forests and mineral wealth. These features of our geographic environment are so vitally connected with the daily life of every individual, as well as with our national progress, that ignorance of them is a serious matter.

This study should show the distribution of our resources, their accessibility, their relation to road building, to distribution of population, to development of industries, to location and growth of cities, to commerce, and to social conditions. The work of our government in modifying geographic environment should receive careful consideration. Our government is expending vast sums of money in carrying on soil surveys, in improving plants and animals, in reclaiming desert and swamp lands, in the preservation and extension of forests, in developing waterways and harbors. These are subjects upon which every man and woman should be informed from the geographic point of view. The value of such work in molding useful members of society is certainly very great.

6. A knowledge of the general geography of the most important countries and peoples of the world.

The grasp of regional geography obtained in the elementary school is necessarily very meager. Geography is quite generally discontinued in the seventh grade, and, as has been stated, practically no attention is given to regional geography in the high school. A knowledge of the geography of our own country and of Europe is a much-to-be-desired factor in good citizenship. A somewhat detailed study of these two regions would incidentally put the student in possession of considerable knowledge of the other continents. In addition to this he would gain a "geographic consciousness" that would be of great value.

If it be true that a large part of the education of the average individual comes through reading, then it is of the utmost importance that he should be able to read intelligently. This, in the fullest sense, is impossible unless one's knowledge of geography is wider than that offered by the present high school course in this subject.

7. Some conception of how the history of nations has been shaped by geographic conditions.

We do not forget that this should be a vital part of all courses in history, but it should also receive very definite attention in secondary school geography. All nations afford illustrations of this, some more than others. That our own country is a fruitful field is evidenced by such works as Brigham's *Geographic Influences in American History*, and Miss Semple's *American History and Its Geographic Conditions*.

8. The ability to trace, in the large, the relationships between the most important geographic forms and geographic processes, and to appreciate the responses which human life everywhere makes to its physical surroundings.

Only as the student has observed the results of geographic processes on a small scale can he have any definite conception of the evolution of larger and distant geographic forms. When the student appreciates the significance of human response in the vicinity of his home, he has laid the foundations for the discovery and interpretation of this response in remote areas. Moreover, this training will furnish some basis for seeing in advance the general trend of the geographic development of a new region.

In order to make it possible to present the essentials as herein outlined, your committee makes the following recommendations:

1. Geography, touching as it does the daily life of every individual at so many points, should be, in some form a required subject in all secondary schools.
2. The subject should be pursued for not less than one year.
3. The subject should be presented during the first year of the high school course.
4. There should be at least five recitation periods per week.
5. About one-fourth of the total time should be devoted to laboratory and field work. This should by no means be confined to the study of physical geography. Much laboratory work and some excursions should be undertaken in connection with the commercial phase of the subject, and there should be carefully planned exercises based upon maps and models.

We recommend that about one-half year be devoted to the larger topics in physical geography, with the human side made more prominent than at present, and that the remainder of the year be given to a study of North America and Europe.

III

THE TEACHING OF GEOGRAPHY

The Problems of the Teacher

In teaching a subject like geography, the teacher faces two problems at the outset:

(1) The selection of the matter to be presented.

(2) The adoption of a general method.

The text book used will largely solve the first problem. On the whole, any one of the widely used text books is a safe guide as to subject matter. In selecting topics for emphasis, the teacher must use her own judgment, getting such help as is available.

In the adoption of a general plan of teaching the subject, the teacher will, quite naturally, do about as her own teachers have done, until she has evolved a more satisfactory method for herself.

All studies which are entitled to a place in the school curriculum yield a variety of benefits to the student who seriously pursues them. But some studies, in their very nature, are qualified to yield certain benefits in a larger degree than others. The close application of mind required in studying the classical languages, develops power of concentration. The study of algebra and geometry develops power of logical reasoning. The study of history gives breadth of mind and yields valuable information. The study of physics yields some of the disciplinary benefits of mathematics and some of the general culture of the scientific studies. Besides yielding their own particular benefits, each yields in greater or lesser degree, all of the general benefits of education.

Since some studies are particularly qualified for accomplishing certain ends, it is desirable that we find what these ends are, in the case of a given study which we are to teach, and then so direct our efforts that the greatest benefits may result. Definiteness of aim is exceedingly desirable. In selecting the subject matter to be taught and in determining the method to be followed in physical geography the following principles ought to obtain:

(1) That kind of knowledge which will be most useful in life deserves emphasis. In the case of physical geography, knowledge which helps the pupil to understand the world of nature immediately about him, and to have a healthy interest in it; knowledge which suggests how he may improve unfavorable environment, and utilize the favorable, is the kind that is of most value. It is not, of course, the only kind that may properly be taught.

(2) Physical geography is better qualified to give general culture than to give rigid mental discipline. An effort to make the study of physical geography yield the same kind of discipline that physics is qualified to give will distort the teaching. Such an effort will demand of physical geography results which in the high school at least, it is not well suited to give and at the same time will fail to get those valuable cultural results which it is qualified to yield. Much of the dissatisfaction with laboratory work in physical geography is due to this misdirected effort. The knowledge which physical geography gives to the student is its most valuable contribution. On the other hand, it may be so taught that its general cultural value is maintained and a valuable mental discipline afforded at the same time.

As pointed out in an earlier section, there is a notable trend of opinion among geographers in favor of teaching geography instead of the more limited physical geography, as for some years past has been the practice in secondary schools. The belief is that geography, which gives more attention to the human or life side of the study, is of greater value for general culture, more useful in practical life, and no less valuable for mental discipline. Though at the present time (1910) no text book fully meeting these newer ideals has been published, it is likely that such books will appear as soon as the present trend of opinion has crystallized. However, some of the best of the existing books lay considerable emphasis upon the life side of the study.

Ways of Getting at Physical Geography

At least four ways of getting at the facts of geography are available:

(1) Through oral instruction by the teacher.

(2) Through the printed text, and supplementary reading.

(3) Through laboratory exercises dealing with pictures, maps, models and other materials which require interpreting and thought on the part of pupils.

(4) Through field studies.

Oral Instruction

There are two very different types of oral teaching:

(1) Lecturing.

(2) Questioning, of the kind which is often called "developing" a topic.

Lecturing is not appropriate for the secondary school. Sometimes the college teacher finds that lecturing is his best method, even though very imperfect. His class may be large, and often no suitable text book exists. These conditions are not found in the high school. Lecturing seldom stimulates self-activity on the part of the young hearer, and does not develop power of self-help. Both of these are of primary importance in the educative process.

The valid objections to lecturing do not preclude a teacher's supplementing the text book with facts and explanations orally stated. Yet one of the commonest errors of teachers is talking too much.

The other type of oral teaching, namely, leading the pupil from the known to the related unknown by means of questioning, has much in its favor. When efficiently done it holds attention, stimulates mental activity, and leads to clear ideas. This, however, is *teaching*, not *telling*.

The Text Book and the Recitation

The method of assigning lessons to be studied in a book and recited in a class is often criticised and sometimes ridiculed. "Slavishly following the text book," "memorizing facts," "parrot-like recitations," are expressions frequently heard. Old time teachers spoke of "hearing classes." All teachers know that these practices are not good. Some have thought that better results may be obtained by substituting for text book facts, statements from the teacher's note book, dictated to pupils to be written in their note books, these, perhaps, to be memorized and recited. It is to be hoped that such a method is rarely practiced. Its weaknesses are too obvious to call for discussion. The teacher who "slavishly follows a text book" or whose teaching consists in "assigning so many pages for a lesson," to be followed by "parrot-like repetition of memorized facts," would hardly succeed with any method. The text book-and-recitation method readily lends itself to abuse. The overworked or incompetent teacher may use the method in its objectionable forms. Granting all this, the text book as a source of information, and the recitation, as a method of self expression by the pupil and of examination or testing by the teacher, are essential parts of good teaching.

The good text book even with its imperfections is more accurate and concise in statement, more logical in arrangement, has its various parts better balanced, and its material more carefully selected, than could be the case in a teacher's note book. While the text probably will not contain all that the teacher wishes the pupils to know, yet it will contain a very large part of it. Every wide-awake teacher will do some supplementing.

The following suggestions, though trite, may be useful:

(1) All of the material in a text book is not equally important.

(2) It was not expected by the author that all the topics would be studied by any single class. He inserts enough material to provide for selection to suit individual wants.

(3) The mere assignment of a certain number of pages will seldom bring satisfactory results. One of the teacher's functions is to direct pupils to the essential points in a lesson. This may be done (a) by definitely specifying paragraphs or parts of paragraphs for careful study; (b) by assigning definite topics to be prepared sometimes in writing, sometimes for oral recitation.

(4) Definite assignments of work, reasonable in length, are essentials. Long and vague assignments produce slovenliness in preparation.

(5) Pictures in the text book often are as worthy of study as is the text itself.

(6) Frequent oral and (short) written reviews of the fundamental matters are needed.

Selecting the Materials from a Text Book

Writers of text books are under the necessity of treating all topics, so far as emphasis is concerned, with a considerable degree of uniformity. Their books are designed for use in all sections of the country. Because of local geographical conditions, one teacher desires a book which treats rather fully of glacial work. Another teacher whose pupils live near the sea, wishes a book with an adequate discussion of ocean phenomena; and so on through the list. Hence, text books are not suited to the special needs of any one locality. It becomes the province of the teacher to prune some chapters in the text book and to expand others.

If a school is surrounded by the evidences of glacial activity, there are good reasons for giving more than usual attention to the discussion of glaciers and glacial work. If the school is near the sea and pupils may observe the ebb and flow of the tide, the action of waves and shore currents, types of coast lines, and similar things, then there is ample reason why the chapter on the ocean and its shores, should be emphasized and supplemented in that school. If the school is in a village or small city where pupils know something about soils and agriculture and have practical use for fuller knowledge, then the discussion of rock weathering, soil formation, soil fertility, drainage, etc., ought to be given emphasis; and the text book material ought to be considerably supplemented. In short, the first principle to guide the teacher in distributing the emphasis is: *Dwell upon those topics which are most closely related to the lives of the pupils and are best illustrated in the neighborhood.*

The second kind of knowledge which is worth emphasizing is that which explains phenomena, that directly affect the lives of the people at large, their industries, and other activities, as contrasted with knowledge which has no particular bearing on the life of the average person.

For example, the work of rivers in eroding valleys, spreading sediment over flood plains, building deltas, filling harbors, or supplying water power, is worth more to high school pupils than knowledge of river piracy, or ability to talk about the development of meanders, shifting divides, antecedent rivers, engrafted rivers and dismembered rivers. Such topics as the latter belong to more advanced study. Many details about mountain growth, mountain structure and various types of mountains, may well give place to the discussion of the ways in which mountains influence climate, industries, the distribution of people, the growth of cities and the building of railroads, and their relation to rainfall, to mining, to forests, etc.

While classification and description of mountains, rivers, lakes, shore features, plains, volcanoes, or glaciers can not be omitted, yet the emphasis should not be placed upon mere classification and description. The second principle may be stated thus: *Emphasize those facts, a knowledge of which helps in understanding the influence of man's physical surroundings upon his activities and his well-being, rather than those which have merely an academic value.*

There are certain topics which are frequently considered in physical geography, which have but little practical bearing on man's life, and yet which it seems almost a misfortune to disregard. A brief knowledge of the solar system, and a brief knowledge of the most common minerals and rocks belong in this class.

In mathematical geography if pupils can intelligently answer the questions given on p. 47 they do well. If less than one year is given to physical geography, it is doubtful if all of those questions should be considered.

Comparatively little should be done with the tides. The cause of the tidal wave on the side of the earth opposite the moon is very difficult to explain and the brief explanations found in text books are often misleading.

Memorizing the geological eras and periods is out of place in physical geography.

Outline of a Course in Physical Geography Recommended by a Committee of The Association of American Geographers, 1910

The Earth as a Whole.
- The relations in space of the earth, moon and sun. Full moon, new moon.
- Shape and size.
  - Proofs. Significance in human occupations and daily life.
  - Inclination of axis.
- Earth Motions.
  - Rotation.
    - Proof, rate, significance.
  - Revolution.
    - Variation of seasons and significance in agriculture.
      - Variation in length of day and night.
    - Mathematical zones. Pole. Equator, Tropics and Circles.
  - Latitude and Longitude.
    - Meaning. Origin of terms.
    - Time. Standard Time. International Date Line.
    - Maps and their use. Scale and projection.

The Atmosphere.
- Elements of weather and climate.
- Heat Belts and their meaning. Distribution of great nations in reference to heat belts.
- Pressure.
  - How measured. Seasonal and annual conditions.
- Winds—Great wind systems and the relations of continents thereto.
- Humidity. Relative humidity; causes for variation; significance of humidity.
- Rainfall.
  - Relations to winds and larger surface features. Causes of rain; distribution of rainy and dry regions; relation to occupations and industries.
- Storms—especially temperate latitude cyclones.
  - Types of weather conditions from weather maps. Relation of weather to industries, transportation, etc.
- Climate of World.
  - Broader climatic areas and their principal subdivisions into East Coastal, West Coastal and Interior Regions.

Distribution of principal countries according to climate.
Summer and winter climate in United States.
Climate of the growing season and importance.

The Lands.
The land as home of man. Relation of man to land, water and air.
Simple study of processes producing changes on surface of land and the surface features locally to be seen which are a result of these processes. Especial emphasis on work of running water, standing water, ice and atmosphere. Youth, middle age and old age.
The larger land forms.
Plains. Character of plains; significance of plains historically.
Alluvial plains. Character, distribution and importance. Life features associated therewith.
Coastal plains. Character, distribution and importance. Life features associated therewith.
Interior plains. Character, distribution and importance. Life features associated therewith.
Regions of low relief.
Plateaus.
Character, elevation, results of dissection.
Occupations and life conditions on plateaus.
Broken plateaus.
Plateau countries.
Mountains.
Essentials of a mountain. Ranges, systems, peaks, passes.
Mountain building and earthquakes.
Surface features and life relations of folded, block and massive mountains.
Relation of mountains to climate and rivers. Mountain regions over the world.
Note: Broken plateaus and block mountains may well be deferred until they occur in the later descriptive work.
Soils.
Importance of soils.
Character and origin of local soils.
Fertile and infertile soils as related to crops and distribution of population.
Great groups of soils and their distribution.
Relation of soils to climate and water supply.

Water supply.
- Ground water, evaporation and rainfall.
- Importance of ground water. Seasonal variation in water table.
- Relation of ground water to man, animals and plants.
- Artesian water and irrigation briefly noted in areas where not to be seen locally.

Importance of Valleys.
- Valleys as routes of travel and centers of occupation.
- Strategic points in river valleys.

Strategic Points in river valleys.
- Head of tide, of navigation.
- Falls, head of lake, foot of lake.
- Junction of tributaries.
- Water gaps.
- Bluffs.
- Carries.
- Head of delta.
- Mouth of principal distributary.

The Ocean.

The extent of the ocean. Ocean Basins and continents.

Ocean as a highway and source of food supply; its affect on climate. Man's concentration near the ocean.

Fog areas, ice floes, fishing banks, cable paths.

Shorelines.
- Regular and irregular. Larger problem of origin.
- Drowning. Relation to harbors and shipping.
- Delta shorelines.

Waves and tides as related to accessibility of harbors.

Tidal occurrence, interval, relation to sun and moon. Cause omitted.

Currents.
- General direction as related to winds.
- Special currents.
- Monsoon currents in India.
- Relation to distribution of temperature.

Great ocean routes as relatea to winds, currents and continents.

Distribution of plants as relatea to climate and surface.
- Larger world divisions.
- Special features in United States, as evergreen forests, mixed forests, grazing and dairy areas, mixed farming, cotton, corn, winter wheat, spring wheat areas, etc.

The above outline is given for its suggestive value. It is not recommended as an outline to be adopted unchanged.

Review of Important Facts of Location

The normal schools and colleges find that graduates of the high schools come to them with a very vague knowledge of the location of many of the important places, rivers, mountains, etc. Tests given to freshmen in the University of Wisconsin reveal a surprising lack of knowledge along this line. The reason is clear. Pupils have little or no drill in locational geography after they leave the grammar school. Their fund of knowledge about the location of places is gradually lost on their way through the high school.

The question arises—are there not many facts and details of physical geography which are really worth less than certain important facts of locational geography? We believe that, whether the high school pupil later goes to a higher school or enters upon an occupation, he should be reasonably intelligent in matters of general locational geography. This does not mean that he ought to know where a host of relatively obscure places, or rivers, or seas are, but that the school ought to see that he has a fair degree of familiarity with the geographical names that are constantly before the reading public. The list of such names is really not large.

Our present text books in physical geography provide for no review of this kind. The teacher must provide it, if it is done. The most natural place to take up the great rivers of the world is in connection with the study of rivers; to locate the dozen great mountain ranges, and celebrated peaks in connection with the study of mountains; to locate the important seas, gulfs, bays and islands in connection with the study of the ocean. Incidentally the review should be made to include the position of the leading nations and a limited list of the world's great cities. This may not be physical geography but no matter if it isn't. It is a sensible thing to do, nevertheless. The possible mistake lies in trying to locate too many places, nations, or physical features. Of course this review of location should be done with maps, pupils locating the places upon the map or globe, or still better, indicating them on outline maps.

The following lists are suggested:

Countries:

Of Europe, all except the separate Balkan States.

Of South America, those bordering on the Pacific, on the Caribbean Sea and on the Atlantic. (Also Bolivia.)

Of Asia, Turkey, Arabia, Persia, British India, Chinese Empire (including by name Tibet and Manchuria), Japan, Corea, Siberia.

Of Africa, Egypt, Algeria, Morocco, Cape Colony, the Belgian Congo and Abyssinia.

Rivers:

Yukon, Columbia, Colorado, Rio Grande, Missouri, Platte, Mississippi, Arkansas, Red, Ohio, St. Lawrence, Merrimac, Connecticut, Hudson, Delaware, Potomac, James, Orinoco, Amazon, Plata, Thames, Seine, Rhone, Rhine, Elbe, Danube, Tiber, Po, Volga, Nile, Congo, Tigris-Euphrates, Ganges, Yang-tse-kiang, Hoangho.

Mountains and peaks:

Rocky, Cascade, Sierra Nevada, Coast Range, Ozark, Alleghany, Appalachian, Blue Ridge, Andes, Pyrenees, Alps, Appenines, Caucasus, Ural, Atlas, Himalaya, Mt. McKinley, Mt. St. Elias, Mt. Shasta, Pike's Peak, Mt. Washington, Mt. Blanc, Mt. Everest, Mt. Ararat.

Arms of the sea:

Hudson Bay, Gulf of St. Lawrence, Gulf of Mexico, Caribbean Sea, North Sea, Baltic Sea, English Channel, Mediterranean Sea, Adriatic Sea, Black Sea, Red Sea.

Straits:

Behring, Florida, Gibraltar, Bosporus.

Capes:

Horn, Cod, Hatteras, Good Hope.

Islands:

Newfondland, Cuba, Hayti, Porto Rico, Bermudas, Jamaica, Hawaii, Samoa, New Zealand, Philippines, Java, Ceylon, Madagascar, Sicily, Corsica, Iceland, Greenland.

Cities.

United States—New York, Chicago, Philadelphia, St. Louis, Boston, Baltimore, Milwaukee, Washington, Denver, Louisville, Minneapolis, St. Paul, Kansas City, Cleveland, Buffalo, Pittsburg, San Francisco, Cincinnati, New Orleans, Indianapolis, Duluth, Salt Lake City, Seattle, Tacoma, Galveston.

Europe—London, Liverpool, Manchester, Edinburgh, Glasgow, Madrid, Berlin, Hamburg, Vienna, Rome, Naples, Athens, Constantinople, St. Petersburg, Paris, Marseilles, Venice, Antwerp, Rotterdam.

Asia—Bombay, Calcutta, Canton, Pekin-Tien Tsin, Hong Kong, Jerusalem, Tokio-Yokohama.

Africa, Australia, and Scattered Islands—Cairo, Cape Town, Melbourne, Sydney, Manila, Honolulu.

Western Continent Exclusive of the United States—Montreal, Quebec, Rio Janeiro, Buenos Aires, Havana, Mexico.

Laboratory Work

As laboratory work in physical geography has been but recently introduced, it may be of interest to learn what some of the authors of laboratory manuals give as the reasons for such work:

Gilbert H. Trafton (1905) says:

"The reasons for the introduction of laboratory methods in this subject are the same as those which demand its use in the other sciences, namely, the training which the pupil receives in the laboratory, and the additional light thrown upon the subjects discussed in the class room. * * * This first science should be so taught as to inculcate scientific methods of study."

James F. Chamberlain (1906) says:

"The purpose of these exercises is to develop *power* and to enable pupils to acquire certain important facts and principles at first hand."

Everly-Blount-Walton (1908) say:

"A valuable service of the geographical laboratory is to give concreteness and location to the general principles taught in the text book."

Frank W. Darling (1905) says:

"Mere copying of maps, charts, diagrams, etc., is of little or no value. Such work must have in it something to stimulate the self activity of the pupil so that his work will give him a better realization of the principles involved."

He calls certain kinds of laboratory exercises, "pyrotechnics and monstrosities."

W. M. Davis (1908) says in the preface to his manual that its purpose is to provide "*a series of disciplinary exercises.*" He further says: "The student's attention must be directed to and detained upon each feature of a complicated fact, each step of a large problem, in order that the facts and problems may reach his understanding and remain in his memory." He points out also that such laboratory exercises as he has arranged produce a more vivid impression upon the pupil, than the text book statements can possibly do; that they produce "strength of conviction" and "clearness and fullness of conception."

It is quite clear that at least two motives have actuated leaders in geography-teaching and makers of laboratory manuals: (1) The feeling that because physical geography is a science, and sciences ought to be taught with laboratory exercises, therefore physical geography ought to be so taught. (2) The belief that the facts of the text are illustrated and impressed through laboratory work, and that such work is "disciplinary."

Before laboratory studies in physical geography had taken definite shape, those in physics, chemistry and biology had been worked out. It was entirely natural then, that the existing types of laboratory exercises in those sciences should strongly influence men in the preparation of supposedly suitable exercises for physical geography. In physics, it was thought that the best disciplinary results are obtained by quantitative experiments, and our high school manuals are based upon that assumption. In some of the laboratory manuals in physical geography, it is evident that their authors shared this prevailing feeling—that good laboratory exercises ought to involve measurements and computations which would give quantitative results. Moreover, the apparatus for physics and chemistry were on hand and were therefore utilized in physical geography. There are good arguments in favor of that contention, particularly if mental discipline is the chief purpose of the laboratory work. It has been found, however, that satisfactory quantitative exercises in physical geography are not easy to find and that when found they are either difficult to perform, or do not appeal to the pupils, or are of little practical value when performed. The very fact that suitable quantitative problems could not readily be found has probably been a benefit to the science, for there are other types of laboratory work which are of more all-around value.

The nature of laboratory work in physics and chemistry calls for a distinct room properly fitted up and equipped. The recitation room is a separate room, as it ought to be. For the most part, definite hours are set aside for class recitations and others for laboratory work.

It is not certain that either a separate room for a laboratory or fixed laboratory hours are really necessary in physical geography. Often the orderly progress of the class calls for more laboratory work this month than it did last. If the room used by the physical geography classes can be fitted up as a combined recitation room and laboratory, then the two kinds of work may go along together in a natural way. No doubt there is a gain in having at least one double period a week. Three single periods and one double period per week make a good combination. It is not necessary that the laboratory work be always done during the double period, but the provision for the longer period enables the teacher to begin and complete exercises which could not be completed in a single period. Recitations, discussions, work with maps and other materials may very properly take place in the same period. Some of our foremost geography teachers prefer this method to the other method of making a formal separation of laboratory work from the other work of the class.

It is not proposed to give an outline of a laboratory course here. The young teacher who has not had special training in physical geography, and who is expected to do laboratory work, will find it best to use a laboratory manual, carefully selecting the exercises. The loose-leaf combined manual and note book has certain advantages, providing the exercises are satisfactory.

The laboratory work ought to go hand in hand with the text book work, each supplementing the other. Every exercise ought to have a clean-cut, definite purpose. If the superintendent should drop in and should ask the teacher. "Just what do you expect to accomplish by this exercise?" she should know, and should be able to tell him promptly. When the pupils have finished the exercise, they, too, ought to have at least a fairly definite idea of what they have been doing and why they have been doing it. It would not be a bad plan if the teacher made herself write out in a sentence, the purpose of each particular laboratory exercise, as she sees it, then keep this purpose in mind, and when the exercise is completed, ask the pupils what they understand they have been doing it for? The plain fact is that no small amount of time is wasted in so-called laboratory work; that there is a large amount of aimless effort and dawdling, partly, at least, because neither teacher nor class know exactly what they are after, and when they are through, don't know quite why they did it. Such work can never bring pleasure or satisfaction to anybody. Clean cut work, with a conscious aim, does give pleasure and satisfaction as well as benefit. All of the laboratory manuals now in use were prepared for the use of classes in *physical* geography. Under the section on the present trend of geography, it was pointed out that there is a marked trend of opinion in favor of humanizing secondary school geography—of laying less emphasis upon the purely physical side of the study and more upon regional geography and those phases which deal with human activities. If this change in the character of the high school work shall take place, then our laboratory manuals must be rewritten and our laboratory courses reconstructed. At any rate, those laboratory exercises which bring out and illustrate the cause and effect relations between the earth and its inhabitants seem to have the greater interest and the greater culture value.

The following articles, bearing upon laboratory work, have appeared in the Journal of Geography, since January 1, 1902.*

The Use of Maps in the Teaching of Geography, by A. W. Andrews, Mar., 1902, Vol. 1, p. 97.

Practical Exercises in Physical Geography, by W. M. Davis, Dec., 1903, Vol. 2, p. 516.

Practical Work in School Geography, by R. H. Whitbeck, Oct., 1904, Vol. 3, p. 374.

Laboratory Work in Physical Geography in Secondary Schools, by Clara B. Kirchwey, Mar., 1905, Vol. 4, p. 122.

Some Contributions to Laboratory Physiography, by W. F. Langworthy, Mar., 1905, Vol. 4, p. 131.

Practical Exercises on the Topographic Map, by Martha K. Genthe, May–June, 1905, Vol. 4, p. 221.

Map Reading, by Robert M. Brown, Sept., 1905, Vol. 4, p. 273.

Laboratory Work With the Sun, by J. Paul Goode, Mar., 1906, Vol. 5, p. 97.

The Storing of Maps, by Frank Carney, Nov., 1908, Vol. 7, p. 52.

Representation of Land Forms in the Physiography Laboratory, by R. S. Tarr & C. D. von Engeln, Dec., 1908, Vol. 7, p. 73.

The Interpretation and Use of Maps, by Helen B. Montgomery, Apr., 1909, Vol. 7, p. 173.

New Laboratory Methods of Instruction in Geography, by W. H. Hobbs, Jan., 1909, Vol. 7, p. 97.

The Laboratories for Physical Geography in Two California High Schools, by C. T. Wright and J. C. Fremont, Sept., 1909, Vol. 8, p. 10.

Field Work

When conditions can be made favorable for field work, it constitutes the ideal way of studying many of the phases of physical geography. Geikie, one of the ablest English geographers, goes so far as to say that one hour's instruction in the field is worth twenty hours of reading or listening to lectures. Again he says: "There is happily now a growing

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* Back numbers of the Journal of Geography (prior to September, 1910) may be secured of R. E. Dodge, Teachers College, New York City, at 15c. each. The magazine is now published at the University of Wisconsin.

recognition of the principle that adequate geographical conceptions are best gained by observations made at the home locality."

Says Professor Tarr: "The value of field work is such that every course in physical geography ought to be accompanied by at least some. No laboratory or text book work can take the place of well conducted field work."

Said Colonel Parker: "Field lessons are an indispensable means in teaching geography."

Leading geographers in America and abroad are a unit in considering field studies to be the most effective method of teaching physical geography. Teachers who have had the benefit of good field instruction are usually enthusiastic advocates of it, at least in theory. Yet, it is a fact, in this country at any rate, that field trips are only rarely taken by any teacher and not taken at all by many. Here is a method universally approved, but sparingly employed. Why is it so? The explanation is easily found.

1. Many teachers do not feel competent to undertake field trips. Either they have had no special training in field work or they have had only a little, and that in a different region. Besides, it is difficult to maintain discipline with a class of youngsters in the open air. The strain upon the teacher is a severe one, and she dreads it.

2. Usually, in arranging schedules of classes, no provision is made for the teacher to be away from her room or for the class to be away from school during a half day session, which is often necessary for a trip. If field trips are taken they must be taken outside of regular school hours. There are many difficulties in the way of doing this.

3. In larger towns and cities, the class must go some distance, involving expense and time, and generally restricting the excursions to places accessible by trains or trolleys.

4. To successfully conduct a field lesson, the teacher must first find a suitable place to go, must go over the ground in advance and carefully plan every detail of the excursion and the lesson. This will be a drain upon her spare time and will tend to dampen her enthusiasm and lead her to put it off.

5. Not infrequently principals and parents regard field trips as a form of play or as a picnic, and disapprove of them.

Any one of the above conditions is enough to put a damper upon field work but in the most instances several of these deterring conditions exist and the result is that field trips are few and far between.

Yet some teachers have enthusiasm enough and energy enough to find a way around difficulties and they are the bright examples. If only two or three well planned excursions can be taken in the year, the return upon the investment will be large, providing of course the teacher is competent and efficient.

The following suggestions are offered (by one who has conducted field trips for some fifteen years with grammar school children, high school pupils, normal school and college students). It is assumed that the pupils are of high school grade.

1. Field classes should be fairly small: twenty or twenty-five pupils are enough.

2. If the school's schedule of studies allows the teacher to go out with her class during school time, attendance upon the trip may reasonably be required and usually pupils are glad to go. If trips must be taken outside of school hours, attendance should be voluntary and the teacher will get the best response by putting the matter in the form of a personal invitation to the pupils to go with her on out-door trip. If the pupils are her guests, they are not likely to give her much trouble in discipline. Some will not go, but that need cause no serious concern.

3. If pupils are taken on trips as a regular part of the school work and in school time, discipline must be maintained, yet it need not be quite so rigid as in school. When walking or riding from place to place, ordinary freedom may be allowed pupils. When the class stops for instruction, the usual rules of the class recitation should be observed: no communication between pupils, strict attention, speaking out or answering questions only under the same conditions as in a regular class. The trip may, if desired, be an outing but the outing and the instruction features should be separated. "Work when you work and play when you play."

4. The teacher must go over the ground in advance and know exactly where she is going and what she is to do.

5. Best results are secured when each pupil has a copy of the outline of the lesson directing him to be on the lookout for certain things and giving questions whose answers he is to discover. These outlines and questions may be mimeographed, or may be dictated to pupils before leaving the school for the trip. This is one of the most important recommendations here made. Samples of such outlines follow.

6. On the whole, questioning is better than telling in a field lesson as well as elsewhere. Yet time should not needlessly be sacrificed or interest deadened.

7. A summary of the facts learned in the field should be made, either at the close of the trip, on the ground, or later in the class room. A written report is generally the best way for pupils to organize the information which they have gained. The field work should be the foundation of subsequent class discussions.

The following articles bearing upon field work, have appeared in the Journal of Geography since Jan. 1, 1902.

1. Field work in Physical Geography, by W. M. Davis, Jan., 1902, Vol. 1, p. 17. Feb., 1902, Vol. 1, p. 62.
2. Home Geography, by W. M. Davis, Jan., '05, Vol. 4, p. 1.
3. Observational Studies for Children, by Frank Carney, Jan., '05, Vol. 4, p. 12.
4. Out of Door Work in Geography, Feb., '05, Vol. 4, p. 49.
5. Field Work in Gecgraphy, by A. P. Irving, Sept., '05, Vol. 4, p. 288.
6. The Field Work of a Physiography Class on a Glacial Problem, by Geo. W. Low, Oct., '05, Vol. 4, p. 321.

Suggested Field Lessons

Different localities vary in the kind of illustrations which they afford, and the teacher must shape the field work to the locality. There are, however, certain studies which are possible in almost any section of the state. The glaciated portions furnish the greater variety of types for study. The following lessons will, with modifications, fit most parts of the glaciated area. Two or more trips may be required for each of the following lessons.

NUMBER 1

ROCK-WEATHERING AND SOIL

Purpose: To see rocks in various stages of decay, to note the changes due to weathering, to understand how soil is formed, and to study different kinds of soil.

Materials: A geologist's hammer or small stone-hammer for the teacher is desirable but not absolutely necessary. Each pupil should have an outline or set of questions to direct his observations. Additional interest will attend the lesson if each pupil has a glass test tube six or eight inches long with a cork to fit. Into the bottom of the test tube place fine pieces of fresh rock an inch deep; crowd in a little tissue paper to form a partition between the rock fragments and the next layer. Then put in an equal amount of small pieces of weathered, or partially decayed, rock of the same kind as the bottom layer. This shows the first step in soil making. Insert another tissue paper partition. Make the third layer of finely powdered weathered rock; the fourth, of the ordinary brown or yellow soil of the region, and the top layer, of the black top-soil, rich in decayed vegetable matter or humus. Then insert the cork and you have a fairly good series of samples showing the different stages from fresh rock to rich soil. The teacher will, of course, explain that glacial soil is a mixture of many kinds of rock waste, not the product of the decay of any one kind of rock.

Locality: A railroad or highway cut where fresh earth is exposed and various kinds of erratic bowlders are to be seen is an ideal place. Any excavation where fresh earth is revealed will do. Success in a field trip requires that the teacher go over the ground in advance and decide exactly how she will handle the lesson.

Directions and Questions

1. Find unweathered rock, also rock with yellow or reddish brown stain. This stain is probably due to the "rusting" or weathering of particles of iron contained in the

rock. Nearly all rocks contain some iron and when they weather, they turn brown or yellow and make soil of that color.

2. Find rocks that are rather soft, and break up quite easily. Do they seem to be decaying? What causes them to decay? Find a number of such rocks and let pupils fully satisfy themselves that rocks do actually decay. The full appreciation of this is a long step forward.

3. Examine a little soil and note that it contains fine flour-like powder. This is largely clay. The coarser gritty grains are quartz sand. Soil is mostly clay and quartz sand in varying proportions. There are very small quantities of lime, potash, and phosphorus compounds also. These have much to do with the fertility of the soil. Bring out that when a rock decays, it gives to the soil whatever substances the rock is made up of. The weathering of sandstone gives a sandy soil. Limestones and shales give much clay. When limestones decay, most of the lime is carried away by the ground water and only the clay, an impurity, remains.

Have pupils explain why some soils are very sandy, others largely composed of clay and others mixed.

4. Discuss the water-holding qualities of sandy soil and clay soil, and why the former will do for potatoes but not so well for meadows, while clay soil is well suited to grass and grains and hence often leads to dairy farming. What is loam? Why is it good soil for general farming?

5. Contrast recently dried clay soil with recently dried loam and sandy soil. What are the chief differences? In what ways do these differences influence farming?

6. Examine the black top layer of soil where there is sod. Account for the color. Why is it rich? Why is forest mould so rich? Why is swampy soil usually black? Does it make good soil when drained?

7. Find a little flood plain of a stream. Discover the qualities of alluvial soil. Why is it fertile? Name rivers that have extensive flood plains. Contrast glacial till with alluvial soil. Explain the differences. How does till differ from soil? What is sub-soil?

8. Upon what does the productivity of soil depend? (Both the composition and the physical condition of the soil are

factors.) What is meant by worn-out soil? How may it be replenished? Why is rotation of crops practiced? How does plowing clover under enrich the soil?

Other questions will suggest themselves to the teacher and special points of interest will arise. Many of the questions can be discussed to better advantage in the class room after the trip. Pupils should either write a report summarizing the points brought out in the trip or they should take a written test on the work.

Number 2

THE WORK OF STREAMS

Purpose: To see a stream at work eroding, transporting, and depositing; to gain an understanding of the methods by which it works and by reasoning and inference to appreciate the great work of denudation on a larger scale.

Locality: If convenient, the first field lesson on stream work should be a detailed study of a small but active stream; this to be followed by the study of a large creek or river. If both types of streams are not accessible the study of one may still be highly illuminating.

Answer as many of the following questions as possible:

1. Where does the stream rise? Empty? To what ocean do its waters finally go? Of what drainage system is it a part? (Mississippi? St. Lawrence?)
2. Why does the water flow down hill? (Gravity.)
3. Whence comes the water which supplies the stream? What is meant by ground water? By run-off?
4. Is this stream now being supplied by run-off or by ground water? Explain.
5. Why does the water continue to flow long after a rain?
6. Is the drainage basin of this stream mostly farm land or forest?
7. If farm land, how largely is it plowed land? Meadow and pasture land?
8. Show how these facts affect the rapidity of the run-off after a rain, and hence influence the regularity of flow of the stream.
9. Explain how forests prevent floods.

10. Find places where, at present, the stream is deepening its channel. Widening it. Also places where, at high water, it has done effective eroding. Bring out the fact that in flood season a stream does much work, but not very much at low water.

11. Find places where the stream is undercutting its bank, producing bluffs. Why does the face of the bluff remain nearly vertical?

12. Find meanders. In what part of the meander is the stream eroding its banks, and in what part is it building sand bars? Explain.

13. Find places where there are evidences that the stream has recently been overloaded.

14. How does the amount of material eroded by a stream compare with the amount deposited? Which is the constructional and which the destructional work? Must the two always balance? Why or why not?

15. Some streams, as in the mountains, do much eroding; others do little. Name four conditions which determine how much eroding a stream will do.

16. Generally speaking, is this an active or a sluggish stream? Your reasons?

17. At present is the stream transporting much sediment? Explain. How does the stream appear when it is transporting actively?

18. What is meant by the stream's visible load and its invisible load? (Material in suspension and in solution.)

19. Has this stream a flood plain? How was it built? Of what use is it? To what use are the flood plains of large rivers usually put? Why?

20. How do you recognize a young valley? An old valley? How do you class this valley? Why?

21. Has this stream rapids or falls? If so, to what are they due? What are the advantages and the disadvantages of rapids and falls in large rivers? Give examples.

22. Do you think that this stream made the valley which it occupies? If so, can you explain exactly how it was done? Is it a rapid or a slow process? Reasons?

23. If this stream emptied into a lake, explain how it could build a delta.

24. Suppose, by some process, the mouth and lower course of this stream were considerably lowered, what effect would that have upon the swiftness of the stream?

25. Suppose the land about the headwaters were considerably raised, what effect would it have on the swiftness of the stream? Explain the rejuvenation of streams.

SETS OF ILLUSTRATIVE QUESTIONS

Following are six sets of review and test questions which are designed to bring out both the physical side and the human side of geography.

(1)

Rivers, Valleys and Stream Work

1. What gives rise to rivers? In the beginning, what gives direction to their course? What determines their volume? Length? Swiftness? Constancy?
2. Why do rivers flow down hill? Why do they tend to deepen their valleys? To broaden them? Exceptions?
3. What are a river's eroding tools? Whence do they come?
4. Explain three types of work done by a river (erosion, transportation, and deposition).
5. Upon what does a stream's power of doing work depend?
6. Effect of weathering in valley formation?
7. Why does a river sometimes aggrade and sometimes degrade?
8. What causes wide variations in the load carried at different times by the same river? By different rivers? Illustrate.
9. Characteristics of a youthful drainage system? Of a young valley in rock? Of a mature system? Of a mature valley?
10. Usual causes of waterfalls? Types? Illustrations of each?
11. Explain the formation of flood plains, bars, deltas?
12. Causes which rejuvenate a stream? Effect upon stream?
13. Why so many waterfalls in New England and New York? Account for Niagara Falls.
14. Why so many falls in the Piedmont Belt of the South? Why so few in the Mississippi Valley?

15. Account for the shape and great depth of the Colorado Canyon.

16. Account for the estuaries of the rivers of the Atlantic slope (of U. S.); for the sluggishness of the coastal plain rivers; for the great length of the rivers of Siberia; for the great size of the Amazon.

17. Why do all rivers not build deltas at their mouths?

18. Why do some rivers build flood plains and others build practically none? Illustrations.

19. Why does the Missouri River grow smaller in crossing the Plains?

20. The Platte, in places, is a mile wide and six inches deep. How possible?

21. The headwaters of the Mississippi are a labyrinth of lakes. Explain. How does this affect constancy of flow? State principle.

22. Account for the natural levees of the lower Mississippi. Why is a break so disastrous?

23. Account for the clearness of the St. Lawrence; for its steady flow.

24. Why has the Niagara a gorge below the falls, but none above?

25. Where is the earlier mouth of the St. Lawrence? Of the Hudson?

(2).

Rivers and Valleys in their Relation to Commerce

1. Why is the mouth of a large river a favorable site for a commercial city? Give examples in North America; in South America; in Europe; in Asia.

2. Why is the junction of navigable rivers a favorable site for a commercial city? Give several examples.

3. In a rugged country, cities and towns are usually found at the junction of valleys. Explain why. Give illustrations.

4. Why do valleys exert such an influence on railway building? Examples.

5. Consider the relation of rivers and valleys to the building of the Erie Canal and hence to the development of New York State and New York City.

6. Why are the railway routes of the Central States less influenced by stream courses than those of the Eastern States?

7. Show the relation of streams and valleys to the exploration and development of a new country. Give illustrations in the United States; in Africa.

8. Show the connection of streams with lumbering.

9. Show the influence of streams in the development of manufacturing in New England.

10. Name five or six manufacturing cities whose early growth was stimulated by water power.

11. Show the relation of streams to the present rapid development of cotton manufacture in the South.

12. Show the dependence of commerce upon rivers in South America.

13. Why is the internal commerce of the United States dependent so little upon rivers while in China it is quite the opposite?

14. What is meant by a canalized river? Examples.

15. Show the relation of rivers to irrigation. Some rivers are practically useless for irrigation purposes. Explain.

16. The following named rivers are largely used in the commerce of the countries through which they flow. Where are these rivers? Rhine, Volga, Amazon, Danube, Seine, Thames, La Plata, Yang-tse-Kiang, Yukon.

17. Give reasons for the decline of shipping on the Mississippi.

18. Why is each of the following rivers not well suited for shipping: Missouri, Rio Grande, Colorado, Mackenzie, Nile?

19. The tonnage carried on the Ohio River is large. Explain.

20. Stream valleys greatly aid in coal mining in the whole Appalachian field. Explain.

(3)

Lakes and Some of their Relations to Human Affairs

1. What are the leading causes for lake basins?
2. Whence comes the supply of water which feeds lakes?
3. What determines the location of the outlet of a lake?
4. Under what conditions do lakes have no outlets?

5. Why are most lakes longer than they are wide?

6. Why are there more lakes in the northern states than in the southern?

7. Where was Lake Agassiz? Cause? Extent? Why has it disappeared? Why did its existence benefit the region formerly covered by it?

8. Account for the great lakes of Africa. Name two of them.

9. Account for the large salt lakes in S. W. Asia. Compare the area of the Caspian Sea with that of Lake Superior.

10. Are the bottoms of the Great Lakes of North America above or below sea level? Explain probable cause.

11. What are the causes which lead to the disappearance of lakes?

12. Whence come the salts found in salt lakes?

13. How do lakes in a river course affect the flow of the river? Why? How do they affect the clearness of the water? Why? Examples.

14. Give some specific examples of the influence of large lakes upon the neighboring climate and industries, e. g. upon the fruit growing.

15. Discuss the importance of the great lakes to our iron and steel industry.

16. What points on lakes seem to be favorable sites for the growth of cities? Explain. Give examples.

17. Account for the early growth of Buffalo and the more recent growth of Cleveland.

18. Account for the absence of large American cities on Lakes Huron and Ontario; on the east side of Lake Michigan.

19. Can you assign satisfactory reasons for the situation of Duluth, Superior, Milwaukee, Chicago, Detroit, Cleveland, Erie and Buffalo?

20. Four or five commodities constitute most of the freight carried on the Great Lakes. What are they? Explain.

(4)

Shore Lines and their Influence

1. What three causes chiefly account for the constant changes in shore lines?

2. What is the character of elevated sea-bottom coasts? Regions where such coasts now exist?

3. Character of straight mountainous coasts? Example.

4. Contrast the cause and character of straight mountainous coasts with those of irregular mountainous coasts. Give examples of the latter.

5. Why has Europe such an irregular outline? Why has South America such a regular outline? Africa?

6. Discuss the effect of sinking of the coast lands upon a shore line.

7. Show in some detail how an irregular coast line develops seamanship in the people. Example.

8. Name some large bays, gulfs or seas that are due to uplift of the surrounding lands. Name some bays that are due to sinking of the land.

9. Name some islands that have been made such by sinking of the coast lands. Name some peninsulas that have been nearly severed from the mainland by sinking.

10. What is a fiord coast? How produced? Examples.

11. On a fiord coast, where are villages and cities usually built? Why?

12. Account for the hundreds of islands which fringe fiord coasts.

13. What is an estuary? How formed? Why important to commerce? Name important commercial cities located on estuaries.

14. What off-shore conditions give rise to fishing banks? Why is the development of ocean fishing closely connected with the maritime growth of a nation? Examples.

15. Discuss the work of waves, tides and currents upon a shore.

16. How is such a coast as that of New Jersey caused?

17. The state of Maine has a great number of most excellent harbors, yet no large cities. Can you tell why?

18. Why has Alaska many good harbors, but California few? Why has Western South America few good harbors? Mexico? Africa?

19. Why is it probable that the coast line of Europe has greatly aided her rapid advance in civilization?

20. Contrast the United Kingdom's advantages for ocean

commerce with Germany's; Germany's with Russia's. Our own with those of the United Kingdom?

21. What conditions, besides a good harbor, give New York superior advantages as a commercial city?

22. The Puget Sound ports are gaining rapidly upon San Francisco. What superior advantages have they?

23. Why are our South Atlantic and Gulf ports inferior to the North Atlantic ports?

(5)

Some Climatic "Why's"

1. Why may there be perpetual snow on mountain tops in the torrid zone?

2. Why does the land warm and cool faster than the sea?

3. Why is an oceanic climate more equable than a continental climate?

4. Why is North Western Europe milder than Labrador?

5. Why are there winds? Why are they such important factors in climate?

6. Why is there a belt of equatorial calms? Why is it rainy?

7. Why do wind belts migrate north and south?

8. Why is the equatorial calm belt prevailingly north of the equator?

9. Why do the trade winds blow from the Northeast and Southeast instead of from the North and South?

10. Why do the trade winds bring deserts to Africa and jungles to South America?

11. Why are there belts of tropical calms? (horse latitudes.)

12. Why are the horse latitudes dry? Where are they?

13. Why are there alternate land and sea breezes on coasts?

14. Why and how are monsoons produced? Where best developed?

15. Why are monsoons alternately wet and dry?

16. Why is so much of western North America arid?

17. Why is the desert east of the Andes in Patagonia and west in northern Chile?

18. Why is so much of Central Asia arid? of Australia?

19. Why does our Pacific coast have more rain in winter than in summer?

20. Why are the frigid zones so cold? Why not warm in July?

21. Why will wheat mature more rapidly in Canada than in Kansas? (longer days).

22. Why does western Washington have such heavy rainfall?

23. Why is the weather of our central states so variable?

24. Why are these states not arid, being east of high mountains?

25. Why is the hottest part of the day not at noon? When is it?

26. Why is June 22 not our warmest weather? When is it?

27. Why can Mexico or Equador raise the crops of all latitudes?

28. Why can Italy, in the latitude of Pennsylvania, raise sub-tropical fruits?

29. Why is the rainfall of northeast India so very heavy? how heavy?

30. Why are North Sea ports free from ice when Baltic ports are frozen?

(6)

Mathematical Geography

1. What is the earth's axis? North pole? South pole? Rotation? Orbit? Plane of the earth's orbit? Shape of earth's orbit? Revolution of the earth? Inclination of earth's axis? Amount of that inclination?

2. What is a great circle on the earth? Small circle? Meridian? Meridian circle? Prime meridian? Longitude? Latitude? North latitude? South latitude? East longitude? West longitude?

3. How many degrees in a circle? Same for all circles? How many degrees from pole to equator? From pole to pole?

4. What places have no latitude? No longitude? Neither? Why?

5. What is the latitude of each pole? The longitude?

6. What do you mean by *north* on the earth? *South? East?*

West? What point is north of every other point on the earth? South? What do you mean by *down* on the earth? *Up?* Since there are people on all sides of the earth, why are some not walking with heads downward?

7. The earth's diameter in round numbers? Circumference? How much does the equatorial diameter exceed the polar diameter?

8. What do you mean by the attraction of gravitation?

9. Name the zones? Their respective widths in degrees? Show the reason for the width of each zone. Which zone includes the largest amount of the earth's surface? Why? Smallest amount? Why? Why are the frigid zones called *caps*, while the others are called *belts?* Which zone contains the most land surface? The least?

10. Explain exactly why the tropic of Cancer, tropic of Capricorn, Arctic circle, and Antarctic circle, are where they are?

11. What do you mean by the sun's vertical rays? Only where do they fall? Why not elsewhere? When are they vertical at the equator? Tropic of Capricorn? Tropic of Cancer?

12. How many degrees wide would the torrid zone be if the earth's axis were inclined 20 degrees? 25 degrees? 30? 50? How wide would each of the other zones be in each of these supposed cases?

13. At what degree of inclination must the earth's axis stand to cause the temperate zones to be 20 degrees wide? 10? To wholly do away with the temperate zones? To cause the tropic of Cancer to be north of the Arctic circle?

14. Explain what changes from present conditions would result if the earth's axis were perpendicular to the plane of its orbit? Where would the tropic of Cancer be? The equator? The poles?

15. Why do we have alternate day and night? Where on the earth are the days and nights always of equal length? Why? How long would the days and nights be at Quito if the earth's axis were inclined 25 degrees? 33 degrees? Not inclined at all?

16. On what days of the year does the circle of illumination pass through the poles?

17. Why are the days longer than the nights in summer? Where do the longest days occur? Why there? What is the length of the longest day in the temperate zone? In what part of that zone? Why can there not be more than 24 hours of continuous light or darkness outside of the frigid zones?

18. Is there a natural reason for dividing the year into 365 days? Explain? For dividing the day into 24 hours? The week into seven days? The year into 12 months? The month into 28–31 days?

19. What three causes combine to produce our change of seasons? Show why these three causes must combine to produce the change.

20. Assuming that it is sun-rise at New York at 5 a. m., how long before it will be sun-rise at a place 30 degrees west? 40? 45? 60?

21. When it is 6 p. m. at New York is it earlier or later in London? Rio Janeiro? Chicago? Manila? Honolulu? Cape Town?

22. What is the international date line? Where is it? What day of the week is it in Hong Kong? Jerusalem?

23. Ships crossing the Pacific either gain or lose a day in reckoning. Explain why.

IV

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A List of Helpful Articles and Books on Geography Teaching

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Brigham, Albert P. Geographic Influences in American History. Boston, 1903.

The shorter of the two recent books which trace the more manifest influences of geography upon the history of our country. Written in an easy and somewhat popular style. Should be read by every teacher of American history and geography. Inexpensive.

Chamberlain, James F. Some Essentials in Geography. Jour. of Geog., Vol. 5, pp. 369–375. Oct., 1906.

Urges the study of home surroundings and industries, causal relations, the use of maps, globes and pictures. Sufficiently detailed and definite to be really helpful.

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An analysis of the objections to the type of geography generally taught, and a recommendation for the future. The most important report on this subject since that of the Geography Conference of the Committee of Ten in 1893.

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A collection of over twenty-five essays published in various periodicals since 1889. Some of the topics are: The Content of Geography (1906); The Progress of Geography in the Schools (1902); The Teaching of Geography (1892); The Extension of Physical Geography in Elementary Teaching (1892); Geography in the Grammar and Primary Schools (1893); Physical Geography in the High School (1900); The Need of Geography in the University (1895); Physical Geography in the University (1894); Methods and Models in Geographic Teaching (1889); Field Work in Physical Geography (1902). There is no other such valuable collection of geographical essays on the teaching side of the subject, at least, not in America.

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Outline of the Round Table Discussion at the meeting of the Association of American Geographers in Baltimore, December, 1908. The first formulation of the platform of the movement for humanized geography in the secondary schools.

Dodge, Richard E. (Editor.) Equipment for Geography Teaching. Jour. of Geog., Vol. 5, pp. 242–250. June, 1906.

Contains a rather full list of recommended maps, periodicals, school texts, teachers' books, and reference books both for teachers and pupils. Publishers' names are given in each instance.

Dodge, Richard E. (Editor.) Geography in Secondary School Courses. Jour. of Geog., Vol. 6, pp. 241–254 and 274–285. Mar. and Apr., 1908.

Professor Dodge sent out a questionnaire to a score or more of geographers in various parts of the country. The replies of nineteen are printed. These replies constitute a most valuable collection of opinions on the question of what ought to be the character of the secondary school geography work. Every geography teacher in the secondary school should read them. The replies indicate a marked change in sentiment in recent years.

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Discusses the changes both in the subject matter and the method of secondary school geography within twenty years. Gives suggestions for a course in introductory Earth Science, discusses laboratory work, advocates Regional Geography, or rational Commercial Geography.

Gibbs, David. The Pedagogy of Geography. The Pedagogical Seminary, Mar., 1907, Vol. 14, pp. 39–100.

One of our most thorough and scholarly papers on the subject. Deals with: 1. A historical review of geographical text books. 2. A historical review of method. 3. Present status of geography in Europe. 4. Geography in high schools in the United States. 5. Geography in our Normal Schools. 6. Geography in our Technical Schools. 7. Geography in American colleges and universities. 8. Geography in the elementary schools. Contains a bibliography of 95 titles.

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Discusses the gradual decrease in the control over man exerted by his physical surroundings as he advances in civilization. One of the few available papers on this important phase of modern geography.

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Surface, G. T. Geography in the High School. Jour. of Geog., Vol. 6, pp. 348–355. June, 1908.

Makes a plea for concrete-regional studies, and illustrates with a detailed plan for treating the Atlantic Coastal Plain.

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A strong and clarifying discussion by an experienced teacher, well trained in geography. The analysis of the aims and scope of geography is clean cut. Gives several chapters of practical suggestions for improving the teaching of geography. Contains a bibliography of 40 titles of books and papers on the teaching side of the subject and 150 titles of the subject matter side. It is perhaps the best single book for the average teacher.

Tarr, Ralph S. The Use of Physiography in Geography Study. Bulletin of the American Bureau of Geography, Vol. 1, pp. 1–11. Mar., 1900.

A brief and excellent presentation of the modern point of view in the teaching of geography.

Whitbeck, Ray H. Secondary School Geography: What Shall It Be? School Science and Mathematics, Vol. 7, pp. 579–582; also Jour. of Geog., Vol. 6, pp. 104–107. Oct., 1907.

Plea for the humanizing of our high school course in geography.

Reference Books for High School Libraries

Magazines Recommended to Teachers

Journal of Geography. $1.00 per year. Address, The Journal of Geography, University of Wisconsin, Madison, Wisconsin.

A journal whose purpose is to stimulate both the study and the teaching of geography. Its articles abound in illustrations of the relations of geography to life. It publishes outlines of field and laboratory exercises, sets of test and examination questions, gleanings from government publications in the field of geography, notes and comments on current geographical events, etc. It aims to keep the teacher in constant touch with the best ideas of the day. Sample sent on application.

National Geographic Magazine. $2.00 per year. Address, The National Geographic Society, Washington, D. C., for a sample copy.

It pays less attention to the teaching of the subject, but contains valuable geographic material. It might well be taken by the high school for students to read, as it is always interesting and is beautifully illustrated.

Books

(See also list of books and articles, on pages 49–52)

Salisbury, R. D.: Physiography. Holt. $3.50.

An advanced text book written advisedly for college and university use, and, therefore, of too advanced grade for high school use by the students, though most useful to teachers as a reference book, and for suggestions on map work. The book has many maps and pictures, and full references to articles and books on physical geography.

Davis, W. M.: Elementary Meteorology. $2.50. Ginn & Company, New York City, N. Y.

A standard work explaining the phenomena of the atmosphere.

Ward, R. DeC.: Practical Exercises in Elementary Meteorology. $1.12. Ginn & Company, New York City, N. Y.

A book of well-tested laboratory exercises on weather conditions and atmospheric phenomena.

Davis, King & Collie: The Use of Governmental Maps in Schools. 30 cents. Henry Holt & Company, New York City, N. Y.

A valuable guide in the selection and use of government maps, including the U. S. Geological Survey maps, the Coast and Geodetic Survey charts, the Lake Survey charts, the Mississippi, and Missouri River maps, etc.

Gregory, Keller and Bishop: Physical and Commercial Geography. Ginn & Company, New York City, N. Y.

This is a new book (1910) and is the first attempt to carefully correlate the facts of Commercial and Physical Geography. It is designed for use as a college text or reference book. It is one of the books which shows the present trend of Geography.

Mill's International Geography. D. Appleton & Company, New York City, N. Y. $3.50.

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Shaler's Aspects of the Earth. Charles Scribner's Sons, New York City, N. Y. $2.50.

Shaler's Sea and Land. Charles Scribner's Sons, New York City, N. Y. $2.50.

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Russel's Glaciers of North America. Ginn & Company, New York City, N. Y. $1.75.

Bonney's Story of Our Planet. Cassell & Company, London. $1.80.

Wright's Ice Age in North America. D. Appleton & Company, New York City, N. Y. $5.00.

Case's Wisconsin, Its Geology and Physical Geography. (Can be bought of the author, Professor E. C. Case, Ann Arbor, Michigan. $1.00.

All of these books are primarily reference books exceedingly valuable for reading because of their accuracy and interesting style, but no one of them is suitable for class use as a high school text book.

A three-sheet topographic wall map of the United States should be bought for each high school. The cost is 60 cents (or 36 cents if ordered with 100 or more of the topographic maps listed below), and it may be mounted on cloth and used in locating the larger scale topographic maps referred to below. The size is about 4 ft. by 6⅓ ft. Address, The Director, U. S. Geological Survey, Washington, D. C., enclosing a money order for payment in advance. It is also desirable to have the railroad map of Wisconsin. This is 3 ft. by 3½ ft. and may be obtained from the State Railroad Commission.

In addition, a set of 100 topographic maps selected by the U. S. Geological Survey to illustrate features of the surface of the United States should be bought and used by each high school. These are on a scale of an inch to a mile (or 2 inches to a mile) and show rivers, lakes, swamps, and ocean in blue; roads, houses, etc., in black; elevation of all points above sea level (by contour) is shown; and in some cases, forests in green. There is an accompanying sheet containing a double index: first, by topographic features, as *Dunes* shown on Wyndmere, N. Dakota, and Syracuse, Kansas, and Easthampton, N. Y., sheets, etc.; second, by sheets, as Eagle, Wisconsin, sheet shows "glacial deposition, glacial swamps, lakes of glacial deposition, morainal lakes, and moraines," etc. These 100 maps may be purchased by sending a money order for $3.14 to The Director, U. S. Geological Survey, Washington, D. C., asking for the "Topographic maps of the United States showing Physiographic Types" with the index sheet. *These 100 maps*, or an equivalent number, *should surely be bought and used by every high school in Wisconsin where physical geography is taught.*

In the state of Wisconsin many other areas have also been mapped, and an inquiry might be made of the Director of the U. S. Geological Survey whether the sheets including the town of .... has yet been published. If it has, or if an adjacent sheet has, 10 to 20 duplicate copies should be purchased for use in the high school. They cost 5 cents each, or 3 cents each if 100 or more are ordered at a time, and must be paid for in advance by money order, as above.

The maps should be used in connection with the indoor study and field work on physiographic features; and suggestions for map work are found in appendices in the books by Tarr, Davis, and others, where other excellent map lists will be found, as well as in the laboratory manuals. $3.50 will buy the large map of the United States and the 100 indexed topographic sheets; and any number of additional Wisconsin maps, especially of the home region, if published, may be bought at 3 cents each, if included in the same order.