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PHYSICAL GEOGRAPHY IN THE HIGH SCHOOL

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PHYSICAL GEOGRAPHY IN THE HIGH SCHOOL*

(One-half unit may be offered.)

The Physical Geography offered to absolve an entrance requirement of the University should include both text-book instruction and laboratory practice. It is thought that five exercises per week for a half year, at least, will be necessary to complete the work. Probably the best results will be obtained by devoting three periods to recitation and the *equivalent* of two periods to laboratory practice. By the equivalent of a recitation period is meant the time actually spent in recitation plus that spent in preparation, that is to say, a laboratory period should be twice if not three times as long as a recitation period. (In the University a laboratory period of three hours is the equivalent of a recitation period of one hour.) While the laboratory work should be under the direct supervision of the instructor, the *pupils* should do the work. All notes should be carefully written and the drawings, maps and diagrams well made. Slovenly work should not be accepted and hasty work should be discouraged.

That there may be a definite understanding concerning the *kind* of laboratory practice required the following sample exercises from *Laboratory Lessons in Physical Geography,* by Everly, Blount and Walton are cited. Equivalent exercises from a *Laboratory Manual in Physical Geography,* by Frank W. Darling, from *Laboratory and Field Exercises in Physical Geography,* by Gilbert H. Trafton, or from a *Manual of Physical Geography,* by Frederick V. Emerson, will, however, be accepted.

I. MATHEMATICAL GEOGRAPHY.

1. A Globe Exercise: To study latitude and longitude, etc., on a globe representing the rotating earth.

2. The Globular Projection of the Western Hemisphere: To represent in a plane the curved surface of half a sphere.

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3. Mercator's Map of the Earth: To draw a map that shall represent the surface of nearly the whole earth, and in which the points of the compass do not shift in going across the paper.

4. Sunrise and Sunset Graphs: To study and compare graphically the lengths of day and night throughout the year.

5. Standard Time: To study the time belts commonly employed in the United States.

II. MATERIALS OF THE EARTH'S CRUST.

6. Preliminary Study of Minerals: To learn the appearance of minerals in granite.

7. The Study of Minerals: To study in detail the minerals of the preceding exercise together with calcite, gypsum, rock salt, kaolin, etc.

8. The Study of Rocks: (a) Granite and gneiss; (b) limestone and marble; (c) shale and slate; (d) sandstone and quartzite.

9. Coal: To study the characteristics of coal.

10. Hard and soft water: To determine whether water is hard or soft.

III. DRAINAGE AND LAND FORMS.

11. First Exercise with Contours: To familiarize pupils with the use and meaning of contours.

12. Second Exercise with Contours: To construct a contour map from numbers placed on a chart.

13. Illinois.—La Salle Sheet, U. S. G. S.: To study the earlier stages of river development.

14. Drainage Areas: To map and study the drainage of the United States.

15. Iowa-Illinois.—Savanna Sheet, U. S. G. S.: To study a typical portion of the Mississippi valley and adjacent upland along the middle course of the river.

16. Louisiana.—Donaldson Sheet, U. S. G. S.: To study the swamp flood plain and levees along the lower course of the Mississippi River.

17. Illinois.—Ottawa Sheet, U. S. G. S.: To study a region of immature drainage.

18. West Virginia.—Charleston Sheet, U. S. G. S.: To study a region of mature surface drainage.

19. Kansas.—Caldwell Sheet, U. S. G. S.: To study a region in the central part of the Great Plains.

20. California.—Shasta Special Sheet: To study a young but inactive volcano.

21. California —Shasta Special Sheet: To study the glaciers on Mt. Shasta.

IV. THE ATMOSPHERE.

22. Colors in Sunlight: To study the colors that compose white sunlight.

23. Absorption of Colors: To learn how some of the colors of the sunlight may be absorbed by passing through a substance or by being reflected from it.

24. Atmospheric Pressure: To determine whether the atmosphere exerts pressure.

25. Weather Maps: To represent on a map the weather conditions on a given date.

26. Weather Record.

27. Rainfall in the United States: To map and to study the average annual rainfall within the United States.

28. Daily Range of Temperature: To plot and to study the daily changes of temperature in summer and in winter at a place in the interior of a continent and at a place on an island in the sea.

V. THE OCEAN.

29. Section of Ocean Border.—Continental Shelf: To show the widths of the continental shelf, the depths of water, and the slopes of the bottom.

30. New Jersey.—Atlantic City Sheet, U. S. G. S.: To study the sea border of a low growing plain.

31. Maine.—Boothbay Sheet, U. S. G. S.: To study the ocean border of a high rocky plain well dissected by rivers.

32. Winds and Currents: To study the relation of the ocean surface circulation to the planetary winds.

33. Rainfall and Vegetation: To study the distribution of

rain over the earth, and the vegetation areas and belts depending on rainfall and temperature.

It is important that the teacher should encourage geographic observations at first hand which may be written up in the form of brief notes or occasional essays. The action of water upon land surfaces can be studied, if only in the temporary rills formed by the falling rains; atmospheric currents—winds—and weather permit of constant observation, and if instrumental, as with vane, thermometer and barometer, so much the better. The study of clouds is a topic of never-failing interest. In the more rugged portions of our State the decay of rocks may be noted and the physical agents that assist in or promote rock decay studied. On the other hand, the resistance of solid rocks or hard layers to stream wear, with the formation of cascades and waterfalls, affords a fruitful subject for investigation, even if exemplified in the wayside ditch. Then, too, much can be learned by a study of the changes wrought by storms—the effects of wind action and of wave action, especially when of a violent character, as seen in cloudbursts, tornadoes, etc. There is no subject more suggestive to the thoughtful mind than Physical Geography, the problems are so varied and interesting, changing with each locality. Thus wave action may be studied by those living on the coast or near ponds and lakes; cliff disintegration by those living in mountainous regions; the relations of plant life to the underlying rocks by those inhabiting a region of varying geological formations.

To understand physical geography well there must be a complete understanding of maps, especially the contour map. To the pupil such a map should become something more than a mere plan upon paper—it should become a picture with its topographic forms, hills and valleys, lake basins and mountains, plains and plateaus, so brought out as to form a clear and distinct impression. In these days of cheap photographs, correct representations of the relief of most regions can be placed in the hands of the pupil at a trifling cost. In well-equipped schools additional facilities may be afforded by models showing different types of relief and by relief globes. From them various sketches and drawings may be made which will afford practice of substantial value.

Text-books: For recitations one of the following books is recommended: Maury-Simonds' *Physical Geography* (American Book Co.); Davis's *Elementary Physical Geography* (Ginn & Co.); Gilbert and Brigham's *An Introduction to Physical Geography* (D. Appleton & Co.); Tarr's *New Physical Geography* (The Macmillan Co.); Fairbanks's *Practical Geography* (Allyn & Bacon).

For laboratory practice, exercises, as already indicated, selected from one of the following: *Laboratory Lessons in Physical Geography*, by Everly, Blount, and Walton (American Book Co.); *A Laboratory Manual in Physical Geography*, by Darling (Atkinson, Mentzer, and Grover); *Laboratory and Field Exercises in Physical Geography*, by Trafton (Ginn & Co.); *Manual of Physical Geography*, by Frederick V. Emerson (The Macmillan Co.).

It is felt that students entering the University should possess some knowledge of the State in which they live. It is recommended, therefore, that the geography of Texas be made a part of the school course, as collateral reading, if it can not be given a more prominent position. Text-book: Simonds's *Geography of Texas: Physical and Political* (Ginn & Co.).

Laboratory Equipment.

That portion of the laboratory equipment necessary for the above exercises which should be furnished by the school is as follows:

1 six-inch globe.

1 small ball.

Specimens of granite, calcite, gypsum, rock salt, kaolin, quartz, feldspar, mica, gneiss, limestone, marble, shale, slate, quartzite, lignite, bituminous coal, anthracite.

1 bottle dilute hydrochloric acid.

3 (or more) hand magnifiers.

4 (or more) sets of the map sheets marked U. S. G. S. (United States Geological Survey).

1 glass prism.

1 small mirror.

Most of the above equipment can be supplied by school furnish-

ing houses, with the exception of the maps which may be purchased from the Director of the United States Geological Survey at Washington.

The pupils should furnish their own rulers, dividers, and colored pencils, etc.

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