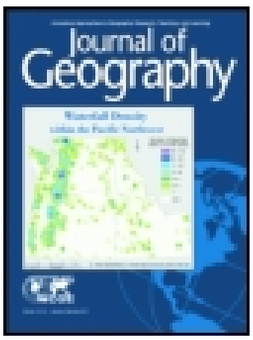

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THE STUDY OF MINERALS AND ROCKS IN HIGH SCHOOL PHYSICAL GEOGRAPHY

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IT is an interesting fact that two of the best-known university teachers of physiography in the United States have almost, or entirely, omitted the consideration of minerals and rocks from the text-books which they have written for secondary school use. I wish to raise the question—Is such an omission desirable?

Both of these authors, who have written their text-books from the college viewpoint looking down (i. e. simplified), rather than from the high school standpoint looking out, have given considerable attention to the composition of the atmosphere and hydrosphere, but have done little in their text-books to turn the pupils' attention to the composition of the lithosphere.

Some simple experiments to bring clearly before the pupil something of the nature and properties of the gases composing the atmosphere have been found worth while with first year students. Why not also attempt to teach our pupils something definite regarding the principal rocks and minerals composing the lithosphere? Yet there are many schools where the pupils learn almost nothing of the latter by work with actual specimens.

By collecting some of the more important rocks and minerals of the region where the pupil lives, the idea is early brought home that these are a part of the "real thing" about which he is studying. Much of the elementary study of the lithosphere may be so "perfectly general as to be perfectly meaningless" to the young pupil; here is, at least, one point of contact which is concrete.

Moreover, from seeing nothing but soil or vegetation on the surface many of the pupils overlook the fact that there is a bed-rock below; in fact, many of them graduate from high school without knowing the nature of the bed-rock in the region where they have studied. If teachers of physiography doubt this, let them question their classes carefully on this point—even in some schools beyond the high school.

Not only is a brief study of minerals and rocks a *logical* part of the earth science course—call it physical geography, physiography, or what not—but I have found that a reasonable amount of time given to such study early in the course is an unfailing means of *deepening an interest* in the subject, especially where each pupil is required to make a collection of his own and become thoroughly familiar with it.

The collecting instinct is generally still active in the first or second

year of the high school and needs little stimulating. Where I have required a collection of thirty-five rocks, minerals, and building stones as a minimum, I have found some pupils in every class who have gotten together seventy-five to one hundred, or even more, different specimens. One of the requirements in such a collection was that each pupil should pass an individual oral examination upon *his* specimens and show that he knew something of their properties and distinguishing characteristics, as well as their names. The pupils could get their specimens from the field or stone yards, from the garret at home, by trading with one another—get them in a variety of ways—the principal thing being to get them and to *know* them.

Some of the collections thus started have been added to long after the required work of the course was over, especially where the pupils at the start were given encouragement and suggestions in labelling and arranging their specimens. Personally, I have always felt well paid in securing additional material from the region, material which would be broken up and placed at the disposal of the class in the form of "special offerings." Of course, a reference collection is necessary to assist the pupils in identifying their specimens; but this is not a matter of great expense as it can be secured largely from the region, and should be a part of the working equipment of every school.

In the glaciated portion of the United States pupils might bring in some specimens of fine grained boulders that could not be determined to a certainty, but those of coarser structure in most cases could be recognized; in any case the lesson could be emphasized that the specimens represented *erratic* boulders *entirely different* from the underlying bed-rock, and therefore that their presence in the region was a matter of interest to be accounted for.

Some regions are naturally richer than others in materials for such collections, and there may be places where it might be difficult to secure, in the ways already suggested, 35 different specimens for the individual collections. However, typical glaciated fragments, pebbles, angular talus fragments, wind cut stones, specimens showing disintegration and weathering, can be added; even different kinds of soils, for the latter certainly are of interest in any study of earth science, and can be secured in any region.

Regardless of the wealth or poverty of any region in natural specimens, good representative specimens can be *purchased* cheaply enough for the individual collections. As a part of the working equipment of our school, we have individual student collections of 60 to 65 minerals and rocks (mixed) which were purchased for 45 cents a set. These fragments are of moderate size, a part of them over an inch in length, and were purchased from the Howell Microcosm, Washington, D. C. (Mr. George Robertson, Manager), having been selected from the Student Collection of 40 minerals and 40 rocks each, and cut somewhat larger than the fragments generally

sold in these collections. Other dealers* in rocks and minerals can doubtless furnish similar collections.

Aside from the value of the study of such material in giving the pupil a more definite understanding of the composition of the solid part of our earth, incidentally it is a most excellent training in keen, discriminating observation; and this, in itself, is of no small value as a life preparation.

While the work with the purchased collections possesses much value, nothing can take the place of the specimens secured by the pupils themselves in their own region; and in *getting out* to get this material either individually, or on class trips, they are bound to see much of physiographic interest in the field. The questions often raised by pupils after such trips are often gratifying, for they indicate that the field trip has caused them to *observe* and *think*. If the making of such collections served no other purpose than getting pupils out into the field more I believe it would have an unquestionable value.

While this is only one of several lines of valuable laboratory and field work that should be included in every well developed course in high school earth science, and should not receive undue prominence, I believe it is entitled to more consideration than it is receiving at present in many secondary schools. Moreover, I do not know of any secondary school where such work has been carefully tried and has failed to yield results if recognized and unquestioned value.

NEW ENGLAND FARMING; ITS PRESENT AND FUTURE

By WALTER LEFFERTS,

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New England represents two widely different sections, the northern and the southern. The first, including in a general way Maine, New Hampshire and Vermont, is a region of scanty population, where agriculture, although unimportant in a national sense, still employs a considerable proportion of the people . The second section, embracing Rhode Island, Connecticut, Massachusetts, and a small part of New Hampshire, is more densely populated than any other region of the same size in the United States, and looks to manufacturing as its main support. In both sections, however, cereal raising has suffered a great decline.

Like Old England, New England produces but a part of the grain she

*Geography Supply Bureau, Ithaca, N. Y.

Ward's Natural History Museum, Rochester, N. Y.