GEOGRAPHICAL ILLUSTRATIONS: SUGGESTIONS FOR TEACHING PHYSICAL GEOGRAPHY BASED ON THE PHYSICAL FEATURES OF SOURTHEN NEW ENGLAND

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SUGGESTIONS FOR TEACHING PHYSICAL GEOGRAPHY BASED ON THE PHYSICAL FEATURES OF SOUTHERN NEW ENGLAND

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GEOGRAPHICAL ILLUSTRATIONS.

Suggestions for Teaching Physical Geography, based upon the Physical Features of Southern New England.

INTRODUCTION.

The descriptive geography of a region gives us an account of its various parts, such as rivers, valleys, hills, and mountains, independently of one another, except as to relative position. It deals largely with statistics of length, height, and area. In its more political chapters, it tells of the place, size, and business of cities and states.

Physical geography deals with the same subjects, but seeks to consider them in their natural relations. It recognizes that the surface of the earth has been fashioned by natural processes, and that it now stands in a transient stage between its past and its future. It perceives that certain features of the surface are newly made, and that others are the product of long-continued processes; and in this difference it finds useful means of giving reasonable understanding to the subject. It includes a consideration of the occupation of the earth by man as one of the most interesting chapters in natural history, and it therefore takes particular care to distinguish those conditions which determine man's settlement and occupation.

A subject so comprehensive as this, must needs be treated in a carefully chosen and systematic order, if confusion is to be avoided; and I therefore introduce in brief form a statement of the scheme under which the various parts of the land are, to my mind, most simply placed in their natural relationships, and thus most conveniently grouped for study.

It is well understood that every part of the surface of the land has a form dependent on the interaction of two kinds of forces, the one constructive, the other destructive. It is, therefore, important to begin with a conception of land forms such as they would be if determined by constructive processes alone. The accumulation of a sand dune is a minute example of such a process; the heaping of a terminal glacial moraine is another; the heaping of a volcanic cone is a much larger example; the uplift of a broad plateau involves an enormous mass of earth crust; and the crushing together and uprising of a mountain range give us the climax of these constructive operations.

As soon as land form is thus constructed, the destructive processes of the atmosphere attack its surface. The waste thus produced creeps and washes down the slopes, and the streams and rivers then carry it to its goal in the sea. Time is so long that even the loftiest constructional forms must in this way be reduced to lowlands, if the destructive processes go on without hindrance or interruption; and between the constructive beginning and the far distant completion of the destructive denudation, there is a whole sequence of forms to which the adjectives young, adolescent, mature, and old apply most appropriately.

When their meaning is once perceived, the student will not willingly give up their use.

The succession of features attained by any land area will depend, then, in the first place, on its initial constructional forms: it may begin as an even plateau surface, as a volcanic cone, or as a series of mountain ridges. The features will depend, in the second place, on the degree of advance made by the destructive forces in wearing away all that part of the mass which stands above sea-level, or above "baselevel," as it is more conveniently expressed. An adolescent plateau is different from an adolescent mountain range; an adolescent plateau is also different from an old plateau.

A similar plan may be followed in considering the features of coast lines. When a change in the relative attitude of the land and sea brings the waters to reside at a new level, the outline of the coast may be called constructional. As long as the land stands still, the littoral waves and currents work upon it and effect progressive transformation of its outline, thus carrying it through successive stages that may be called young, adolescent, and mature as before.

There are two qualifications of this scheme which must be noticed, rather to avoid misapprehension than to present the scheme completely. The first is that the destructive processes do not hold back their attack until the constructive processes have completed their work. Destructive denudation begins as soon as any part of a land mass rises above sea-level. If the constructive processes are relatively slow, a considerable advance may be made by the destructive processes

before construction ceases; but as far as the facts are now understood, the greater part of the task that is set before the latter still remains undone after the former have completed their work. It is, therefore, fair in a general way to separate with some distinctness the two stages, constructive and destructive, in the history of any land area.

The second qualification is that we need not imagine every constructed land area to stand still, suffering continually from the destructive forces, until it is completely denuded to baselevel. If no disturbance took place, the time required for complete denudation would be called a complete geographical cycle. But a renewal of constructive upheavals, or deformations, may be introduced at any stage in the destructive development of a land mass. The forms then reached by the constructive and destructive processes of the first incomplete cycle serve as the constructional or initial forms of the new cycle, and from this beginning the destructive forces then proceed again. Thus land areas frequently present what may be called composite topographic forms, part of the surface having been shaped during an earlier cycle of destructive development, and another part being the work of later destructive work, while the land mass stood at a different attitude with respect to baselevel. The discrimination of the different parts of a composite landscape affords one of the most interesting tasks that a geographer can undertake. Composite topography is illustrated in great variety and with surprising distinctness in New England.

It is manifest that the study of physical geography

on such a scheme as this implies an understanding of physical geology. There can be no question that this is essential for any proper advance to a good treatment of the subject. Indeed, I believe that the chief cause of the slow progress of physical geography in the text-books and in the schools is due to the weakness or absence of this fundamental subject. No great amount of study is needed for its acquisition; nothing need be said about fossils or about the ages of the world; but the general principles of changes of level, deformation, volcanic action, and especially of denudation, must be clearly in the mind of every teacher who would gain a rational understanding of physical geography.

Let us take southern New England as a field in which to look for illustrations of a systematic method of treating physical geography.

THE PHYSICAL FEATURES OF SOUTHERN NEW ENGLAND.

On ascending the summit of any of the hills in southern New England, the most characteristic feature of the view is the comparative evenness of the horizon line. From one upland to the next there is small change of height. The successive uplands are more or less widely separated by valleys, like those of the Blackstone or of the Connecticut, which are sunk beneath the general upland level; and occasional mountain-like eminences rise above the general upland surface, as the Blue Hills, Wachusett, and Monadnock. But both the valleys and the mountains are only local departures from the relatively continuous upland sur-