Elementary physical geography

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Plate I. Grays Peak, Rocky Mountains of Colorado
ELEMENTARY

PHYSICAL GEOGRAPHY

BY

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PREFACE

The educational progress of recent years has resulted in two profitable advances for the venerable subject of Geography. A strong feeling has been developed in favor of treating the subject as a whole more rationally than heretofore, and a wholesome desire has arisen in favor of introducing some of its scientific aspects more generally into the school course. A natural accompaniment of this progress has been a demand for text-books that shall present Physical Geography in its modern scientific development as well as in an elementary form. The present book, reduced from the author's "Physical Geography," has been prepared to meet this demand.

The reduction of the earlier book to the present volume has been made chiefly by omitting the more advanced problems and by simplifying and abbreviating the treatment of the remainder; but the chapter on The Atmosphere is here given a greater length than before; and a new chapter is added on The Distribution of Plants, Animals, and Man, considered from a physiographic standpoint. Several topics of a somewhat more advanced nature than the rest of the text, and yet of too great importance to be omitted altogether, are placed in supplements to Chapters I, II, and III.
The plan of this volume is, like that of its predecessor, to give the problems of Physical Geography a rational treatment. The object of this method is not simply to explain physiographic facts, but through explanation to increase the appreciation of the facts themselves. It is, however, not enough that physiographic facts should be associated with their causes; they must also be seen in relation to their consequences if their full importance is to be realized. This relation must not be presented merely as an afterthought, in a detached chapter at the end of a book; it must accompany the presentation of the facts themselves. As Guyot long ago said so well: “To describe, without rising to the causes, or descending to the consequences, is no more science than merely and simply to relate a fact of which one has been a witness.” The ideas of cause and of consequence, one preceding, the other following, the physiographic fact, have therefore been held constantly in mind by the author; they should be no less constantly remembered by the teacher and impressed upon the pupil.

Yet, while the causal notion is introduced as far as possible, it must be recognized that certain facts of great importance cannot be really accounted for in an elementary book. Such facts must therefore be described rather than explained. For example, the rotation of the earth and the separation of continental masses from ocean basins are subjects of great importance; they must be described, and their consequences deserve careful attention, but their causes involve speculative investigation of a grade that far transcends the reach of an elementary text. Again,
the simpler phenomena of the tides must be presented; their period may be correlated with the movement of the moon, and the moon may be thus indicated as their chief cause; but the relation between lunar cause and tidal effect cannot be demonstrated to young pupils. A mere outline of theory, with the briefest consideration of the joint action of sun and moon, is introduced in the supplement to Chapter III.

The general circulation of the atmosphere is also far beyond elementary explanation. The circulation may be not unreasonably asserted to depend on the differences between equatorial and polar temperatures; but the more intelligent the pupil, the less can he be satisfied with a simple conventional origin of the prevailing westerly winds. Explanation of this complicated problem is therefore touched upon lightly; while emphasis is given to the elements of which the circulation consists, to the correlation of these elements, and to the deduction of climatic conditions from them. The deflective effect of the earth’s rotation is almost universally misunderstood, because it cannot be fully explained in an elementary manner. Its quality is briefly asserted in the text, and on account of its importance a correct explanation in the simplest possible form is inserted in the supplement to Chapter II; but neither this supplement nor that on the tides should be studied by the youngest pupils.

On the other hand, the forms of the lands have not as a rule been sufficiently explained in text-books on Physical Geography. Fifty years ago there was justification for the empirical treatment and even for the neglect of land
forms, in the ignorance of geographers concerning their origin; but the investigations of the last thirty years have thrown a flood of light on this important division of the subject, and to-day it may be treated as rationally as any other. Many problems, formerly obscure, are now seen to be essentially simple and to lie entirely within the reach of elementary treatment. It has thus become possible to extend the explanatory method, long familiar in the study of the atmosphere and the ocean, to the lands as well; and to present plains and plateaus, mountains and volcanoes, rivers, valleys, and shore lines under a rational system. It is believed that this division of the subject is here treated in a manner more systematic and comprehensive and at the same time more simple and reasonable than is the case in any other elementary book. It should however be carefully borne in mind that the explanation of the processes which are involved in the dissection of a plateau, for example, is not introduced merely that the past history of the plateau shall become known, but chiefly that the existing features and especially the systematic correlation of these features shall be better perceived and remembered.

While the list of topics treated will, it is believed, be found exceptionally full for an elementary book, it has nevertheless been necessary to go somewhat against time-honored traditions in omitting certain subjects. Elementary text-books should not present an encyclopedic richness of contents, as if to show the learning of their authors; they should provide a well-selected body of useful information having disciplinary value, pertinent to their subject