

able strata are characterized by dry valleys and few water-courses, while the impermeable beds support abundant streams.

The relations of disturbed strata, of anticlinals and synclinals to valley and hill, are duly noted; and it is pointed out how the flow of rivers is determined by the lie of the land when it is upraised from beneath the sea-level, and that in few cases are their courses directed by faults or fractures. The authors explain the recession of escarpments by the undermining or undercutting of softer beds and the production of landslips; and they note the influence of lateral streams in eroding these softer strata at the foot of the hills, a subject illustrated by reference to the Wealden area and other districts.

Little is said about marine denudation, for the action of the sea is essentially limited to the destruction of cliffs along its margin, and to the formation of marine platforms. Concerning great "plateaux of abrasion," or so-called "plains of marine denudation," the authors express their opinion that it would be wrong to attribute their formation exclusively to the sea, for they consider that the prolonged action of sub-ærial forces is to reduce the land to a level. Nor do the authors attribute great excavating power to glaciers. In their opinion these icy agents occupied and modified old valleys, and have not always effaced the pre-Glacial alluvial deposits; and they see little evidence of post-Glacial erosion. In these respects their observations are based on local and limited evidence; for in this country, although the main features were marked out in pre-Glacial times, there is abundant evidence of denudation by glacial action, and subsequently in times when the ice had done its work.

The authors have clearly pointed out that the topographical features are as a rule in direct relation with the geological structure; indeed, the form of the ground is one of the most important guides to the field-geologist in his delineation of the superficial distribution of the rock-masses. Nevertheless, in the explanation of the origin of our scenery, there are many points concerning the original extent of each formation, and the changes in texture which the rocks have undergone, that are but briefly, if at all, noticed in this work. In this respect, however, each country must be studied in detail before the complex history of its physical features can be deciphered.

The present work, as before stated, deals mainly with the mode in which rain and rivers sculpture the surface of the earth. It is an instructive summary of what is known on this subject, supported by original observations and by references to the principal authorities, and illustrated in a far more sumptuous manner than has ever been attempted in this country. H. B. W.

#### OUR BOOK SHELF.

*Eclectic Physical Geography.* By Russell Hinman. (New York: Van Antwerp, Bragg, and Co., 1888.)

To quote the author's preface, "The aim of this book is to indicate briefly what we know or surmise concerning the proximate causes of the more common and familiar phenomena observed at the earth's surface." The book commences with an introduction to the general laws of Nature, in which short outlines of the properties of matter and the various forms of energy are given. The

earth is then treated as a planet; its relation to the sun and stars, and the nature and results of its movements, being described. Next come chapters on the atmosphere, the sea, the land, meteorology; and finally, the various forms of life. The causes of the movements of the atmosphere, sea, and land, and their respective effects, are all clearly stated. Brief outlines are given of the gradual disintegration of terrestrial rocks, and the subsequent transportation and accumulation of the products. Fossils and their teachings also receive attention. In short, nothing of importance has been omitted.

The general plan of the book bears a considerable resemblance to that suggested by the syllabus of the Science and Art Department's course of elementary physiography, and with a teacher to extend the preliminary chapter on the forms of energy, would form an admirable text-book for that subject. The order in which the subjects are taken is practically the same, and is obviously the most natural and rational.

The chapters on the forms of life and their distribution will prove of special interest to young students or general readers. There is a good outline of the development theory, and of what we know of man from prehistoric times.

The book throughout is illustrated by a great number of drawings, maps, and charts, which not only beautify but illustrate the text in a most admirable manner. The charts are drawn on three different systems of projection, each system being applied where it is most suitable; and, what is very important, the different systems are fully explained. A book like this cannot fail to impress the reader with a due sense of the importance of diagrammatic representation in facilitating description. The various sectional drawings are especially valuable in this respect.

The book thoroughly deserves the highest praise, and as an introduction to the study of science must certainly rank among the best.

#### LETTERS TO THE EDITOR.

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#### Prophetic Germs.

PROF. RAY LANKESTER has mistaken me. When I said in my last letter of October 8 that "all organs whatever do actually pass through rudimentary stages in which actual use is impossible," I referred specially to the embryological development of the individual. This is a fact which cannot be denied. But on the Darwinian hypothesis this fact applies equally to the birth of species—which are nothing but the passing results of individual variation. If true now of all individuals, it must, on that hypothesis, have been true of them for all time.

Inheritance is no explanation of this fact. It is merely one part of the fact separately stated. Neither is "correlation of growth" any explanation of it. This, again, is a mere phrase stating in another form the very fact which it pretends to explain. All organic growths are "correlated." But with what? First, with each other; and, secondly, with some combined use, which invariably lies in the future when such growths begin. "Correlation of growth" is the law under which "prophetic germs" begin to be developed; and this prophetic character becomes all the more marked in proportion as we carry back existing forms of life to the forms which were primeval. It is a favourite idea among the disciples of Darwin that the embryological development of individuals represents in epitome the whole history of organic life. I do not see why they should object to it when it leads us to the conclusion that the whole organic world must have begun in germs which were prophetic—that all organs must have come into being before they could be used.

ARGYLL.