

inorganic chemistry, and 141 to organic chemistry. The student who is already fairly acquainted with the subject will find the summaries of properties, &c., of much use. The analogous compounds of various groups of elements are treated together, and their differences are concisely remarked upon. He will, perhaps, be a little troubled at first to find names employed in an unusual manner. For instance, Ag_2O is called argentous oxide; AgO , argentic oxide; AgCl , AgBr , silver chloride, &c.; and there is a statement that "no argentic halides are known." If he looks up the paragraph on valency, he will find silver put down as a monad along with hydrogen, potassium, &c., and not with copper and mercury, which are marked monad and dyad. There are other inconsistencies that might have been eliminated, such as in the use of the words distill, and sublime. Directions are given to distill a fluoride with strong sulphuric acid, to distill a mixture of sand, fluor-spar, and sulphuric acid, and so on, and on turning to the description of the operation of distillation, in the first part of the book, we find that the word is used there in its correct sense. The solution of a carbonate in an acid is spoken of, and the sublimation of a mixture of mercuric sulphate and salt. Such operations are impossible according to the meaning of the words expressing them given in the earlier part of the work. The statement that chlorine peroxide is formed by distilling a chlorate with sulphuric acid at a low temperature might lead to serious accidents in the case of the young students for whom the volume is primarily intended. While the symbol Aq. is used to represent the water of solution, a refinement which is scarcely necessary in an elementary treatise, the reaction taking place when a jar of chlorine is inverted over a strong solution of ammonia is represented by an equation that demonstrates the liberation of hydrochloric acid. It is such inconsistencies as these that perplex and mislead the student.

C. J.

OUR BOOK SHELF.

Applied Geography. By J. Scott Keltie. (London: George Philip and Son, 1890.)

THE greater part of this volume consists of four lectures which were delivered last year at the Bankers' Institute, and given in part before the Society of Arts and the College of Preceptors. An article which appeared originally in the *Contemporary Review* is also included. The volume is one of great interest, both theoretical and practical, and ought to be of genuine service to various classes of readers, by showing how high is the place which must properly belong to geography in any complete scheme of education. Mr. Keltie has been especially successful in indicating some of the influences which geographical facts have exerted on the movements of races and the evolution of nations. On so great a subject it was impossible for him, within narrow limits, to develop any of his ideas fully; but his suggestions are excellent, and may perhaps be worked out by some of his readers for themselves. Mr. Keltie has much to say about the bearings of geographical conditions on the development of Africa, and about the relation of geography to the commercial prosperity of the British Empire. He also discusses various problems connected with the actual and possible geographical distribution of some of the common commodities of commerce. On all these subjects he writes with freshness and lucidity, displaying

a thorough grasp of the principles of geographical science. Maps and diagrams, for which the author expresses his thanks to Mr. Ravenstein, add considerably to the value of the text.

The Autobiography of the Earth. By the Rev. H. N. Hutchinson, B.A., F.G.S. Pp. 290. (London: Edward Stanford, 1890.)

WE have rarely met with a popular work on geology or natural history so crowded with information as Mr. Hutchinson's little volume now before us. In less than 300 pages of large type, all the leading features of the "geological record" are passed in review, with special reference to the mode of reasoning by which the various facts and inferences are established. Nothing of importance seems to be omitted, from the nebular hypothesis and the birth of the moon, to theories of glacial epochs, the permanence of ocean basins, the origin of oolitic structure, and the method of discovering the hidden appendages of trilobites. Some of the sections, indeed, such as those relating to the nebular theory and the nature of geological agents, are seldom found more concisely arranged even in the pages of an examination "cram-book."

With all this wealth of material, however, the author succeeds in completely divesting his work of the "dry" and "uninteresting" formality which, in his opinion, repels the general reader from ordinary text-books. The several chapters are pleasantly written and illustrated with occasional woodcuts; while, although the accounts of the successive formations are systematically arranged from the Archæan to the Pleistocene, every occasion that permits of some digression into general principles is turned to good advantage. An allusion to the igneous rocks of the Devonian period thus leads to a few brief paragraphs on the interest of denuded volcanoes; the Lower Carboniferous rocks afford an opportunity for discussing the origin of limestones; the chapter on the Oolitic rocks is followed by another on the organization of Mesozoic reptiles; and the short notice of the Glacial period forms a fitting occasion for digressing to the subject of ice as a geological agent. If, in any respect, the general reader's interest fails, it will be due to the too frequent use of inadequately defined technical terms, and the too rapid succession of unfamiliar ideas. Of such terms as "schist" and "Neocomian," for example, the definition seems to have been quite overlooked.

In a compilation of so wide a scope it is, of course, easy for a specialist to detect inaccuracies, but the present volume bears evidence of so much care bestowed in its preparation, that absolute errors appear to be unusually few. The bold statement on an early page that glaciers erode valleys like rivers is qualified in the last chapter; and the assertion that no Chelonian bones have been found in the Trias is corrected in a footnote on a later page. The most serious error is the frequent quotation of brachiopods and polyzoa as Mollusca; and nearly all the lesser misstatements relate to biological matters. The author, however, unlike many popular writers, has been trained in the modern school, and thus recognizes throughout the broad principles of organic evolution.

The volume is well printed, and issued in a style uniform with Miss Arabella Buckley's popular works, to which it forms a worthy companion. A. S. W.

Spinning Tops. "Romance of Science Series." By Prof. John Perry, F.R.S. (London: Society for Promoting Christian Knowledge, 1890.)

IN September last Prof. Perry delivered the "Operatives' Lecture" of the British Association meeting held at Leeds, the subject of which was entitled "Spinning Tops." The present little work is a revised and much expanded edition of that lecture, and, instead of the moving apparatus originally displayed, the author has provided a