

ROCK METAMORPHISM

Metamorphism

A Study of the Transformations of Rock-Masses. By Dr. Alfred Harker. Second edition, revised. Pp. x + 362. (London: Methuen and Co., Ltd., 1939.) 21s. net.

THE first edition of this book appeared in 1932. Dr. Harker had completed the revision of the text of this second edition only a few weeks before his death, which took place in July 1939. The modifications appearing in the new edition are chiefly minor changes, usually limited to a few words each, leading to certain clarifications. In addition, references to some of the work which has appeared between 1932 and 1939 are given, but little new matter is incorporated in the text. Among the more important alterations are the following: the cordierite-anthophyllite rocks of Kenidjack, Cornwall, are now considered with Eskola's Orijarvi analogues in the chapter dealing with pneumatolysis and metasomatism; brief mention is made of recent experiments by Bridgman and Larsen on stress effects; the inhibition of reactions through the presence of carbonaceous material, a notion rather frowned upon in the first edition, is now admitted to be possible; there are certain additional remarks on the Inchbae aureole, adinoles, the oligoclase zone, eclogites, etc. The book thus remains essentially unchanged.

In its own field, Harker's "Metamorphism" is a masterpiece. It presents the essentially British

contributions to the study of the metamorphic rocks, chief among these being Barrow's zonal work, and the notion of rock metamorphism as a series of progressive changes in response to changes of external conditions. Harker's presentation is reinforced by a wealth of personal observations and by perfect lucidity of expression. The book remains as a magnificent monument to Harker and his generation.

It is not ungenerous to suggest, however, that the field covered by Harker is a very restricted one, and that his outlook was essentially conservative. These facts should be realized by British students in particular, who should take this book as a partial and personal statement. There are wide realms of investigation in metamorphism that were scarcely touched upon by Harker. Such topics as migmatization and its relation to metamorphism, petrofabrics, the importance of metasomatic processes and so forth are not dealt with, and yet it is along these lines that future progress in the study of British metamorphic rocks is likely to develop. Once the limitations of Harker's treatment are realized, however, his work can be used as a sure foundation for British metamorphic geology—a foundation not possessed by field-workers in other countries. Upon this firm base can be built all the more securely the future edifice of British contributions to the development of metamorphic studies.

H. H. READ.

THE CHEMICAL BOND

The Nature of the Chemical Bond and the Structure of Molecules and Crystals

An Introduction to Modern Structural Chemistry. By Prof. Linus Pauling. (The George Fisher Baker Non-resident Lectureship in Chemistry at Cornell University.) Pp. xiv + 429. (Ithaca, N.Y.: Cornell University Press; London: Oxford University Press, 1939.) 21s. net.

SINCE G. N. Lewis's fundamental paper of 1916, the electronic theory of valency has been amplified and applied so extensively as to create the need for a monograph every few years; and every few years, so far, a monograph has been produced by a leading contributor to the subject. Lewis's own book "Valence and the Structure of Atoms and Molecules" (1923), Sidgwick's

"Electronic Theory of Valency" (1927), and his "Covalent Link in Chemistry" (1933), set a high standard, and the present volume is a worthy successor.

In it the author discusses the nature of chemical combination in both molecules and crystalline aggregates. The treatment is based on the electronic theory of valency as rationalized and extended by quantum mechanics, special emphasis being laid on the resonance phenomenon. The fundamental types of combination are discussed very thoroughly. The one-, two-, and three-electron bonds are considered as involving resonance between alternative electron assignments among the bonded atoms. The directed bonds in polyvalent atoms involve additional resonance among the *s*- and *p*- or *s*-, *p*- and