

REVIEWS.

The Petrology of the Sedimentary Rocks. A description of the sediments and their metamorphic derivatives. By F. H. HATCH and R. H. RASTALL. With an appendix on the systematic examination of loose detrital sediments, by T. CROOK. Pp. xiii + 425, with 60 text-figures. (London: G. Allen & Co., 1913. Price 7s. 6d. net.)

This is a companion volume to Dr. Hatch's well-known 'Text-book of Petrology' (treating of the igneous rocks alone), the fifth edition of which was reviewed in these pages in 1909. On the half-title of the present book appears 'Text-book of Petrology, vol. ii'. In view of the little attention that has hitherto been given in textbooks to the sedimentary rocks, this volume will prove to be of much use, not only to the student working for examinations, but also to other workers. The matter is, however, not treated on the same lines as in Dr. Hatch's previous volume, and rather than being a descriptive petrography of the sedimentary rocks, it is more a dissertation on petrogenesis. Further, so much latitude is given to the term metamorphism that practically every rock, except a freshly deposited sediment, would appear to be metamorphic; and the title of the book might well have been 'The origin of metamorphic rocks'. Part I (pp. 3-145) deals with the various forms of sediments—fragmental, chemical, and organic; and Part II (pp. 149-338) with the various metamorphic processes—cementation and metasomatism, contact metamorphism, regional metamorphism, and weathering. Useful tables, showing the relations between the different kinds of rocks, are given on pp. 160 and 220. The book is thus not well adapted to the needs of a reader who requires definite information about the lithological and petrographical characters of, say, sandstone or limestone. Not the least valuable portion is the Appendix (pp. 339-414), which gives in detail the practical methods for determining the mineralogical composition of loose detrital sediments, and especially of the concentrates of heavy minerals obtained by panning.

Mineralogy: an introduction to the theoretical and practical study of minerals. By ALEXANDER HAMILTON PHILLIPS. Pp. viii + 699, with 534 text-figures. (New York: The Macmillan Company, 1912. Price \$3.75 = 16s. net.)

In format and general appearance this book bears a strong resemblance to Miers's well-known 'Mineralogy: an introduction to the scientific study of minerals', issued by the same publishers just ten years before. Of the two, we distinctly prefer Miers, although the new book has the advantage in being lower in price. The treatment of the subject is much the same as in Miers, although rather more elementary in character. It is dealt with in three parts: Crystallography, Descriptive Mineralogy, and Determinative Mineralogy, the last including 90 pages of determinative tables. Many of the illustrations are half-tone photographic reproductions of actual specimens, but only few of them adequately represent the minerals portrayed. Several misprints have been noticed in the text.

Guide to the Collection of Gemstones in the Museum of Practical Geology.

By W. F. P. MCLINTOCK. Pp. iv + 92, with 43 text-figures.
(London: H. M. Stationery Office, 1912. Price 9d.)

At the very moderate price of ninepence this is quite the cheapest textbook on gem-stones that has yet been given to the public. The treatment is general, and apart from the references to the cases where the specimens are exhibited, it would apply, as a guide, to any collection of gem-stones. The subject is treated in a thorough, yet elementary, manner, giving firstly (Chapters I-III, pp. 4-34) a general account of the properties of gem-stones, the forms employed for their cutting, and their imitation and artificial production; and secondly (Chapter IV, pp. 35-87) a description of each kind of stone. An appendix compares in tabular form the essential characters of different stones of the same colours. There are a few misprints and minor errors, some of which should not have escaped the notice of the press-reader.

Geologische Diffusionen. By RAPHAEL E. LIESEGANG. Pp. vii + 180, with 44 text-figures. (Dresden and Leipzig: Th. Steinkopff, 1913. Price 5 Marks, unbound; 6 Marks, bound.)

In this book the author has brought together the results of all his work on diffusion in relation to geology, and has reviewed the work of most recent investigators in this subject.

The preliminary discussion involves a summary of recent work on the behaviour of colloids, and a consideration of the media in which diffusion can take place. It appears that while diffusion takes place in aggregates of crystals, it cannot do so in a uniform individual crystal. The apparent exceptions to this rule are considered. The principles of diffusion are illustrated by thirty-three experiments, most of them original, and the

applications of the principles to numerous phenomena are treated in separate chapters. These phenomena include the formation of various concretions, the secondary enrichment and lateral secretion of ores, and numerous banded structures in minerals and rocks. All are phenomena with which geologists are perfectly familiar, but of which the explanation has been only vaguely stated. An important chapter is one dealing with the origin of gold deposits, reviewing the work of Hatschek and Simon and of others.

The banded structures depend on the properties of supersaturated solutions, as was suggested by Wilhelm Ostwald in 1899. Chapter XI, explaining the diffusion theory of agate structures, summarizes Liesegang's well-known work in this direction. The origin of banded flints is discussed in Chapter XV. These were at one time regarded as of organic origin. One of the first papers pointing out their inorganic origin was that of S. P. Woodward in 1864, describing the specimens in the British Museum, to which, however, no reference is found in this place.

Among other structures which are considered are 'Eozoon', the ore-pipes of Pitkäranta, and the colour-bands in marl. The subject of 'Eozoon' always arouses interest. The explanation of its banded structures in the light of the diffusion theory is made fully convincing in an admirably illustrated review of Trüstedt's work on the metamorphosed limestones of Hopunwaara, Finland. A reference to the paper by Johnston-Lavis and Gregory on 'The Eozoonal structures in the ejected blocks of Monte Somma' might well have found a place in this chapter. The explanation of the origin of the silicate minerals in metamorphosed limestones leads to a discussion of the diffusion of silicic acid in dolomite, and of the possibility of its being derived directly from intrusive granite. In this connexion the important paper by Hatch and Rastall on 'The dedolomitisation of the Port Shepstone marble' is quoted. The view that certain constituents can diffuse from an intrusive magma into a limestone is strongly supported by a paper, by Adams and Barlow, on 'The Geology of the Haliburton and Bancroft areas, Ontario', dealing with the origin of the 'ophicalcites' in that district.

The book closes with a glance at the wider problems of geology to which the principles of diffusion may be applied, and though he has touched only lightly on many problems, the author has shown that diffusion is a factor of great importance in geology and mineralogy, and one to which we can look for the explanation of many hitherto obscure phenomena.

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