

## REVIEWS.

*Economic Geology.* By HEINRICH RIES. Pp. xviii + 856, with 75 plates and 291 text-figures. Fourth edition. (New York: John Wiley and Sons, Inc.; London: Chapman & Hall, Ltd. 1916. Price \$4.00 = 17s. net.)

The first, second, and third editions of this book appeared under the title 'Economic Geology of the United States' and were published (in 1905, 1907, and 1910 respectively) by the Macmillan Company of New York. The fact that it has already reached a fourth edition alone proves its value; and as a matter of fact it is full of useful and concise information concerning mineral deposits of all kinds. Although in this edition the book has been considerably enlarged, yet it still deals primarily with the mineral resources of the United States. Canadian deposits are now, however, treated at some length, but those of other parts of the world are briefly mentioned in a very scrappy and insufficient manner. Again, the bibliographical references, while very full for the United States and giving just a few for Canadian occurrences, omit entirely those of other parts of the world. We therefore think that the old title of the book is more descriptive of its contents than is the new title. Part I on 'nonmetallics' covers a wide range: coal, petroleum, gas, building stones, clay, limes and cement, salines, fertilizers, abrasives, precious stones, underground waters, &c.; while Part II on ore-deposits treats of the metallic ores.

The illustrations are numerous and excellent, but they are numbered in rather a curious manner. The 'plates' are on the numbered pages with the text printed on the back, and the figures they carry do not differ in character from the consecutively numbered series of text-figures. In all there are 417 figures. The book is very clearly printed and is well bound. For its size, it is extraordinarily heavy, weighing only an ounce short of four pounds. It, in fact, affords an excellent example of a paper heavily loaded with mineral matter; but, although the economic uses of the various minerals are stated, we find in the very full index no reference to the mineral loading of paper; nor does the name 'agalite' appear, although this material is much used in American book-papers.

*The Banket. A study of the auriferous conglomerates of the Witwatersrand and the associated rocks.* By ROBERT B. YOUNG. Pp. xv + 125, with 28 plates and 1 text-figure. (London: Gurney & Jackson. 1917. Price 8s. 6d. net.)

This book is based on the several papers dealing with the Rand banket which have been published by the author during the past ten years. The work of other authors is, however, also freely quoted and many references to the literature are given, but the addition of a systematic bibliography would have been useful. A detailed description illustrated by numerous good figures is given of the characters and mode of occurrence of the rock, and of the original and secondary minerals of which it is composed. Amongst the original minerals, the presence of diamond, iridosmine, and platinum is of interest. The diamonds are invariably green in colour. Only one has been actually found in the matrix, but many small stones have been found in the black sands from the battery stamps. The largest on record is one of eight carats. Amongst the secondary minerals, small crystals of anatase rich in faces are recorded.

The origin of the relatively small amount of gold (averaging  $6\frac{1}{2}$  dwts. per ton, and rarely visible as small, hackly grains) has been the subject of much controversy. Whilst the author at first favoured the infiltration theory, he now accepts the placer theory. With the latter theory it is necessary to assume that the whole of the original gold has been dissolved and re-deposited in place; but seeing that the rock has undergone profound metasomatic changes (e.g. the replacement of quartz pebbles by pyrites) this is quite admissible. The history of the rock is traced out somewhat as follows. The conglomerate was of marine origin and composed largely of pebbles of vein-quartz, together with some heavy minerals (iron-ores, gold, &c.), derived from the metamorphic rocks of the Swaziland System. It was cemented by quartz, folded, faulted, and intruded by igneous masses. The complex mineral changes which it has undergone include: (1) Solution and re-precipitation of the gold. (2) Conversion of the iron-ores (magnetite and ilmenite) into pyrites and rutile by the action of sulphuretted waters. (3) Subsequent solution and re-precipitation of a portion of this secondary pyrites. (4) Formation of chloritoid, sericite, and chlorite at the expense of argillaceous and felspathic material. (5) Introduction of some metallic sulphides, chlorite, sericite, calcite, and carbonaceous matter (small nodular grains of 'carbon') derived from the later igneous intrusions.

*A Study of the Magmatic Sulfid Ores.* By C. F. TOLMAN and AUSTIN F. ROGERS. Pp. 76, with 20 plates and 7 text-figures. (Leland Stanford Junior University Publications, University Series. 1916. Price \$1.00.)

In this essay two general classes of magmatic sulphide ores are considered, namely: (a) nickel- and copper-bearing pyrrhotite deposits (e. g. those of Sudbury in Canada, and of Norway), and (b) chalcopyrite-bornite deposits (e. g. those of Ookiep in Namaqualand, and of Plumas Co., California). Both of these types are associated with dykes and sills of basic igneous rocks, such as norite, gabbro, and peridotite. A general discussion of the origin of these ores is followed by the results of microscopical examination of thin sections and of polished opaque sections of specimens from several typical localities. The sulphides have been introduced by the aid of mineralizers at a late stage in the sequence of magmatic events, being later than the silicates, which they partly replace.

*The Magic of Jewels and Charms.* By GEORGE FREDERICK KUNZ. Pp. xv + 422, with 56 plates and 29 text-figures. (Philadelphia and London: J. B. Lippincott Co. 1915. Price \$6.00 net.)

This is a companion volume to Dr. Kunz's 'Curious Lore of Precious Stones' (1913; reviewed in this Magazine, vol. xvii. p. 125), and is got up and illustrated in the same elegant style. The fact that he has been able to follow so soon with a second volume (which, however, does not treat of gems alone) on much the same lines as the first, speaks much for his stores of miscellaneous information. The following selection of the chapter headings will indicate the scope of the book, which is full of quaint and interesting reading: magic stones and electric gems; meteorites or celestial stones (pp. 72-117); stones of healing; virtues of fabulous stones, concretions, and fossils; snake-stones and bezoars; religious use of various stones; amulets; facts and fancies about precious stones.

*The Prodrromus of Nicolaus Steno's Dissertation concerning a solid body enclosed by process of Nature within a solid.* An English version with an introduction and explanatory notes by JOHN GARRETT WINTER, with a foreword by William H. Hobbs. University of Michigan Studies, Humanistic series, vol. xi, part II, 165-288, with 7 plates. 1916. (New York: The Macmillan Company. Price \$1.30 net.)

Steno's Prodrromus, or preliminary to a larger treatise (which was never

completed), first appeared in Latin at Florence in 1669. There have been several reprints, and an English translation was published in 1671. A new English edition of this historical work is therefore welcome. The translator has evidently taken a great interest in the work, and has added much to its value by the numerous critical and explanatory notes. The usefulness of the volume is also increased by the addition of an excellent biography of the author, a complete bibliography, and a full index. The illustrations include two portraits of the author, and reproductions of the original title-page, first page of the original text, and of Steno's figures. The thirteen figures of vertical and horizontal sections of 'the angular bodies of crystal' [i. e. crystals of quartz] illustrate clearly Steno's important law of the constancy of the interfacial angles of crystals and his views as to the growth of crystals.

*Os Satélites do Diamante.* By EUGENIO HUSSAK. Pp. 56, with 3 maps (Rio de Janeiro: Serviço Geológico e Mineralógico do Brazil. 1917.)

The manuscript notes on the minerals associated with the diamond in Brazil, which were left by Dr. E. Hussak at the time of his death in 1911 (*Min. Mag.*, vol. xvi, p. 247), have been translated and edited by his colleague, Jorge B. de Araujo Ferraz of the Brazilian Survey. Particulars are given respecting 56 mineral species, many of which were discovered by Hussak, and some described by him as new species. A summary of results and a bibliography are appended. It would have been fitting to include in this volume a good biographical notice of the author.

*Bibliography of Yorkshire Geology.* By T. SHEPPARD. Pp. xxxvi + 629. (London, Hull, and York: A. Brown & Sons, Ltd. 1915. Price 15s.)

This is issued as vol. xviii of the Proceedings of the Yorkshire Geological Society, and forms the C. Fox-Strangways' Memorial volume. It is based on an uncompleted manuscript covering the years 1534-1892, left by the late C. Fox-Strangways; this has been added to and brought up to the year 1914. The titles of books, papers, and notes, with the references, are arranged chronologically under date of publication, and under each year alphabetically according to authors. There are, for example, 124 entries for the year 1913, and 169 for 1914. At the end of the volume is a long index of authors and subjects. A list (20 pp.) is given of the scientific periodicals that have been indexed, and there is also a complete list of the Geological Survey maps and sections relating to the county. The work appears to have been done very thoroughly; but some of the entries are quite trivial, for which, however, the compiler offers an apology.

*Bibliography of Australian Mineralogy.* By C. ANDERSON. Pp. 164.  
Mineral Resources, No. 22, Geological Survey, New South Wales.  
(Sydney, 1916. Price 2s. 6d.)

The titles of about one thousand papers are listed under the names of authors and numbered consecutively. Whilst a large part of them occur in Australian scientific journals and mining reports, still there are not a few to be found in foreign journals. Only original matter of scientific value has been included, and the author has laboriously referred to all the original sources whenever possible. For each of the seven States of the Commonwealth there is given a separate subject index of mineral names and a locality index, reference being made to the numbered entries in the list of titles. This plan is no doubt the more convenient for local use, but for the general worker it would have been more convenient to have one subject index rather than seven (or indeed eight, there being an extra one for Australia generally). The work has occupied the author during his spare time for the last ten years, and he has been at especial pains to localize carefully each occurrence.

*Microscopic Determination of Opaque Minerals, an aid to the study of ores.* By JOSEPH MURDOCH. Pp. vii+105, with 1 coloured plate and 9 text-figures. (New York: John Wiley & Sons, Inc.; London: Chapman & Hall, Ltd. 1916. Price 9s. 6d.)

The metallographic method of examining polished and treated sections by reflected light under the microscope appears to have been first seriously considered for opaque minerals by the American metallurgist William Campbell in 1906. Since then a considerable amount of work in this direction has been done in connexion with the ore-deposits of the United States; and the subject, for which the name 'mineralography' is proposed, is likely to grow in importance. So far, however, there has been no systematic determination of the characters and reactions under these conditions of the several mineral species. This task the author set himself in 1911, and he has examined every available species or supposed species (many of which prove to be mixtures) in American collections amongst the sulphide and sulpho-salt groups, including selenides, tellurides, and arsenides. The book gives an interesting historical review, a bibliography, and an account of the technique of the method. But, unfortunately, instead of recording his observations in a systematic manner, the author has thrown them into the form of determinative tables. The system of tabs to the right and tabs to the left and of pages partly cut away is certainly ingenious, but irritating

to anybody wishing to learn something of the method and not actually having in hand a specimen for identification. Again, there is a very unnecessary system of abbreviations, in spite of the fact that several pages are almost blank and many lines of only part length. Although the book will be of considerable, if only passing, value, it seems a pity that the author should have missed an opportunity of producing one which would remain a standard textbook on the subject. The few text-figures illustrating the apparatus needed for the method are good, and the one plate of sections is excellent; but several more pictures of sections would have been an advantage.

*A Pocket Handbook of Minerals designed for use in the field or class-room, with little reference to chemical tests.* By G. MONTAGUE BUTLER. Pp. ix + 311, with 89 text-figures and 5 tables. Second edition. (New York: John Wiley & Sons; London: Chapman & Hall, Ltd. Not dated. Price 11s. 6d.)

The first edition of this handy little pocket-book was published in 1908, and the present edition presumably appeared in 1911 (to judge from the statement that the book was copyrighted by the author in 1908 and 1911). It gives a synopsis of the prominent and essential characters of the more important mineral species, such as will be useful to students and amateurs. Space is left on each page for the addition of notes. In this edition, with an increase in size of thirteen pages, specific gravity values are quoted, and a few additional species are included. An appendix of miscellaneous information includes a glossary, prices of metals, minerals, and cut gems, &c. The book is clearly printed on thin paper and is elegantly bound in leather with gilt edges, but the price is rather prohibitive.

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