

BOOK REVIEWS

PETROGRAPHIC MINERALOGY, by ERNEST E. WAHLSTROM. Pages vi+408, 1955. John Wiley & Sons, Inc., New York. Price \$7.75.

The purpose of this attractive booklet is according to its author to bridge the gap between the books that deal with the determinative procedures of petrography and those dealing with the description and classification of rocks. There is therefore given in this one volume a comprehensive review of techniques, descriptions of minerals, determinative tables, and summaries of classifications of rocks—igneous, sedimentary, and metamorphic. It gives universal stage and petrofabric techniques. Despite the inclusion of this advanced matter, the book has been designed for a one semester course for beginners and for geologists and mineralogists who desire to brush up on what they have forgotten about petrography and petrology.

Chapter 6 of 111 pages gives the properties, both megascopic and microscopic, of the rock-making silicates. It is not clear why the "Physical properties in hand specimens" is sandwiched in between "Crossed polarizing prisms" and "Interference figure," as on p. 186 and elsewhere. The minerals described include such difficultly identifiable minerals as merwinite, mullite, humite, and others, but the descriptions are far too condensed to be helpful. Beginners would appreciate more information on the points of dissimilarity between minerals that resemble one another more or less. It is a cause for astonishment to me, even after thirty years' teaching experience, how many minerals "look alike" to beginning students in microscopical petrography and even to students not so near beginning.

It may be suggested that the "Tables for Mineral Identification," comprising Chapter 8, pp. 235-283, could helpfully be improved by adding a column giving the sign of elongation of the principal section of the minerals. It is a valuable diagnostic property which is easily learned by beginners.

Some of the slips that apparently are inevitable in all first editions appear at various places. Pyroclastic rocks are considered to be igneous rocks on p. 304 but on pp. 355-357 they are described as sedimentary rocks. Although the author believes that the best scheme to follow in megascopically classifying rocks is that proposed by Cross, Iddings, Pirsson, and Washington in 1903, nevertheless he greatly changes the meaning of one of their principal terms "phanerite" by redefining it as a rock "sufficiently coarse-grained to permit at least half of the mineral components to be seen with the unaided eye."

Under "lamprophyres" are brought up from the vasty deeps of petrology into the twilight a large number of highly specialized rock names. Kamperite from Broegger (1921) is one, but the essence of Broegger's definition is not given. No beginning student nor geologists or mineralogists "who occasionally need instruction or refreshment in systematic petrography" for whom the book is confessedly written could be trusted to apply any of these terms correctly without adequate development of the underlying principles. The classification of the lamprophyres is reminiscent of the early editions of Rosenbusch, the founder of the lamprophyre concept, but in his later editions Rosenbusch greatly improved on the earlier versions.

Many fine and effective illustrations adorn the book. Another notable feature is that each chapter closes with a valuable list of selected references, wholly up-to-date, and which should be of much service to those instructors who shall attempt to put across in one semester the large amount of material compressed into this volume.

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SOUTHERN AFRICA, A GEOGRAPHICAL STUDY: Volume I, Physical Geography, by JOHN H. WELLINGTON. New York: Cambridge University Press, 1955. xxiv+528 pages, 50 plates, 4 colored maps in pocket. Price, \$12.50.

Volume II of this work appeared before Volume I and in its review (*Am. Mineral.*, 40, p. 1150, 1955) the areal coverage and scope are indicated. Volume I is divided into three parts: (1) Structure and Surface, 190 pages; (2) Climate, Vegetation and Soils, 148 pages; and (3) Hydrography, 170 pages. Much of the information is generalized on four large colored maps. These are on a scale of approximately one to four and a half million and show (1) Geological Outlines, (2) Altitudinal Zones, (3) Mean Annual Rainfall, and (4) Vegetation.

The geology of the region is treated very sketchily in Chapter 1 of Part I (24 pages). Three chapters (91 pages) are devoted to the physiographic regions; one chapter (28 pages), to the seas; and one chapter (48 pages), to the coasts. This is perhaps a logical proportion for a geographical study, but gives only the barest outline of the geology. However, there are 44 references to more detailed and comprehensive articles on various aspects of the geology so that the interested reader who has access to a good library can fill in needed details.

The two volumes constitute a delineation of the more important geographical aspects of the subcontinent as described in publications up to the mid-century, together with many hitherto unpublished facts gathered by the author in 34 years of field work.

The work is well bound, very attractively illustrated and withal is an important contribution to the literature on Southern Africa.

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QUANTITATIVE SPECTROCHEMICAL ANALYSIS OF SILICATES, by L. H. AHRENS. Addison-Wesley, Cambridge, Mass., 1955, 122 pages, 30 figures, 7 plates. Price, \$3.75.

This monograph is primarily a compilation and unified discussion of a number of analytical methods published by Ahrens and his coworkers in several journals during the past five years. A scheme for determining the major and minor elements of silicate rocks and minerals is presented in nine chapters entitled: Introduction, Miscellany, Standards, Log-normal distribution of spectrochemical error, Alkali metals, Volatile elements, In-volatile elements, Fluorine, and Common elements. No attempt is made to cover the literature except that dealing with the determination of the common elements.

Recommended values for the percentage composition of two rock samples, granite G-1 and diabase W-1, are given in chapter 3, and a method of using these samples as spectrographic standards is described. For the minor elements of these samples, the term "tentative values" rather than "recommended values" would have more strongly reminded the reader that the values are based on limited data and that much more research is needed before these samples can be considered in the same category as the standard materials issued by the National Bureau of Standards.

Chapter 5, dealing with the determination of alkali metals, is by far the longest (27 pp.) and contains much useful data. The treatment of the other elements is less detailed.

The book conveniently summarizes the experience of Ahrens and his colleagues during a fruitful five-year period at the Cabot Spectrographic Laboratory of M.I.T. and is a valuable addition to the specialized literature of the field.

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RÖNTGENSTRUKTURANALYSE VON KRISTALLEN, EINE ELEMENTARE EINFÜHRUNG, by RUDOLF KOHLHAAS AND HELMUT OTTO. Berlin, Akademie-Verlag, 1955, ii+212 pp., 163 figs., 21 tables, 17×24 cm. Price 23 DM.

According to the authors of this book, there exists today in Germany no traditional school of crystal structure analysis despite much good work done there in this field. They feel that this is due partly to the lack of introductory textbooks (in German) suitable for the use of students of chemistry, mineralogy, geology, and petrography. It was to help fill this gap that the present book was written. Because of the type of reader for whom the book is intended, the scope of the material covered is restricted, and in particular, the use of specialized mathematics avoided. A good idea of the contents of the book is gained from the chapter headings which are (in English translation):

- I. Fundamentals of Crystallography (62 pp.)
- II. Production and Properties of *X*-Rays (12 pp.)
- III. The Determination of the Elementary Cell (16 pp.)
- IV. Indexing, Aids and Procedures (47 pp.)
- V. Determination of the Symmetry of the Elementary Cell by *X*-Rays (5 pp.)
- VI. The Content of the Elementary Cell (60 pp.)
- VII. The Powder Method of Debye-Scherrer-Hull (7 pp.)

The plan of the book, and the level of presentation are somewhat like those used in C. W. Bunn's "Chemical Crystallography" (Oxford University Press, 1946), although the present volume is much less comprehensive. In general, statements of principles are made clearly and simply but without derivation from more elementary ideas. For example, the fact that crystals can have only (1-), 2-, 3-, 4- and 6-fold rotation axes of symmetry is stated without the proof that this follows from the existence of the lattice. This method of presentation is, of course, entirely appropriate to the present volume.

Fourier methods of crystal structure analysis and analytical applications of the *x*-ray powder method are not treated. However, a list of reference books covering these and other topics is given.

There are some aspects of the presentation with which one might differ. For example, one finds again the use of the idea of the "interpenetrating lattice," a concept apparently dear to the hearts of German crystallographers. This is an obsolete and unnecessary device and should be discarded. The Schiebold-Sauter method of photographing the reciprocal lattice is treated at some length, whereas the related but much more satisfactory Buerger precession method is given only two short paragraphs; moreover, the latter method is wrongly grouped with the Laue method. There are a few minor errors scattered throughout the book.

Despite the criticisms made above, it is clear that the authors have done an excellent job in fulfilling their stated purpose. The treatment, in general, is lucid and sufficiently comprehensive. The book contains a large number of very good illustrations of the type so necessary to this kind of subject. Numerical examples of problems are given where appropriate, and there are many tables and charts. As is usual with them, the publishers have done an excellent piece of work on the physical makeup of the book.

The book can be recommended for those students seeking a good, elementary approach to the procedures of crystal structure analysis, written in German. For English-speaking students the excellent book of Bunn (mentioned above) is available.

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