BOOK REVIEWS

THE STUDY OF ROCKS IN THIN SECTION, by W. W. MOORHOUSE. 514+xvii pages, 226 figures, 18 plates, 2 color plates. Harper and Brothers, New York, 1959. $8.00.

This is a notable and laudable effort by Professor Moorhouse of the University of Toronto to develop under one cover " . . . an adequate synopsis of the almost encyclopedic petrographic information presently available," The book may be considered as consisting of seven major parts. Following an introduction, Chapter 2 presents a summary of the methods of optical mineralogy. Chapter 3, 83 pages, is devoted to descriptions of individual minerals. Chapter 4 is made up of mineral identification tables. The petrography of igneous rocks is described in Chapters 5–17, by far the longest section of the book, (183 pages). The petrography of sedimentary rocks, 66 pages, is dealt with in Chapters 18–24. Metamorphic rocks are described in the 71 pages of Chapters 25–28. The last two chapters deal with the mineralogy of metasomatic rocks and ores.

The initial section dealing with the techniques of optical mineralogy, is, according to the preface, " . . . not intended as a substitute for the standard texts and references on this subject. Its object is to present as briefly and simply as possible the optical tests most frequently used in thin-section mineralogy." Certainly this section is inadequate for teaching purposes, and it might be questioned whether it would not have been better either to omit this part of the book entirely or to reduce it even further to a series of tables in which the arrangement of the optical tests might be more systematic and more readily accessible. This section concludes with a brief statement on the orientation procedure with the universal stage, yet the book contains no subsequent reference to the application of universal stage determinative methods. In this section there also appear the two colored plates, some figures of which seem to be of dubious value. For instance, Figure 5, which is a kyanite fragment under crossed nicols, states no thickness; the same is true for Figures 7 and 8. Figure 6, used to illustrate pleochroism, shows a mineral with a red color in one position and a blue color at right angles; the mineral is not identified. Similarly, Figures 17 and 18 seem to have little real application to the text.

The reviewer is puzzled as to the arrangement of species in the second section (Chapter 3). Here are described 149 minerals or varieties. The silicates are listed first, followed by the minerals of the various other groups. There is no attempt to arrange them in terms of optical complexity, a pattern which the beginning student often finds highly useful. Some of the species are in part inadequately described. For example, there is no mention of water in the composition of opal and its effect upon the refractive index, and certainly to say that the "optical character (of chalcedony) is unknown" is not in accord with data that have been available for some time. In addition, in the SiO_2 group, it should be pointed out that most natural tridynite and cristobalite are not pure SiO_2. The descriptions of the soda amphiboles seem to the reviewer to be inadequate. Furthermore, new data on cordierite and its polymorphism are not included. The formula of antigorite is given as $H_2Mg_3Si_2O_9$ whereas that of chrystotile is given as $H_4Mg_3Si_2O_9$. Dahllite and collophane are recorded as separate species, and their relationship to apatite is nowhere indicated. This section includes the 18 black and white plates, which are chiefly photomicrographs of minerals in thin section. These are clustered together between pages 44 and 45 , and it seems unfortunate that printing arrangements could not have been made so that pictures of the individual species appear with their descriptions.

The mineral identification tables, 13 in number, are likewise hidden in the front half of the book and thus difficult to use readily.

The section on igneous rocks, which is by far the best feature, is organized as follows: After a general chapter on igneous petrography, the author discusses volcanic and hypabyssal rocks, beginning with basalts and progressing to rhyolites, thence to trachytes and

phonolites. This is followed by a discussion of tuffs and pyroclastics. Next come the plutonic rocks, first the gabbros, then the alkali gabbros, and subsequently granodiorite, granite, followed by diorites, monzonites and syenites. Lastly are described the nepheline syenites, ultrabasic rocks and lamprophyres. Such an arrangement has two fundamental drawbacks: First, it results in a great deal of repetition in the discussion of compositionally allied rocks, some of which are extrusive and others of which are intrusive, and more important, it fails to indicate to the student affinities in composition, mineralogy, or occurrence.

Table 16, which is intended as a field classification of rocks, includes such varieties as quartz gabbro and quartz diabase, which are distinguishable megascopically only exceptionally. Table 17 uses "hybrid" apparently as an equivalent for "mela." The igneous rock classification presented by Moorhouse bases its initial subdivision on the presence or absence of olivine, which gives rise to numerous pigeonholes in which no common rocks are represented.

In general, discussions of the individual rock groups are excellent and complete. A particularly fine feature of the book, and a novel one, is that the alterations of the various rocks are discussed individually.

Readers might question the definition of an intersertal texture as being diabasic or ophitic and the inclusion of sanidinites as igneous rocks. Moorehouse further defends his ideas on the late paragenetic position of the common igneous accessory minerals; yet recent work by the U. S. Geological Survey (Bull. 1097-A, p. 26, 1959) has indicated that zircon may continue crystallizing throughout the consolidation period of the rock.

In that part of the book dealing with sedimentary rocks, it might be noted that there are no clays described, nor is there any reference whatsoever to bauxite. The taconite illustrated on page 391 is very likely of metamorphic derivation. This section has no documentation, whereas in that dealing with the igneous rocks there are a few references.

The description of metamorphic rocks do not present the same order of coverage as for the igneous rocks. Rather than the rocks being treated as mineralogical groups or subdivided on the basis of the facies principle, the categories are Dynamic Metamorphism, Thermal Metamorphism, and Regional Metamorphism. This renders difficult mineralogical descriptions of the various diverse chemical groups under each of the types of metamorphism.

There are a number of misspellings, e.g., aegirine and merwinite, and some of the abbreviations for the various states are not standard.

In general, the illustrations are good to excellent, except for a few of the line drawings in the first part of the book, which give evidence of having been prepared in haste. (e.g. figures 3, 35, 37, and 50a.) The author states "In most of the drawings a standard pattern has been used for each mineral or mineral group, so that labeling of the individual diagrams is not necessary." In some instances this is satisfactory, but in many of the drawings it is not, and species identification becomes difficult, particularly inasmuch as the drawings may not adequately emphasize differences in relief.

Apparently the book has been designed primarily for a year's course in petrography for students who previously have been exposed to some optical crystallography. If this is not the case, then certainly the section on optical mineralogical principles is inadequate. Professor Moorhouse has done a remarkable job in attempting to reduce such a large volume of material to a useful compilation in a highly usable form. It must certainly be concluded that his efforts to provide in a single book a combination of a short review of optical mineralogy, descriptions of rock-forming minerals, together with descriptions of the common rock types, have been in the main successful.

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THE LOVOZERO ALKALINE MASSIF (ROCKS, PEGMATITES, MINERALOGY, GEOCHEMISTRY, AND GENESIS), by K. A. VLASOV, M. V. KUZ'MENKO, AND E. M. ES'KOVA, Akad. Nauk. S.S.S.R., Inst. mineralog., geokhim., i kristallokhim. redikikh elementor, 1959, 623 p. (in Russian). Izdatelstvo Akad. Nauk. S.S.S.R., Moscow, $11.50.

The Kola Peninsula has been famous for many years as a storehouse of new and rare minerals. The new volume is a comprehensive monograph on one of the famous massifs, of a size (623 pages, 201 tables, and 257 figures) that makes a detailed review impossible. The scope may be judged from an outline of the contents.

The rocks of the area are described thoroughly, with petrographic data and many chemical analyses. The earliest rocks of the massif are nepheline syenites, foyaites, and aegirine-bearing nepheline syenites; next came a complex of urtites, foyaites, and aegirine lujavrites, then a complex of eudialyte lujavrites and poikilitic sodalite syenites, and finally dikes of monchiquite, tinguaite, and similar rocks.

The section on mineralogy describes about 120 minerals. Emphasis is on paragenesis and mineral associations, but complete descriptions are given, including many previously unpublished analyses. The final section on geochemistry and genesis is very thorough and includes considerable unpublished data.

The book is nicely printed and the illustrations are excellent, but there is no index. It will be indispensable to anyone interested in alkalic rocks; for mineralogists trying to learn Russian, this is a good choice for practice and vocabulary.

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