BOOK REVIEW

INTRODUCTION TO THE STUDY OF MINERALS, by AUSTIN FLINT ROGERS. Third edition, xviii+626 pages, 6 by 9 inches, 729 figures, 1 plate. Price $5.00. McGraw-Hill Book Co., **1937.**

This new edition of the well known Stanford text appears in an enlarged, modernized format, almost disguising the familiar "pocket manual" of 1912 and 1921. The substance has been improved no less than the outward appearance.

About equal importance is given to morphological, physical and chemical properties, which are taken up in that order. The crystallography is exceptionally good in view of the limited space available and despite the fact that few proofs can be given in an introductory book of this sort. The treatment is based on one-circle goniometry. All 32 crystal classes are discussed, with special stress on the 11 mineralogically important ones. The difficult alternating symmetry is not skipped, but explained; the axes of composite symmetry of even period are preferred ($\mathcal{A}P_4$, $\mathcal{A}P_6$, CA_6). The author points out the advantage of the center of symmetry over a 2-fold rotoflection axis undefined in direction. The plane of symmetry is, of course, preferred to the 2-fold rotoversion axis. The baffling relation between crystal symmetry and crystal malformation is clearly shown. The linear projection is revived to bring out zonal relations, a problem for which it is particularly adequate. Professor Rogers' recognition of 4 types of zones and integrity of zone character (independent of temperature) leads to a re-definition of the 6 crystal systems that leaves nothing to be desired.

The stereographic projection is introduced. For illustration purposes the stereographic pole is replaced by a small geometric figure (triangle, rectangle, etc.) aiming at picturing the projected face. This novelty is likely to be found of value in elementary teaching. Some purist might resent the liberty taken with the principle of the projection; his objection would be easily met if the actual pole were retained as a point inside the "face figure." The determination of axial elements and face symbols is very simply solved by descriptive geometry (plan and elevations), with the *Addition and Subtraction Rule* as a valuable auxiliary. Clinographic drawing is based on the "axial cross" procedure, which is somewhat cumbersome but certainly illuminates the Millerian notation for the bewildered student. Overloading of the nomenclature of merosymmetric forms has been carefully avoided; teachers will appreciate this. In the 5 classes of the rhombohedral subsystem, the 3-index notation is recommended when the space lattice is rhombohedral. The recently discovered systematic "morphological extinctions," due to space group symmetry, make this desiratum less imperative now, since the rhombohedral lattice can be considered a centered mode of the hexagonal, thus fitting perfectly with the division into 6 crystal systems.

The terminology of the crystal classes is that of the general forms (Groth); this is sufficient justification for considering the dome and the sphenoid two distinct forms. Although the definition of the twin axis only mentions the 180°-rotation, and includes the statement that a twin axis is never an even-fold symmetry axis, the possibility of twinning by other than 180° rotations is implied in the "iron cross" law, given as twin axis [001]. This seems worthy of mention because so few authors recognize this important fact about twinning. Stress is laid on the centrosymmetric character of cleavage, discussed in the crystallographic section as indeed it should be, since it is one of the 5 discontinuous vectorial properties typical of crystalline matter. The chapter on crystal structure has been enlarged, but not beyond the bounds imposed by the scope of the book. The author contrasts the 7 primary lattices with the 6 crystal systems. Among points of interest seldom found in text books is Friedel's *Law of rational symmetric intercepts:* a crystal polyhedron

may have an irrational 3-fold axis of symmetry and still obey Haüy's Law of rationality of indices (proof given); irrational 3-fold axes, on the other hand, cannot exist in space lattices; Friedel's law of observation (1905) that crystals have no irrational 3-fold axes left only the lattice hypothesis open.

The treatment of crystal optics remains essentially the same, with several additions and with increased emphasis on the index ellipsoid as the only optical surface necessary for pedagogic purposes. In the chemical part, a well illustrated 17-page section on microchemistry (by Lloyd W. Staples) is a good addition. In the descriptive mineralogy the recommendations of the British-American committee on nomenclature are followed. The number of species has been increased by 47, bringing the total to 222 minerals and mineraloids. Of these, about 60 are distinguished by larger type. By indicating the crystal system (or class) and the chemical formula (in bold face), next to the mineral name in the heading, a decided improvement is effected. The alteration of minerals is also given more importance. The German and French synonyms, given for each mineral name, may be found useful, especially the German ones for sulfides and sulfo-salts! As a finishing touch to each mineral description, a short historical sketch is given with the derivation of the name. The species are listed according to the usual chemical classification. The silicates come last, a scheme, long advocated by Professor Rogers, which will be adopted in the 7th edition of Dana's System.

The part dealing with occurrence and genesis is a lucid presentation of the geological rôle of minerals. The last chapter, on mineral identification, includes determinative tables well designed to develop the difficult art of sight recognition. A reference list of minerals and a carefully prepared index and glossary are appended.

Except for a moderate number of misprints, the material presentation of the book measures up to the best standards.

J. D. H. DONNAY.

PROCEEDINGS OF SOCIETIES

ANNUAL MEETING OF THE MINERALOGICAL SOCIETY OF SOUTHERN CALIFORNIA

Edwin V. Van Amringe, instructor in geology at Pasadena Junior College, was unanimously re-elected president of the Mineralogical Society of Southern California at the annual meeting held on the evening of June 12th. Other officers elected were: Franklin G. McIntosh of Beverly Hills, vice-president; Herman Abraham of Pasadena, secretary; and Kenneth N. Reed of Pasadena, treasurer. The new board of directors will consist of Earl L. Calvert, San Gabriel; Ernest W. Chapman, South Pasadena; Heber H. Clewett, San Dimas; Morris R. Ebersole, Hollywood; John M. Grieger, Pasadena; John A. Renshaw, Arcadia; and David B. Scott, Altadena. The business meeting was preceded by a banquet for 120, and a concert. A large variety of beautiful minerals and gems were exhibited by the members.

EXTRACTS FROM THE ANNUAL REPORT OF THE PRESIDENT OF THE MINERALOGICAL SOCIETY OF SOUTHERN CALIFORNIA

On this, the sixth anniversary of our Society, I take pleasure in reviewing a little of the history of its founding and development. It was in the spring of 1931 that John Renshaw sent out about sixty-five announcements of an organization meeting. On the evening of June 23rd, forty people were gathered in the lecture room of the Pasadena Public Library, and I had the pleasure of addressing them on "Mineral Collecting as a Hobby." The