

LEVINSON (A. A.) and TAYLOR (S. R.). *Moon rocks and minerals*. New York (Pergamon Press), 1971. xiv+222 pp., 110 figs., 8 colour pls., Price U.S. \$11.50.

This readable book gives a comprehensive account of the investigation of Apollo 11 samples and of the preliminary investigation of Apollo 12 samples, with interpretation of the results. It provides less background information than Mason and Melson's recent work [M.M. 38-386], but its treatment is more detailed and more comprehensive.

After a brief introduction, the lunar investigation is described under the following headings: The rocks and soils; the minerals; chemistry of samples brought back by Apollo 11 and 12; bioscience and organic matter; petrology [i.e. experimental]; age of the lunar rocks, isotope studies, cosmic ray and solar wind effects; and physical properties. There follows a short discussion on the origin of the Moon. Included is a glossary of scientific terms, but the book lacks a bibliography, although it is stated that most of the data are taken from the Proceedings of the Apollo 11 Lunar Science Conference (Pergamon Press, 1970).

The book is written 'for the layman', but I feel that more advanced students and scientists will benefit more from it, since the subject matter is diverse and the glossary is not comprehensive. I enjoyed reading this work and found it an easy way of catching up on the lunar researches.

R. HUTCHISON

GARD (J. A.), Editor. *The Electron-optical Investigation of Clays*. London (Mineralogical Society), 1971. ix+383 pp., 244 figs. Price £12.50 (£10.00 to members).

This book, which covers electron microscopy and electron diffraction (scanning electron microscopes and electron micro-analysers are not considered), is the latest of a series of monographs published by the Mineralogical Society on methods of studying clays (details of authors and titles of chapters are given in M.A. 72-65).

The book is the first comprehensive account in English of the use of electron-optical methods for the study of minerals. That it is largely devoted to clays is appropriate, for this group of minerals, because of their small particle size, are not amenable to morphological examination by other techniques. There are already several publications containing excellent electron micrographs of clays and these have encouraged the erroneous belief that clay minerals may be identified by electron microscopy alone. The volume under review, with its emphasis on electron microscopy and electron diffraction used in conjunction, shows that not only can small particles be unequivocally identified but also that relationships between external crystal shape and internal crystal structure can be ascertained for sub-micron sized particles. It not only discusses what has been done but about a quarter of the book comprises a manual of underlying theory and practical advice.

Although mainly concerned with electron micrographs and electron diffraction patterns, many other electron-optical effects such as lattice images, Kikuchi line patterns, imaging of dislocations, oblique texture patterns, and moiré patterns are considered. In the chapters on different minerals the various aspects of their morphology and salient features revealed by electron optical methods are illustrated and discussed. For example, Mering and Oberlin show that selected area diffraction can

determine the symmetry of the individual layers of some smectites and that the same technique shows that turbostratic disorder in smectites arises from rotation of layers around an axis normal to the layer rather than from random lateral displacements of successive layers. This information could not be obtained by X-ray diffraction or by any other method.

Naturally the book is not without faults. The subject index is inadequate, occupying less than one page and containing only 53 entries. The mineral index is also unhelpful being no more than a catalogue of the page numbers on which each mineral name is found. There is, for example, no reference to 'selected area diffraction' although the subject is mentioned briefly in Chapter 1, dealt with fully in Chapter 2 and examples of its application to individual minerals are found in almost every other chapter. Similarly, a reader wishing to find micrographs illustrating the morphology of a particular mineral would have to search through the appropriate chapter. In a book of this kind, likely to be used widely as a reference manual, a much more detailed index would have been invaluable.

Some misprints have also been noted. On page 337 $Pc2_1/n$ is printed instead of $Pc2_1n$ as a possible space group for $FeAlO_3$, on page 331 $P2/c$ appears instead of $P2_1/c$ as the space group for bayerite and on page 356 the caption to the rather lattice image of pyrophyllite gives 4.75 Å as the spacing of the fringes whereas the text and lettering on the figure both have 4.57 Å.

These omissions and errors however, do little to detract from the excellence of the book. It is clearly printed on high quality paper and copiously illustrated with about 350 half-tone figures of micrographs and diffraction patterns supplemented by about 60 line-drawings. The editor has clearly fulfilled his aim to explain the significance of electron micrographs and electron diffraction patterns of clays in terms of their crystal structures and properties. This book will be invaluable to those who use electron microscopes to study clays and could be consulted with advantage by mineralogists interested in clays or in the electron-optical examination of minerals.

G. BROWN

PHILLIPS (F. C.). *The use of stereographic projections in structural geology* (Third Edition). London (Edward Arnold), 1971. vi+90 pp., 91 figs. Price £2.20 (boards), £1.10 (paper).

In this third edition of what is in effect the only standard work on the use of stereographic projections, the author claims that his principal aim is to bring the work up to date. Some fifteen per cent of the extensive references are post-1960, the date of the second edition.

Although a description of the 'continuous dipmeter' has been added, the author has omitted some of the more important advances in stereographic usage such as a more accurate method of contouring as used by Flinn (*Journ. Geol.*, **66**, 526–59, 1958) and the plots of the intensities of light seen in conoscopic microscope images of Rath (*M.M.* **38**–535). This volume, however, at the modest price of £1.10 in paperback form, seems assured of a wide sale to students of structural geology. J. W. O.