

BOOK REVIEWS

Paterson (M. S.). *Experimental Rock Deformation—the Brittle Field* (Minerals and Rocks: vol. 13). Berlin, Heidelberg, and New York (Springer-Verlag), 1978. xii + 254 pp., 56 figs. Price DM 48 (\$24.00).

This is a monograph by one of the most distinguished authorities on this subject. It is an attempt to present the subject-matter in such a way that suitably advanced students will be able to understand the framework of the subject and to be able quickly to gain access to the literature. Because the work lists more than 2500 cited references, it will serve enduringly as a reference source for those actively engaged in research in rock deformation. Though the approach emphasizes the fundamental physical aspects of brittle behaviour of rocks, i.e. a 'materials science' approach, the book should prove invaluable particularly to those interested in engineering and Earth science applications.

Because it is basically a guided tour of the literature the text is essentially non-mathematical. The author has clearly considered that it is more important to set out concisely the conceptual framework of each aspect of theory and experimental data. No mathematical derivations of formulae are given at all.

The text is organized into seven main chapters. These deal first with experimental techniques and generalizations about the phenomenology of the brittle failure stress. Then follows a discussion of the problems of the approach to a theory of brittle failure. The bulk of this chapter is built around the attempts to set up physical models of the fracture process, based on the work of Griffith. The next chapters deal with friction and sliding phenomena. Then follows a review of the physical property changes that accompany loading towards failure, through the peak stress and into the post-failure regime. Dilatancy, acoustic emission, elastic wave velocity, and attenuation changes and transport property changes are dealt with here. The concluding chapter considers the transition from brittle to ductile behaviour, which tends to occur with increasing confining pressure and temperature.

There is an appendix, which aims to introduce the basic ideas of the 'fracture mechanics' approach used in engineering. In view of its growing importance in rock mechanics, I was surprised that it was relegated to the status of an appendix. Furthermore, little attention was given in this section to the phenomenon of slow crack growth

and atomistic aspects of fracture. However, it is difficult to be critical of a work that sets out to present an author's personal overview of a large and growing subject area. Different readers will inevitably feel that the coverage is patchy in some areas.

There can be no doubt that this book will be widely welcomed as a valuable and unique contribution to an interdiscipline between materials science, engineering rock mechanics, structural geology, and geophysics.

E. H. RUTTER

Peters (W. C.). *Mining and Exploration Geology*. Chichester and New York (John Wiley and Sons, Ltd.), 1978. xxiv + 696 pp., 218 figs. Price £15.00.

Developments in exploration techniques and mining methods since publication of H. E. McKinstry's classic textbook *Mining Geology* (1948) have created the need for a new book on geological practice, for students reading courses in applied geology, and as a reference book for mining company and survey geologists. Professor Peters has gone some way towards fulfilling the requirement with this book, which is intended 'to furnish an overall view of the geologist's work in mineral discovery and mining'.

The text is divided into five parts: geological principles; engineering factors; economic framework of mining and exploration; data gathering, processing, and presentation; and the geologist's role in exploration and mining. A series of eight appendices have been added for reference. These include symbols and abbreviations for field and mine notes, geological time terms, and a summary of the international (SI) system of units. Other appendices include notes on environmental aspects of mineral exploration, information sources, and a general format for reports on mineral property evaluation (with particular reference to the United States).

The book is useful as a background text for senior undergraduates and M.Sc students interested in mining and prospecting. It is also suitable for young geologists in the early stages of a career in the mining industry. No book can be a substitute for experience but this one provides an introduction to many subjects about which the geological student will hear nothing at university. The variety of subject-matter, reflected by chapter headings related to geotechnics, mineral economics, geological mapping techniques (surface