

the general public of real news about the progress and discoveries of lunar science, will recognize in this book the hallmarks of a true classic to be shared by every person who followed the prologue and is curious about the epilogue. G. M. BROWN

SHUEY (R. T.). *Semiconducting ore minerals* (Developments in Economic Geology, Vol. 4). Amsterdam and New York (Elsevier Sci. Publ. Co.), 1975. 415 pp., 55 figs. Price Dfl. 55.00 (\$22.95).

The book is basically divided into two parts: the first deals with the principles of semi-conduction of materials and the second gives a progressive series of ore mineral information; this latter section deals with the ore minerals in the logical sequence: Elements, Sulphides, and Oxides.

This book is excellent in bringing together for the first time information on the semiconducting properties of ore minerals from sources not normally seen by the economic mineralogist, many of a recent Russian origin.

A major failing of the book is in the lack of a serious attempt to relate this information to the atomic structure of the minerals being considered. Minor criticisms are in the type-face used and the lack of line justification. A minor irritation is in the lack of a complete author index, the authors being indexed by chapter so causing in some instances triplication of one reference. There is a complete lack of reference to many basic publications on atomic structures of minerals.

This book is obviously aimed at those mineralogists engaged in research into the properties of ore minerals, and for those people represents a necessary addition to their library. J. W. OLDHAM

CARMICHAEL (I. S. E.), TURNER (F. J.), and VERHOOGEN (J.). *Igneous Petrology*. New York and London (McGraw-Hill), 1974. xvi+739 pp., 175 figs. Price £11.25.

To Professors Ian S. E. Carmichael, Francis J. Turner, John Verhoogen
Dear Ian and Frank and John,

The appearance this year of your *Igneous Petrology* has by its synoptic view, lucidity, and sense of direction as applied to igneous petrology, made the roles of the advanced student and his teacher much easier.

The original 'T. and V.' is, however, still needed for its references and for aspects of regional petrology. That in this new work certain topics, for example pegmatites, magmatism in relation to ore deposition, are still lacking and that the treatment of the lamprophyres and of the alkali rocks is rather cursory may be taken as a challenge to the reader to amplify these sections to his own requirements using the rest of the book as an excellent model.

I hope that you will accept this 'Consumers' Report', the joint creation of three of

our advanced students while awaiting the results (happily successful) of their final honours examination.

Sincerely yours,
STUART AGRELL

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This book is the igneous part of Turner and Verhoogen's *Igneous and Metamorphic Petrology* (1960) completely rewritten. It reflects the trends of modern research in presenting a thermodynamic and geochemical approach to igneous rocks and their associations and is aimed at advanced students, research workers, and teachers in geology. Lucidly written, it successfully fills the gap in current general petrological literature by summarizing and synthesizing available theory and data relevant to igneous systems and their behaviour.

The first seven chapters of the book present a fairly complete study of the processes that affect magmatic evolution and of how these processes may be explained in terms of thermodynamics. The theoretical aspects of the properties of liquid and solid silicates are described in some detail as well as the modern methods of investigation such as geobarometry, geothermometry, and trace-element geochemistry. The relationships between volatile components and magmas are given the thorough consideration they deserve, and the conclusion of the first section is a very useful summary of the restrictions placed on possible mantle sources by geophysical and chemical data. The evident lack of petrological applications of many of the important crystallization processes described, such as nucleation and growth, is a reflection of how poorly understood the role of these is in silicate systems. In writing this valuable account the authors are providing a lead for future studies rather than attempting to solve any problems.

The second part of the book is essentially descriptive, summarizing the petrographical and geochemical features of various igneous rock associations excluding lunar petrology. The grouping of these associations in the five chapters is partly on the basis of chemistry and partly on that of tectonic setting. The description of tectonic setting is by no means as complete as it could be and possible relationships between rock chemistry and tectonic setting are not fully explored. Oceanic basalts and continental tholeiitic provinces are both well described; the layered tholeiitic intrusions sensibly being given a limited treatment. The chapter on continental mafic magmas gives as full an account as could be justified of alkali basalt and nephelinite series, and also discusses some of the more extreme rock compositions such as carbonatites. The treatment of continental plutonic rocks provides an up-to-date summary of petrogenetic status of granitic rocks, making full use of chemical and isotopic evidence. The weak point in this chapter is the section on Alpine-type peridotites, which fails to provide a sound definition of the now-common term 'ophiolite' and to take account of the recent literature, which shows their petrological significance. The chapter on

andesites and the related rocks of volcanic arcs uses a tectonic classification for this rock series since the broad chemical calc-alkaline classification is not favoured by the authors. The basis for the use of a high-alumina basalt type in this section is not clear especially in view of an earlier reference to 'noise of parameters such as Al_2O_3 ', and the chapter as a whole reflects the great uncertainties over the petrogenesis of this rock association.

The last chapter attempts to draw together the first and second parts of the book in an assessment of the current understanding of mantle-magma relations discussing the possible origins of the igneous rock associations described. While again emphasizing the evidence provided by trace-element geochemistry and including relevant high *PT* experimental studies, it avoids taking controversial standpoints in petrogenetic theory.

The book presents a comprehensive review of the current status of igneous petrology and its approach, particularly the geochemical bias and thermodynamic treatment, makes it unique among texts of its kind. It presents both qualitative and sufficient quantitative data to be useful for research, while avoiding the pitfalls of overclassification. For these reasons, we consider this as undoubtedly the best book for advanced students of the subject yet published.

M. A. CARPENTER

A. M. GRAHAM

J. H. TEMPLE

USDOWSKI (H.-E.). *Fraktionierung der Spurenelemente bei der Kristallisation*. Berlin, Heidelberg, and New York (Springer-Verlag), 1975. viii+104 pp., 42 figs. Price DM 29.80 (\$12.90).

In this student text, the author has developed his lecture course into a sound classical introduction to the principles of trace-element behaviour. Approximately the first half of the book is devoted to the derivation of thermodynamic principles (Henry's Law, Nernst Distribution and its variants, Rayleigh fractionation, temperature, pressure, and composition dependence of distribution coefficients). Henry's Law is introduced, as usual, by considering the solubility of gases in liquids. Although this may, perhaps, introduce conceptual difficulties when the same principle is immediately applied to solid and liquid solutions of solid solutes, it allows a clear illustration of the composition-dependence of Henry's Law constants. English-speaking readers may find some of the symbols confusing—e.g. *f* for activity coefficient and of course *g* for weight.

In the second part examples are given of the application of trace-element distributions to problems in igneous, metamorphic, and sedimentary geochemistry, and also to industrial and laboratory processes. This section of the book is somewhat disappointing in that many of the examples are from older literature, and the selection of examples is small (the book contains only twenty-nine references). With a wider selection of more modern references one feels that the book would have been more stimulating.

D. G. FRASER