

of investigation in applied geochemistry covers geochemical prospecting, the geochemistry of mineral deposits, isotope geochemistry (including age determination), and the geochemistry of individual minerals, each section having a full bibliography. A final chapter lists various units of measurement and their abbreviations.

A minor but infuriating editorial failure in this book is the inclusion of references in the captions to figures and in tables that are not to be found in the bibliographies. The choice of literature is distinctly East European but, with fore-knowledge of this, the book may provide a way in to that part of the literature of geochemistry not adequately appreciated in the West. For more modern geochemical data the inquirer could do worse than consult recent volumes of *Chemical Abstracts* or *Mineralogical Abstracts*.

R. A. H.

PIES (W.) and WEISS (A.). *Crystal structure data of inorganic compounds. Part a: Key elements F, Cl, Br, I (VII. Main group) halides and complex halides* (Landolt-Börnstein: Numeral Data and Functional Relationships in Science and Technology. New Series. Group III: *Crystal and solid state physics*, vol. 7). Berlin, Heidelberg, & New York (Springer-Verlag), 1974. xxxii+647 pp. Price DM 436.00 (\$178.80).

This is a very old-established and respected encyclopedic collection of data. It has many good points; for example, polymorphs are grouped together and transformation temperatures are quoted, while there are always sufficient details to enable the reader to see whether he wishes to go to any source publication. However, references are not given in this volume, and the reader has to wait for the publication of Part g for these. Similarly, there is no index in this volume and for this the reader has to wait for Part h.

This volume is beautifully printed by traditional type-setting, which is now, unfortunately, very expensive in time, labour, and money. It would be expected that such data would now be handled by computer and directly printed out.

In making such data available there is repetition of effort with other publications. In the Preface the following sentence occurs, 'This volume like all other volumes of Landolt-Börnstein has been published without financial support from any outside source.' It would seem natural to suggest that this enormous mass of data would best be published only once by international co-operation and with an adequate subsidy.

N. F. M. H.

MACKENZIE (W. S.) and ZUSSMAN (J.), Editors. *The feldspars. Proceedings of a NATO Advanced Study Institute Manchester 11-21 July 1972*. Manchester (Manchester Univ. Press) and New York (Crane, Russell, & Co., Inc.), 1974. xii+718 pp., 262 figs. Price £9.00.

The proceedings of the first NATO Advanced Study Institute on Feldspars, held in Oslo in 1962 under the direction of Professor T. F. W. Barth, were published in a special issue of *Norsk Geologisk Tidsskrift*. Here in this volume are presented the

proceedings of the second NATO Advanced Study Institute on Feldspars held in Manchester just ten years later and represented by thirty-two papers, including three reviews.

The papers are grouped under four headings: (I) Structure bonding, and order-disorder, (II) Phase equilibria and thermochemistry, (III) Electron microscopy, and (IV) Minor elements and natural occurrences. A complete listing of the individual papers with brief abstracts, will be found in M.A. 74-1850.

The feldspars are, of course, the commonest of all the rock-forming minerals and no other mineral group has been the subject of such intense study. Each advance in technology has uncovered new and often bewildering details of feldspar crystal chemistry. Here papers such as those by Megaw reviewing the architecture of the feldspars or by Ribbe, Phillips, and Gibbs on tetrahedral bond-length variations in feldspars help to lead the reader into the complex notations used by feldspathologists and to lay the groundwork for more comprehensive structural models. The problems of Al/Si distribution are also approached from the standpoint of accurately determined cell parameters used in conjunction with either solution calorimetry or optic axial angle and extinction angles.

Part II opens with a thought-provoking statement by Helgeson on the chemical interaction of feldspars and aqueous solutions and this is followed by the presentation of thermodynamic data related to ordering in end-member alkali feldspars, consideration of the relationship between their unit-cell parameters and solvi, and controls of ordering and subsolidus relations.

In Part III, the review paper by McLaren on transmission electron microscopy illustrates and interprets all the important types of observed contrast, and discusses these concepts in relation to current ideas of feldspar structures. This is followed by papers by J. D. C. McConnell and others, with details of unmixing textures, exsolution phenomena, substructures, and analysis of the time-temperature-transformation behaviour of plagioclases.

The first two papers in Part IV deal with experimental work on ion-exchange and the influence of various combinations of trivalent and tetravalent cations on order/disorder. These are followed by a discussion of the relation between optic axial angle and obliquity of potassium feldspars and by a report on the five different types of potassium feldspars distinguished in some Czechoslovakian lithium pegmatites. The only major discussion of feldspars in metamorphic rocks is given by A. B. Thompson, who considers the instability of plagioclase, in particular, in terms of two ideal solution models. Comparison of experimental data with observations of natural parageneses may be used to determine the departure from ideality in  $P$ - $T$ - $X$ .

This book is obviously an important milestone in the development of a fuller understanding of the detailed structures, phase equilibria, and thermochemistry of the feldspars. Nevertheless, as one gets involved in the details of coherent neutron scattering amplitudes or plots of the isopleths for  $\alpha^*$ - $\gamma^*$ , there is perhaps a tendency to forget that the object of the study is a rock-forming mineral. To this extent the reviewer sees the danger of a further gap opening between the experts clustering around their automatic single-crystal diffractometers and electron microscopes and the field

petrologists seeking help in interpreting the variations observed in feldspars in granites, basalts, or gneisses.

The volume is clearly printed and well illustrated but although the editing has produced uniformity of style there are some unfortunate printing errors, e.g., the chemical formula of the ammonium feldspar buddingtonite is given as  $\text{Na}_4\text{AlSi}_3\text{O}_8 \cdot \frac{1}{2}\text{H}_2\text{O}$ , plagioclase is mis-spelt in the title of the paper by M. L. Crawford, and an extra  $\text{SiO}_2$  appears in the system  $\text{CaO}-\text{Al}_2\text{O}_3-\text{SiO}_2-\text{H}_2\text{O}(\text{CO}_2)$  on p. 645. The width of the column of type is 9 cm on a page width of 15 cm, leaving an ample 4-cm left-hand margin on which to record notes or errors.

These minor drawbacks notwithstanding, the editors are to be congratulated on assembling these important research papers from most of the authors currently active in the study of this the most important group of rock-forming minerals. For once one can add that the price seems eminently reasonable. R. A. HOWIE

RIEKE (H. H., III) and CHILANGARIAN (C. V.). *Compaction of argillaceous sediments* (Developments in Sedimentology, no. 16). Amsterdam, London, and New York (Elsevier), 1974. xiv+424 pp., 217 figs. Price Dfl. 85.00 (\$30.90).

This book covers a wide range of topics relating to compaction of sediments from soft marine clays to stiff shales, and has therefore considerable interest not only for the geologist but also for the civil and petroleum engineer. The literature covered is enormously wide and for those familiar with one discipline the remaining fields that are opened up raise inquisitiveness to read widely from the original sources.

In itself this is excellent, but in part it is due to a lack of satisfaction in the extracts presented by the authors. Thus nearly every page quotes from three or four learned sources (there are over 800 references), which follow quickly on one another, often only tenuously connected. For example, we read for two pages about how to estimate the maximum effective pressure (defined twice) that has ever existed in an argillaceous sediment: and on the following page we read about the pre-consolidation pressure without perhaps realizing that the two are one and the same thing. It is on simple detail of this sort that the book is weakest—a more flagrant example is in Fig. 2 where Archimedes' principle has been misunderstood. The experts will not be led astray by such trivia, though the book is presumably not being written for them.

One of the most interesting chapters relates to the behaviour of the pore fluid, not only water fresh or saline, but also the squeezing out of oil and bitumen from muds and shales.

This has the makings of an excellent book; were the authors to have fully assimilated all they have read and turned it into a more unified text in terminology and units, then it would be even more valuable. J. K. T. L. NASH