

(Nägele u. Obermiller)), 1983. vi + 545 pp., 309 figs., 63 tables. Price DM 188/US \$86.60.

The papers collected in this text have resulted from a specially funded priority programme organized by Deutsche Forschungsgemeinschaft as a contribution by the Federal Republic of Germany to the International Geodynamics Project. This programme was started in 1974 and the papers published in this volume were presented at its final colloquium in October 1980. At this final colloquium, seven overseas guests were invited who contributed, as specialists in their fields, introductory reviews on the state of the art internationally, and these papers are also included.

The research presented in this volume differs from much high-pressure research in so far as it concentrates on the materials, and the measurement of physical and chemical parameters, while the materials are held at elevated temperatures and pressures. This *in situ* approach differs fundamentally from the more common approach of quenching the material before studying the effects of its exposure to elevated temperatures and pressures.

The text is divided into six sections; Elasticity (four papers), Fracture and Flow (five papers), Structural Behaviour (five papers), Spectral and Thermal Phenomena (seven papers), Electrical Conductivity (seven papers), and Thermodynamics and Equilibria (six papers), and should be of interest to a range of specialists in the fields of geophysics, petrology, materials science, and structural geology. The standard of the individual papers is uniformly high throughout—they are presented in English with English and German summaries. The standardization of units and constants in the text (listed in a table at the end) maintains a consistent format. In my own field, some of the ideas presented challenge the status quo and should form the basis for some healthy arguments. Many of the contributions present new experimental methods and details of apparatus designs are clearly given. Obviously the majority of the work presented is that conducted in Germany during the period 1974–80 and one could criticize the volume for not containing any contributions representative of the work conducted by the excellent high-pressure laboratories elsewhere in Europe and in Australia although the American laboratories are well represented by the contributions from the invited overseas guests.

This text contains a collection of interesting articles which should find a fairly wide readership in geological and other laboratories where high-pressure and temperature experiments are conducted. The content of these papers should stimulate

discussion and encourage further research in these fields.

MERVYN E. JONES

Atherton, M. P., and Gribble, C. D., eds. *Migmatites, Melting and Metamorphism*. Nantwich, Cheshire (Shiva Publications Ltd.) and Cambridge, Massachusetts (Birkhauser Boston Inc.), 1983. x + 326 pp., 152 figs. Price: hardback £25.00; paperback £12.50.

The twenty-five papers in this well-produced volume represent the proceedings of a meeting of the Geochemical Group of the Mineralogical Society, held at Glasgow University in April 1982. There are six sections: Experimental Studies, Isotopic Studies, Fluid Studies, Field and Related Studies—Migmatites, Field and Related Studies—Other Rock Types, and Synoptic Papers (the latter including five papers presented essentially as abstracts).

An introductory chapter by B. E. Leake outlines the problems and reviews the contributions, and in the experimental section two papers by Wyllie are accompanied by a detailed report from Johannes on the drastic effect of 5 kbar water pressure on simple feldspar systems. Contributions in the isotope section all emphasize the theme of crustal and mantle components and their contribution to many granites. Another recurring theme is the influence of fluids: thus Manning and Pichavant show that the occurrence together of F and H<sub>2</sub>O can affect anatectic melt generation, and the dominance of H<sub>2</sub>O in fluid inclusions in high-grade amphibolite-facies migmatites from Connemara is described by Yardley *et al.*

That many granulite-facies rocks may be residues after partial melting is argued by Powell, who considers that CO<sub>2</sub> flushing from the mantle is likely to be less important than internal buffering and melting. Weaver and Tarney, however, point out that although the Lewisian granulites of Scotland are strongly depleted in the radioactive heat-producing elements (K, Rb, Th, U), the Indian charnockites and Peninsular gneisses are enriched in these elements, and removal of a partial melt during granulite-facies metamorphism cannot explain this. Indeed Weaver and Tarney prefer the concept of a chemically evolving fluid flux in the deep crust. A close relationship between the formation of charnockite and the production of anatectic granite is reported by Friend, who postulates partial melting in advance of a charnockite-forming front.

Other papers of wide interest include that by Pitcher on the 'typology' of granites, relating the different types to their mode of origin and hence to their particular environment. Thus this book affords

an up-to-date account of current research and interpretation of the role of high-grade metamorphism in migmatite formation and in the genesis of granitic magmas. The production and presentation are good and although there is no index, some 500 references are usefully collected together at the end. The price is such that this work should be on the shelves of all research workers in this area of the Earth Sciences.

R. A. HOWIE

Hutchison, R. *The Search for Our Beginning: an Enquiry Based on Meteorite Research, into the Origin of our Planet and of Life*. London (British Museum [Natural History]) and Oxford (Oxford University Press), 1983. 164 pp., 64 figs., 4 colour pls. Price £7.95.

This small book reviews the flood of recent research results in meteoritics, and emphasizes the contribution they have made to the understanding of the early stages of the evolution of the sun and planets. The frontispiece shows the discovery of a meteorite among Antarctic ice, and the large number of new meteorite finds from such sources, as well as some of the discoveries made from them, are well described in the text. Individual chapters summarize the history of meteorite studies, relevant information about the Earth, Moon, and the Solar System, the petrological variety of meteorites, their chemistry, the principal conclusions of research about the origin of the Earth, and in considerably less detail, the origin of life.

The book is written for non-specialists in Geology or Petrology, but specialists will find its reviews of such topics as the discovery of the daughters of short-lived isotopes (for example, aluminium 26) surprisingly comprehensive. There is a very short reading list at the end, which might have been extended to four or five references for each chapter. The text of the book is easy to read, but the author's wide knowledge of the subject and active involvement in research shows through and adds an air of authority. It is an excellent account of the subject for students who would like background reading to introductory lectures about meteorites, or for Earth and Planetary scientists who would like a brief survey of the recent advances in meteoritics.

ROGER MASON

Reeder, R. J., ed. *Carbonates: Mineralogy and Chemistry* (Reviews in Mineralogy, Volume 11). Washington, DC (Mineral Society of America), 1983. xii + 394 pp., 291 figs. Price \$13.00.

This latest volume of 'Reviews in Mineralogy', a series begun as 'Short Course Notes' in 1974,

attempts to synthesize present understanding of certain aspects of the mineralogy and chemistry of the rock-forming carbonates. Because of their importance in sedimentary rocks, low-temperature examples are given emphasis, but the broader consideration of all aspects of carbonates is a reflection of their widespread occurrence also in metamorphic and some igneous environments.

The nine chapters include descriptions of the crystal chemistry (R. J. Reeder) and phase relations (J. R. Goldsmith) of rhombohedral carbonates, solid solutions and thermobarometry of metamorphic carbonates (E. J. Essene), magnesian calcites (F. T. Mackenzie *et al.*), crystal chemistry and phase relations of orthorhombic carbonates (J. A. Speer), CaCO<sub>3</sub> polymorphs and the aragonite-calcite transformation (W. D. Carlson), the kinetics of dissolution and precipitation of CaCO<sub>3</sub> (J. W. Morse), trace elements and isotopes in sedimentary carbonates (J. Veizer), and microstructures in carbonates (H.-R. Wenk *et al.*). This last chapter introduces transmission electron microscopy, a relatively new tool that has great potential in carbonate research. The references for all chapters are sensibly placed together at the end of the book.

This review follows, by ten years, a major assessment of sedimentary carbonate minerals by F. Lippmann, and allows the reader to appreciate the tremendous if belated development of interest in this important group of minerals in the past decade. The applications of calcite-dolomite thermometry to metamorphic rocks are a case in point, and here, as for most topics, the discussion concludes with suggestions for future work. As with earlier volumes in this series, the work is clearly produced and well illustrated; all mineralogists will continue to be grateful for these stimulating and up-to-date texts at a very reasonable price.

R. A. HOWIE

Ferry, J. M., ed. *Characterization of Metamorphism through Mineral Equilibria* (Reviews in Mineralogy, Volume 10). Washington, DC (Mineral Society of America), 1982. xiii + 397 pp., 124 figs. Price \$13.00.

This is the second book in this series to be dedicated to a subject other than a distinct mineral group (the other being Volume 8: *Kinetics of Geochemical Processes*, 1980). In this new volume, the orientation is primarily directed to the application of methods of determining the history of metamorphism via chemical and mineralogical studies. There are nine chapters contributed by a galaxy of authors including J. B. Thompson on composition and reaction space—an algebraic and geometric approach, F. S. Spear *et al.* on the linear