structures instantly more readily visualized. Later chapters deal with variations in structure as a function of temperature and pressure, solid-solution series, crystal morphology, stereographic and other projections, and twinning.

The crystallography sections are interdigitated with an important chapter on the methods of calculating the chemical formula of a mineral and expressing its composition in terms of end-member molecules; graphical methods of plotting composition in two-, three-, four- or multicomponent systems are also discussed.

Full consideration is given to the physical characters of minerals and the methods used to determine their various physical properties, including density, cleavage, hardness and electrical properties. Optical properties of minerals and mineralogy under the microscope are each dealt with in separate chapters. The theory and practice of X-rays are considered in detail and other determinative methods described include infrared spectroscopy, thermal analysis, XRF, electron microscopy and (briefly) SEM and the microprobe. Mineral equilibria and the experimental techniques used in the investigation of synthetic systems are each discussed before the final chapter on geothermobarometry.

Although the text is in Italian, it is clear and readily understandable (even by this reviewer who has no knowledge of the language) aided of course by over 400 two-colour diagrams. This is a book which all teachers of mineralogy should have available on their own or library shelves. The price is right.

R. A. Howie

Ryan, M. P. (Ed.). *Magma Transport and Storage.* Chichester and New York (J. Wiley and Sons), 1990, 420 pp. Price £125.00.

This book is divided into two parts—Part I, Heat and mass transport in magmatic systems; Part II, Transport structure, mechanics and dynamics of magmatic systems.

Part I. Compaction models and fluid mechanics are formulated at the outset (Fowler) and a model for melt transport applied to the Earth. Fluid mechanical models are used by Olsen in a study of plume evolution. Melt movement as diapirs or by porous flows (Whitehead and Helfrich) is considered along with evidence for solitons (solitary waves) and the importance of the dihedral angle (Riley and Kohlstedt). Studies of fracture-controlled dike transport (Bruce and Hoppert) deal with solidification and melting along dikes and the role of laminar and turbulent flow (Turcotte) A numerical treatment of explsoive eruptions (Wohletz and Valentine) is followed by an evaluation of the thermal gradients within pyroclastic units (Ryan, Banks, Hoblitt, and Blevins).

Part II deals more with magma transport. Hydrofracturing and porous flow at ridges (Nicolas) is evaluated using theoretical and field observations. Geophysical, structural and petrologic data from Iceland (Ryan) are next combined to produce a two-dimensional model of the magma system beneath Iceland, to a depth >300 km. Next the subcaldera magma storage system of Krafla, Iceland (Ewart, Voight, and Bjornsson) is defined as a 'hot, largely non-elastic rock mass that encompasses numerous magma chambers connected by "pressure valve" conduits'. Sato and Sacks explore the seismic structure of intra-plate and subduction zone magmatism by a comparison of laboratory-based studies of partial melts and seismic observations in the Earth. Seismic tomography (Iyer, Evans, Davison, Stauber, and Achauer) is shown to be a useful tool when evaluating the behaviour of magmas in the Long Valley–Mono Craters region and the Newberry volcano in the Cascades. Finally details of magma ascent, storage and eruption are provided for Mt. St. Helens (Endo, Dzurisin, and Swanson), Sakurajima (Ishihara) and Mt. Etna (Murray, Hughes, Guest and Duncan).

This is an extremely useful text which contains an acceptable balance of theoretical experimental and field based contributions. It covers a plethora of topics; solitons to segregated peridotites, dihedral angles to dyke emplacement, plumes to plumbing systems. It should be on the shelf of every library and active researcher and teacher of volcanology [M.A. 91M-2072/2089].

M. A. Menzies

Troll, G. *Mineralvorkommen im östl. Bayerischen Wald.* Sonderband nr 31 of Aufschluss, 1991. 152 pp., illustrated in black-and-white and in colour.

The Bayerischer Wald is largely taken up by a national park whose geology forms the subject of the first paper in this multi-author survey. Some of the most interesting minerals are found in the pegmatite region and other major mineralizations are found in the Bodenmais area and in the graphite-producing locations of Kropfmühl and Passau. Each paper has its own extensive bibliography but there is no subject or general index. Subscribers to foreign journals are not always aware that monographic series are often produced and it is always worth finding out whether

or not your subscription covers them—they may be the only up-to-date surveys of mineralogically significant regions.

M. J. O'DONOGHUE

Cruse, B. and Hentschel, G. (Eds.). *Zur Mineralogie und Geologie des Rheinischen Schiefergebirges.* Sonderband nr 33 of Aufschluss, 1990. 224 pp., illustrated in black-and-white and in colour.

The Rheinisches Schiefgebirge includes the volcanic area of the Eifel and papers in this volume describe the geology, palaeontology and mineralogy of the area as well as of the Ems and Westerwald districts. Short bibliographies are included in each paper and some accounts of mining are given. Trilobites from the Devonian in the Eifel region are major fossil features of this area west of the Rhine.

M. J. O'DONOGHUE

Rock, N. M. S. *Lamprophyres.* Glasgow (Blackie and Son Ltd.), 1990. viii + +285 pp., 13 maps. Price £49.00.

This book will be both loved and hated. It is packed with 'science' but is written in Rockese, i.e. a language which incorporates non-standard abbreviations, mostly mnemonic, created by Rock. For instance, 'CAL are most typical of convergent, AL/UML of divergent or passive, and LL/KIL of intra-plate settings.' By the time I had worked out what LL and KIL are (having turned to appendix A on pp. 214–16 for the code). I had forgotten what the others were, let alone thought out the deeper meaning of it all. This is compounded by the type unfortunately used by the printers, which does not distinguish between l (the letter) and 1 (the number). Thus M1, which includes melilitic rocks, is magma type number one, as I discovered on getting to p. 138 (it is not in appendix A). This is not to be confused with Ml, which is a common abbreviation for melilite (Rock's is Me). I nearly exploded on picking my way through this minefield of codings when I encountered TNT. That is Rockese for Ti-Nb-Ta (p. 215) or Ta-Nb-Ti (p. 134), and is used in describing -ve anomalies in spidergrams. I really fear that this potentially most informative book, on a subject of vital interest, may not be readable by ordinary geologists. Nor do I think there is an up-and-coming generation of petrologists who will happily talk about 'OL being an LL with oliv', to use three Rockese terms.

Rock includes lamproite and kimberlite within the lamprophyres. This is unfortunate, and clouds the discussions about 'true' lamprophyres. IUGS did, in 1989, temporarily classify lamproite and kimberlite within 'lamprophyric rocks' but Rock adjusts this to 'lamprophyres'. Lamproites and kimberlites are not lamprophyres. Rock's 1977 definition of lamprophyre in Earth-Science Review is better.

Nine chapters on 153 pages build half the book. Chapters 1–6 cover the history, classification, distribution, rock associations, petrography, mineralogy, geochemistry and xenolithic inclusions. The well-chosen data presented in these chapters are relentlessly methodical and easily accessed via the detailed list of contents (pp. v–viii) or the index. The tight text is relieved by invaluable maps, tables, binary and ternary diagrams illustrating the geochemistry of the major, trace and rare earth elements, and of the stable and radiogenic isotopes. Chapter 7, which includes a contribution by A. E. Wright and D. R. Bowes, is a novel in-depth analysis of the plutonic and volcanic equivalents of the lamprophyres. Chapter 8, on petrogenesis, cogently argues a mantle origin for most lamprophyres. Chapter 9 dwells on the association with gold and diamonds. The 'selected bibliography' at >1500 coded references on 57 pages is comprehensive. Appendix A interprets the ~200 Rockese terms; appendix B is an 8-page invaluable glossary of lamprophyric terminology; appendix C comprises 8 well compiled tables covering 40 pages based on distribution and type; and appendix D gives the rationale of his computerized lamprophyre database LAMPDA. The 11 page index is thorough.

'Lamprophyres' is a real break-through in a previously intractable subject and, despite its pitfalls, must be consulted by all petrologists.

M. J. LEBAS

Glasson, K. R. and Rattigan, J. H. (Eds.). *Geological Aspects of the Discovery of some Important Mineral Deposits in Australia.* Parkville, Victoria (Australasian Institute of Mining and Metallurgy: Monograph 17), 1990. x + 503 pp., 70 sketch-maps.

This monograph is a collection of 55 papers which overview the histories and geological aspects of exploration of the major mineral deposits in Australia. These include gold, copper, lead–zinc–silver, tin and tungsten, iron, coal, heavy mineral sands, aluminium, nickel, diamonds and uranium. Although published in 1990, most papers appear to have been written in 1986 although some contain references to 1989 (e.g. diamonds). Nevertheless this volume contains a wealth of