

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 explosive

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