

provinces examined include those of Portugal (A. M. R. Neiva), west central Spain (J. Saavedra), and Sardinia (M. Biste). African tin-tantalum-niobium acid rocks and pegmatites are represented by papers by Bowden and by Matheis *et al.* on Nigerian provinces and by Legg and Namateba on Zambian pegmatites; the Thailand tin-bearing granites are also discussed, Norman and Trangcotchasan favouring ore deposition from fluids derived from a magma rather than from meteoric connate waters. Reports are also given on a stanniferous peraluminous granitic pluton in Nova Scotia and on the numerous Bolivian tin deposits; Dulski *et al.* consider that the Bolivian Tertiary tin porphyries must have inherited the tin from the older metallogenic crust.

More general papers cover the mineralogy and geochemistry of the group IVb elements, the zoning of tin-tungsten-molybdenum metallization and the reasons for the association of tin and fluorine in natural assemblages, and B. van de Pijpekamp reports that using a matrix of fifty-three mineralogical, textural, and structural features, a measure of tin potential can be obtained from thin-sections of the rocks of granitic complexes. The importance of fluorine is emphasized also by the experimental work of D. A. C. Manning who demonstrates a 100°C lowering of the minimum liquidus temperature and a considerable change in minimum melting composition for the addition of 4 wt. % F to the system Q-Ab-Or-H₂O at 1 kbar.

Other papers include reports on mineralization around the Drammen granite, Norway, the Leinster granite, Ireland, and Precambrian granites (U-bearing) in Sweden.

The book gives an excellent insight into current thinking on the continuing controversies involving ore genesis associated with granitic rocks. Further applications of modern chemical and isotopic methods are clearly urgently needed before sufficient understanding of the processes involved can lead to the establishment of proven criteria for identification of potential ore-bearing granites by mineralogical and geochemical methods. The book is well-produced with clear diagrams and abundant full references with each paper. Its reasonable price should encourage wide readership.

R. A. HOWIE

Thorpe, R. S., Editor. *Andesites: Orogenic Andesites and Related Rocks*. Chichester, New York, Brisbane, Toronto, and Singapore (John Wiley and Sons), 1982. xiii + 724 pp., 277 figs. Price £59.50.

This is a collection of thirty-one papers covering all aspects of orogenic andesites and related

magmas. It starts with an introductory review by the editor in which he emphasizes the plate tectonic setting of andesite volcanism, and this is a theme which continues throughout the rest of the volume. The following two contributions are concerned with andesites as rocks, and in particular a very extensive survey by Ewart of their major element composition and mineralogy establishes that there is a difference between the predominant magma types of the island arcs and the active continental margins. The remaining 600 pages of the book are roughly divided into two parts: a survey of the Earth's major andesite provinces one by one, with a geological and geochemical summary of the known information on each region; and a series of articles on specific aspects of andesite petrogenesis and their geological significance.

Most of the geographical accounts are of excellent quality. Each contributor gives the geological background, with information on such things as geophysical evidence of the tectonic environment, eruption history, magma types, and detailed geochemistry. Some of the contributions illuminate additional special features of the individual provinces. Marsh's account of the Aleutian Islands draws attention to the relationship between lava flux and subduction rate. McBirney and White discuss the anomalous Cascade province, which does not apparently overlie a Benioff zone and is not near an oceanic trench. On the other hand Carr *et al.* and Hutchison, in their respective contributions on Central America and Indonesia, emphasize the particularly close relationship between volcanism and the inclined seismic zones in those areas. Aramaki and Ui provide a valuable service to English-speaking readers by reviewing the extensive Japanese literature on this subject. The contributions by Innocenti and Tarney and their co-workers reveal the great structural complexity of the volcanic provinces in western Asia and the Scotia Sea region.

The special topics covered by the later sections of the book include eruption mechanisms, sub-volcanic plutonism, experimental studies on andesitic and related melts, trace element, and isotope geochemistry, the occurrence of ancient andesites, their role in continental growth, and the mineralization associated with andesites. Many of the contributors address themselves to the fundamental question of where andesite magmas originate: in subducted oceanic crust or in the overlying mantle, and with or without contributions from oceanic sediment and continental crust? These questions are particularly dealt with in the excellent reviews of experimental evidence by Mysen and T. H. Green and of isotopic evidence by Hawkesworth. There does not appear to be any

general agreement yet on the major source of andesite magma. One of the most interesting chapters is that by Weaver and Tarney on the role of andesite magmatism in continental growth. Their conclusion is that calc-alkaline plutonism is more important than andesitic volcanism as the agent of continental growth, and that vertical accretion of calc-alkaline rocks at continental margins is more important than lateral accretion of island arcs.

The whole book is a well-balanced compilation of modern knowledge on andesite volcanism. Nearly all the contributions are well written and well illustrated. One's only regret is that the high price of the volume will probably preclude its purchase by many of the workers in this field for whom it has been written.

A. HALL

Dohr, G. *Applied Geophysics* (2nd edn.). New York (Halsted Press) and Chichester (John Wiley and Sons Ltd.), 1981. 231 pp., 166 figs. Price £9.90.

This is Volume One in the *Geology of Petroleum*; the first edition was published in 1974, and this edition has been extensively revised. About two-thirds of the book is devoted to seismic methods especially reflection work. There are two chapters on digital processing and these have been up-dated since the first edition. A chapter on Recent Developments is a welcome addition, although more space might have been found for direct indication techniques.

Despite the concentration on seismic methods the author deals with other geophysical techniques in an adequate, although brief way. The chapter on gravitational methods includes a section on modelling. In the chapter on Geoelectric Methods

the author has enlarged the section on magnetotellurics because he believes it to be of growing importance. There is also a chapter on well-logging, but this quite properly concentrates on those methods which are used in conjunction with geophysical surveys, and does not pretend to be a comprehensive account of well-logging.

Throughout the book German examples are illustrated and used. This gives an individual flavour, and is welcome in an industry which has become dominated by excellent North American publications. A new translation has been used and it is an enormous improvement on the first edition. The larger, clearer format is also welcome. The book can be recommended as a moderately priced undergraduate text, and as a useful reference for mineralogists seeking information about geophysical techniques.

H. C. POTTER

Hazen, R. M. *The Poetry of Geology*. London and Boston (George Allen and Unwin), 1982. 98 pp., 18 figs. Price £4.95.

This collection of twenty-three poems is drawn from American and British sources of the eighteenth and nineteenth centuries. It includes *Epitaph on a mineralogist* by F. D. Hemans (1836) and 'To make granite' from *Geological Cookery* by J. Scafe (1820), the latter including the lines.

Of felspar and quartz a large quantity take,
Then pepper with mica, and mix up and bake.
This granite for common occasions is good;
But on Saint-days and Sundays, be it understood,
If with bishops and lords in the state room you dine
Then sprinkle with topaz, or else tourmaline.

R.A.H.