BOOK REVIEWS

Leake, B. E. and Tanner, P. W. G. *The Geology of the Dalradian and Associated Rocks of Connemara, Western Ireland:* a Report to accompany the 1:63 360 geological map and cross-sections Connemara. Dublin (Royal Irish Academy), 1994. 76 pp; 12 maps, 4 coloured geological maps (1:10 560 &1:63 360). Price £15.00.

Those who have long known Bernard Leake will be aware of his abiding love of Connemara, on the Irish west coast, and his interest in its geology. In this volume he, together with Geoff Tanner, summarises the field based research that he has carried out, together with numerous research students (of which this reviewer was one) and other colleagues, over a period of more than 40 years. Given the quote at the beginning of the book from Geikie's 'A long life's work', Leake may well see this as being a memorial to his life long work. My personal view is that, while understandable, if this is indeed so, then he belittles the major contributions that he has made to the wider fields of mineralogy, petrology and geochemistry.

The book is divided into ten chapters. These include a brief introduction to the geology and history of research in Connemara; a description of the Dalradian stratigraphy; a description of the orthogneisses and metagabbros intrusive into the southern part of the Dalradian inlier; a description of the structure of the metamorphic complex; a description of the metamorphism; and then a description of the younger rocks that border the complex. Then follows a series of largely structural descriptions, of complex and/or misunderstood subareas within the complex. The book concludes with what may best be termed as two extended abstracts dealing with the geochronology of the complex and with its structural setting within the overall Caledonide framework, followed by a summary chapter.

I found this a delightful book to read. There is obviously a deep understanding, not only of the geology, but of the way that our knowledge of the geology has evolved. I still enjoy the story that the Delaney Dome was named, and mis-spelt, after Miss Francis Delany who first identified its structure.

A few reservations. In some ways the book is a throwback. Yes, in the 1960s and 1970s structural geologists did count deformation phases (D numbers) as is done here. Those days have largely gone. From amongst all the geochemical data that Leake and his co-workers have generated over the years I see no spidergrams, trace element plots or tectonic discrimination diagrams. The data are there, and it would have been nice to have seen them included and discussed in connection with the origins of the gabbros and granites. The metamorphic chapter is possibly over-brief. An attempt to plot pressures and temperatures on a map would have been of interest. The thermal history is still poorly defined, relying as it does on a large number of K–Ar dates. There is obviously still work to be done here with an obvious need for T–t plots based on a wider range of more valid thermochronometers.

For anybody who already knows Connemara, who wishes to begin to work there, or who is just interested, this is a very valuable and readable synthesis. It comes complete with a marvellous collection of coloured geological maps and sections including geological and structural maps of the whole province at a scale of 1:63 360. At the price, these maps make the synthesis astoundingly valuable and a must for all libraries and anyone interested in the geology of Ireland or of the Caledonides.

P. J. TRELOAR

Holland, G. and Eaton, A. N., Eds. *Application of plasma source Mass Spectrometry.* London (Royal Society of Chemistry), 1991. viii + 222 pp. Price £39.50. ISBN 0 85186 5666.

This book contains a collection of selected papers from the Second International Conference on Plasma Source Mass Spectrometry held at the University of Durham in 1990. The subject areas covered in the 21 papers are very broad and include applications using both inductively coupled plasma and glow discharge sources. Although most of the articles are applications oriented, a few deal specifically with fundamental instrument studies. Sample types covered by applications papers, include environmental, geological, nuclear, medical, biomedical and industrial examples. Three contributions are specifically concerned with alternative methods of sample introduction — hydride generation, laser ablation and electrothermal vaporisation. The applications papers illustrate the versatility of the technique and its now

wide acceptance in many areas of science. However, it is clear that sample introduction or presentation is still a limiting factor for some sample types.

The quality of the figures is variable and style varies from one contribution to another — as does font and layout. Despite its vivid hardback cover, this book contains contributions of rather mixed quality and content. Unfortunately, the editors' wish to "allow authors the opportunity to preserve their ideas and observations intact" has led to a lack of uniformity and consistency in the expression of units of measurement and unexplained abbreviations. Poor proof reading, reflected in numerous errors throughout, spoils what would otherwise be an interesting and informative collection of papers.

K. E. JARVIS

Augustithis, S. S., *et al.*, Eds. *High-Grade Metamorphics*. Athens (Theophrastus Publications S. A.), 1992. Price US$ 60.00. x + 504 pp.

This compilation volume purports to present papers addressing modern and key issues in high-grade metamorphism as well as 'innovative' interpretations for the origin of granulites and mineral assemblages in both well- and little-known high-grade terrains. Although useful as a source of basic data and information on regions for which little is currently available in accessible journals, much of the information presented in the various papers is piecemeal and only a few of them present coherent reviews of the geology of their described areas. For example, several papers present rock geochemical data where mineral chemical and structural information would be much more useful. The utility of this volume is limited too by the propensity of some authors to indulge in large scale, unsubstantiated or even wild speculations about processes, tectonic settings, and petrogenesis on the basis of poor, limited or at best only vaguely indicative data.

The book includes 19 papers arranged in five somewhat artificial sections, namely fluid, granulites, charnockites, 'sillimanites-metamorphics' (i.e. metapelites), and regional considerations. The 'fluids' section includes three papers which look at rather different aspects of the subject. Shlygin considers the physical aspects of fluid movement in 'locked' circulating systems in the crust, invoking fracture propagation but leaving the lengthscales vague. Gupta compiles evidence for CHOSCl fluids, summarises experimental data on H_2O-CO_2 fluids, and gives brief examples of the roles of fluids in solubility, kinetics, anatexis and reactions in a paper that is broad but hardly a critique. Srikantappa *et al.* present an orthodox application of fluid inclusion microthermometry to a granulite suite, making the usual assumptions about peak entrapment of high density inclusions.

The 'granulites' section contains five papers describing aspects of terrains in the former Soviet Union (Anabar and Ukrainian shields) and India (Eastern Ghats and Gujarat). There is useful documentation and description of mineral assemblages in some of these, but the emphasis on geochemical characterization of rock types in others is not well-founded in the absence of proper descriptions of the rock relations and deformational histories. Rosen (Anabar) and Rao & Rao (Eastern Ghats) speculate that the granulites in their regions were derived from island arc magmas and marginal platform sediments on the basis of rather general geochemistry but do not establish timing or evolutionary relationships which could aid in understanding the development of the terrains.

Charnockites are considered explicitly in three papers. Nambiar *et al.* apply relatively recent geothermobarometry and geochemical tools to igneous charnockites from northern Kerala, whereas Rao and Kumar adopt a traditional descriptive petrographic approach complemented by some basic mineral and rock chemical data in a report on Eastern Ghats charnockites. Prasad *et al.* propose charnockite formation through anatexis of pyroxene granulite precursors and use major, trace element and *REE* geochemistry to support their model.

The 'Sillimanites-metamorphics' section is very varied in content and quality. Papers on metasediments from Hubei, China (Lu and Jiang) and Karnataka (Devaraju *et al.*) are interesting and useful in providing good petrographic or mineral chemical data and providing some insight into the metamorphic conditions and grade variations in these areas. Collins and Davis describe a high-grade terrain in Colorado where they consider hydrothermal alteration and Ca-leaching of gabbro-diorite to have produced regional cordierite gneisses. The large-scale mass transfer involved in this process, however, is nothing compared with the massive influx of silica (from the mantle, of all places) that these authors propose in their speculative and unconstrained concept of 'global hydrothermal circulation' generating expansion and extension of the continental crust. Cela *et al.* describe enclaves in dacites from Spain and try to connect their metamorphism and the volcanism to one decompressional $P-T$ path, a requirement which detracts from an otherwise stimulating and interesting paper. These authors also extend a poorly argued model of frictional heating, based on their xenoliths, to low-pressure high-temperature regional granulite terrains without any assessment of the energy budgets involved.