specifically considering the importance of quartz and feldspar grains containing oil inclusions. Abundant fluid inclusion data are presented in summary form, together with the geological information necessary for their interpretation. Carruthers and Ringrose present a model for the flow of oil in porous media in the context of secondary migration, modelling trajectories and the consequent proportion of oil-rock contact, on a centimetre scale. Secondary migration on a basinal scale is modelled in the next paper, by Sylta *et al.* Attractive colour prints from the model are given but one has to read the fine print of the text to realise that these describe areas of 10s of km^2.

Quaternary dating problems are addressed in two papers. Metcalfe *et al.* give a review of the methods used to date groundwater flow events, drawing on their experience with characterisation of Quaternary deposits in the context of radioactive waste management. This substantial critical review emphasises the importance of mineralogical observations such as the characteristic morphology of calcite cements. Finally, Fukuchi and Imai use ESR isochron dating to identify the first movement of the Nojima Fault, last active in 1995. ICP-MS data are given for clays from fault gouge, but do not really contribute to the task in hand, and the authors interestingly allude to formation of clays deep in the Earth's crust as a phenomenon associated with earthquake activity.

As with all symposia volumes, this book contains some gems and other papers which are less appealing, and identification of these will vary from reader to reader. It is quite clear that the bulk of dating methods are indirect, and depend very much on geological as well as geochemical or mineralogical information. This book is useful for those working on the problem of "when did it happen?", as a summary of the available approaches and by providing examples of how data from many sources can be integrated. Appealing mainly to postgraduates and professional researchers, this is a book for the library, and perhaps for the personal bookshelves of the specialist.

D. A. C. MANNING

Holtstam, D. and Langhof, J., (Eds). *Långban: the Mines, their Minerals, Geology and Explorers.* Raster Förlag, Swedish Museum of Natural History, Stockholm, 1999. 215 pp Skr 450 (400 for direct purchase), approx. £34. ISBN 91-87214-881.

The Fe-Mn deposit of Långban, in Värmland, Sweden, is one of the half-dozen most productive mineral localities in the world. About 270 mineral species have been described from Långban; it is the type locality for 67 of these and 23 occur nowhere else. The dust jacket of this book features a beautiful hexagonal prism of the eponymous mineral långbanite, a member of a distinctive chemical class of Långban minerals, the Mn-Sb oxide silicates. A monograph on this complex locality has been long awaited, and the authors, editors, and publishers of this book are commended on addressing this need with such style. The book is robustly bound, printed on stout high-grade paper, and lavishly illustrated with beautiful diagrams and photographs. The quality of the mineral micrographs, in particular, is superb. The text is lively and reasonably up-to-date, with only a few trivial typographic errors. Above all, the price is extremely reasonable for a book of this quality.

Långban is organized into a foreword, introduction by the editors, seven main chapters, bibliography and appendices. In the inspiring foreword, Paul Moore compares Långban with other localities such as Franklin and Tsumeb, muses on the relationship between crystal chemistry and paragenetic conditions, and spotlights areas for future research. The editors' short introduction then explains the context in which the book was planned and written.

Ingmar Lundström's chapter on 'Geology of the Bergslagen ore region' provides an invaluable account of the regional stratigraphy and tectonic and intrusive history. 'Geology of the Långban deposit' (Frej Sandström and Dan Holtstam) focuses on the immediate setting of the mines and the paragenetic sequence in the skarns. This chapter is followed by Bengt Bollmark's 'Some aspects of the origin of the deposit', a complementary account with a more geochemical bias. This chapter presents interesting major and minor element analyses for nine bulk rock types, which are, alas, the only analyses in the book. Attention then shifts from the Proterozoic to the Quaternary with 'Långban's mining history' (Jörgen Langhof and Thomas Österberg) and 'Mineralogists and collectors' (Langhof). The individual case histories are fascinating, especially that of the remarkable Gustaf Flink (1849–1932), whose collection of 'unknowns' is still providing species new to science.

The stage thus set, the main act follows: the 95 pages of 'The Långban minerals' by Per Nysten,

Dan Holtstam and Erik Jonsson. All reliably identified species receive an entry, in alphabetical order from adelite to zoisite. Entries provide a formula, a crystal system, and detailed data on physical appearance(s), association(s), original locations underground where known, and a few references. A large proportion have crystal drawings and optical or SEM photographs, mainly of specimens in the collection of the Swedish Museum of Natural History. Jonsson's short chapter 'Collecting at Långban' provides a nice postscript.

The bibliography, by Urban Strand, collates 567 references covering a time span from the late 1970s to 1995. These apply to the 'minerals' chapter only: the earlier chapters each have their own specific reference lists which are additional to the bibliography. Next is a 'mineral index' which locates references to general topics and specific minerals in the bibliography. Like the bibliography, it is complete up to only 1995, containing no reference to philolithite, for instance, although the mineral and reference to its 1998 descriptive paper do appear in the 'minerals' chapter. Then follow three appendices: a systematic list of Långban minerals, a list of some varietal and obsolete names, and a list of fluorescent species.

My criticisms are few. Specific topics that are not mineral species are not indexed in detail, and the bibliography already needs updating. More important, this book is not sufficient in itself to allow identification of species acquired by the collector or researcher. Properties such as hardness, density, cleavages, optical constants and powder X-ray data are not provided, meaning that a comprehensive mineral encyclopedia is needed as an adjunct. Goniometric data are also absent despite being useful to keen amateurs. Admittedly, inclusion of such additional data would double the size and price of the book. *Långban* remains invaluable for the site-specific information that it does provide, which is often condensed, garbled or absent in more general texts.

The last and most tantalizing omission is any treatment of minerals absent at Långban but present in the other deposits of similar type nearby. Thus, the Mn-Be silicate harstigite, found only at Harstigen, is missing, as is the melanostibite of Sjögruvan. Harstigen is also the type locality for pyrophanite, Jakobsberg for jacobsite, and Nordmark for hedenbergite, which highlights the importance of the area as a whole to mineralogy. The authors have whetted my appetite for a sequel volume on these related mines.

To those with an interest in exotic skarn mineralogy, Swedish regional geology, comparison with other ore deposits such as Franklin, and to collectors and curators everywhere, I can only recommend: buy this book — it is beautiful, informative and excellent value. A. G. CHRISTY

Hacker, B.R. and Liou, J.G. (Eds). *When Continents Collide: Geodynamics and Geochemistry of Ultrahigh-Pressure Rocks*. Dordrecht, Boston and London (Kluwer Academic Publishers). 1998, Hardback, x+32 pp. £90.00 (US$144.00), ISBN 0-4128-2420-5.

Ultrahigh-pressure rocks are gaining greater importance as more localities are discovered and as the areas of those localities that are known are being expanded. The fact that large pieces of continental crust have been subducted to depths of ~150 km (or indeed even deeper) requires some radical methods for both the subduction and, more importantly, the recovery which preserves the mineral assemblages. All of these problems are addressed in this rather timely and useful book. The volume, which would have benefited from some form of introduction by the editors, comprises 12 essentially unconnected papers which cover aspects of specific sites, models and theory. Overall, an up to date summary of many UHP localities and their importance is presented. The organization of the book might be viewed as odd since it starts with two chapters that deal with theory rather than UHP rocks themselves, i.e. the database. In Chapter 1, Lin and Roecker present a synthesis of new, directly and remotely acquired geophysical data from Taiwan, which previous models have suggested to be an accretionary wedge. Instead, they propose that at least part of the island is a site where active exhumation is taking place above a subducting slab. This model provides an explanation of how UHP rocks may be recovered to the surface. Douce and McCarthy then examine the melting of crustal rocks during subduction in Chapter 2. The experimental data are derived from very ordinary crustal rocks of the type one might expect to find in subduction zones and the results do seem to produce some of the magmatic rocks found at higher levels as well as granulitic and eclogitic residues. Rheological aspects of crustal rocks at UHP conditions are explored by Stöckhert and