enthusiasts. The editors should be congratulated on imposing reasonably consistent style and, more difficult, nomenclature. The flavour of the original meeting is captured in the volume. Most significantly, a new IGCP project was conceived (277: Phanerozoic Oolitic Ironstones) and I suspect this collection of papers will serve as the base from which many new and exciting projects develop. In this sense, I suspect the volume will become 'required reading' for anyone interested in these fascinating rocks.

C. CURTIS

Bell, K. ed. *Carbonatites: Genesis and Evolution.* London (Unwin Hyman), 1989, xix + 618 pp., 235 figs, 57 tables. Price £85.

This book is timely. Much petrological interest is focussed on the geochemistry of partial melting processes in the mantle, and carbonatites feature strongly in such processes. The book stems from a carbonatite symposium held in Ottawa in 1986.

Of the 23 chapters which comprise the book, five examine the melting processes of variably metasomatized mantle and the nature of the carbonate melts produced, their Mg-rich character and whether they are related to kimberlites and lamproites: Ch. 18 (A. Jones), Ch. 19 (Meen, Ayers and Fregeau), Ch. 20 (Wyllie), Ch. 21 (Haggerty) and Ch. 22 (Eggler). Isotopes, particularly those of Sr and Nd (Ch. 12 by Bell and Blenkinsop) and Pb (Ch. 14 by Kwon, Tilton and Grunenfelder) are used to estimate the metasomatic state of the source mantle and its antiquity (*c.* 2000 m.y.).

Useful tools for modelling carbonatite magmas are provided by the new silicate–carbonate liquid immiscibility phase equilibria data and the silicate/carbonate distribution coefficients of *RE* and other elements determined by Hamilton and colleagues (Chs 15, 16), and by Treiman's new thermochemical and thermophysical properties of carbonate melts (Ch. 5). The chemical and physical characters of extrusive carbonatite lavas and pyroclastic deposits are graphically described by Barker (Ch. 3), Keller (Ch. 4) and Dawson (Ch. 11). Keller's photomicrographs of carbonatite lapilli, shards, spatter and flow textures illustrate well how carbonatite magmas behave.

Carbonatites are now almost commonplace with some 330 occurrences in both continents and oceans; and the Cape Verde occurrences are truly oceanic, being floored by oceanic crust (cf. p. 294). Woolley (Ch. 2) reveals many more in the U.S.S.R. than I had hitherto realized. Woolley and Kempe (Ch. 1) show that nowadays it is necessary to say what sort of carbonatite one is talking about and to give its mineralogy or chemistry. This inevitably leads to identifying carbonatite fractionation sequences. Useful chemical averages are given for calciocarbonatites, magnesiocarbonatites and ferrocarbonatites, which dispel Gold's old 'average carbonatite'.

The origin of carbonatites remains a controversial subject. Almost no support is expressed for the generation of carbonatite magma as a residue from crystallization fractionation of alkali silicate magma. Gittins (Ch. 23) prefers direct melting of partially carbonated mantle, the production of olivine sovite in the crust without the intervention of liquid immiscibility and an increase in the alkali content during carbonatite fractionation. My chapter (no. 17) argues to the contrary: that alkali silicate and carbonate magmas are commonly associated, that experiment shows these two magmas, which can be matched in the field, are related by liquid immiscibility (Ch. 15), and that the carbonate magma so produced could be Na, K-rich and be the source of the fenitization observed around the least fractionated carbonatites. It is also shown how diverse the many paths of carbonatite fractionation can be. Hogarth's chapter (no. 16) is particularly useful. He digests a vast amount of mineralogical data on pyrochlore, apatite and amphibole, much of it in Russian, and produces an invaluable resource for modelling carbonatite fractionation.

Bell has made an excellent job of bringing together so many disparate views into a readable text. However, as he says, not enough is said about fenitization and the role of alkalis, and these to me are among the 'hallmarks' of carbonatite magmatism. Nor are fenite data as sparse as he suggests. The book also fails to do justice to the other half of the carbonatite story, that is the associated alkaline silicate rocks.

Using single column rather than double column format by the printers is unfortunate, but it has forced use of a large print size which is good for those with poor eyesight. Even carbonatitologists will find the £85 excessively expensive. Every Earth Science library will need to buy a copy, as all petrologists, mineralogists and geochemists must consult this book.

M. J. LE BAS

Crawford, A. V., ed. *Boninites and Related Rocks.* London (Unwin Hyman), 1989. xxiv + 465 pp. Price £60.00.

Twice in the last twenty years petrologists have had to come to grips with a new addition to the familiar trilogy of tholeiitic, alkaline and calc-alkaline rock series. Komatiites are now familiar