Australia, Korea, Thailand, Singapore, Malaysia, Afghanistan, Japan, Burma, Indonesia, Papua New Guinea, Kampuchea, Laos, and Vietnam. While browsing through this lengthy tome the thought occurred to me that perhaps the natural boundaries in regional geology should be plate margins and that a text on the geology and mineral resources of a single plate might have a more coherent theme. This volume provides a collection of studies ranging from abstracts to full papers on a tremendous range of different topics (see MA 80-2796 [1]-[41]). Despite the fact that this diversity makes it a volume to dip into, rather than read steadily from cover to cover, taken as a whole it does provide a good starting point and background to the geology of this part of the Earth and should be useful to all those interested in this. It is particularly refreshing to see two papers on aspects of the geology of Burma (one is by U Khin Zaw on fluid inclusion studies of the Hermingyi tin-tungsten deposit and the other by Dr Goosens on the Metallogenic provinces) since so little recent geological information on Burma has been published with the notable exceptions of the two recent publications by IGS (Garson *et al.*, 1976 (MA 77-2211)) and Mitchell *et al.*, 1977 (IGS Overseas Geol. Mem. **51**) and by Mitchell, 1981 (MA 82-82M/0201). The standard of the production is adequate although the English is not always perfect. There are a number of bibliographies and the book will prove an invaluable source of reference.

R. D. BECKINSALE

Dawson, J. B. *Kimberlites and their Xenoliths.* Berlin, Heidelberg, and New York (Springer-Verlag), 1980. xii+252 pp., 84 figs. Price DM 88.00 (US $52.00).

Over the past 15 years, following the discovery of the Siberian kimberlite province, and a new opening up of the South African deposits to outside researchers, there has been an enormous increase of information on kimberlites, exemplified by two international conferences in 1974 and 1977. Proceedings of the First Kimberlite Conference make a heavy tome, while those of the Second required two volumes. In spite of these, and all the other publications on the subject, coverage has become not only profuse but lopsided—most of the literature in English relating to southern Africa examples, with most of the Russian literature devoted to Siberian kimberlites. There has been a growing need for a small book providing a synoptic view of kimberlite, and for members of the Society it is apt that this should be provided by our 1980 Hallimond Lecturer.

After an interesting, brief historical introduction, chapters 2-6 are devoted to the distribution, geology, petrography, geochemistry, and mineralogy of kimberlites. Chapter 7 fills a third of the book, and deals with the xenoliths in kimberlite. A short chapter 8 covers the megacrysts (large single crystals and intergrowths) found in kimberlites. Dawson elects to follow the time-honoured path of descriptive discourse. Although this offers the advantages of an ostensibly neutral position, inevitably, in summarizing complicated matters, the examples and the emphasis must be personal choices. The route also has some danger in that connections might be missed. For instance, the eruptive state of kimberlite at high crustal levels is of vital concern, and shallow intrusions are rightly given special treatment in the petrography chapter, but the only seemingly acceptable case of a kimberlite lava flow is not. Interpretive discussion is largely reserved until the last two short chapters, 9 (subcontinental crust and mantle) and 10 (kimberlite genesis). Considerations of these must be left to the cognoscenti, a short review such as this allowing comment only on a few factual matters.

The most crucial matter must be kimberlite itself. Chapter 2 gives a sorely needed account of the distribution and tectonic setting of kimberlites, but even here uncertainties start to creep in about whether particular cases can correctly be called kimberlite. In fact, any reader without previous acquaintance with kimberlite would be advised to make a quick perusal of chapters 4, 5, and 6 before serious reading of chapters 2 and 3, because the only prior description has been a reference to mica-peridotite in the Introduction. Even with the aid of these later chapters, which describe the attributes of kimberlite, it may appear surprising (and tantalizing) to find no explicit petrographic-mineralogical-chemical definition. In several places kimberlite is described as a 'complex, hybrid rock', and it becomes clear that precise definition is a major unresolved problem. A range of minerals may be present but there seem to be no agreed limits on proportions (even presence or absence)—mica-peridotite hardly seems appropriate to a rock that may contain up to 50% phlogopite, or none at all (p. 104)! It must surely be this lack of an agreed definition that permits some of the needless modern controversy about the relationship of kimberlite to other magmatic rocks. If no-one can say precisely what kimberlite is, then its genealogy *can* be anyone's guess. Of course, everyone must agree that kimberlite is the stuff that fills 'diamond pipes', but this offers a disconcertingly wide range of composition, and if you then go further and admit the possibility of kimberlite without diamond, all the nomenclatural demons are out of

the box. Perhaps Lewis's original definition, which specified diamond as an essential constituent, was more percipient than we thought. It would be naïve to expect this exceptional eruptive rock to submit to the standard classificatory devices applied to the more common magmatic rocks, but it is a pity not to find a more searching examination of the issue, if only to see how the nettle of kimberlite definition (and its relationship to other magmatic rocks) might be grasped. Kimberlite composition is complicated horribly by the content of extraneous material, and post-emplacement alteration, so that a recent attempt at kimberlite classification on the basis of olivine-free groundmass compositions merits serious consideration.

Lack of mineralogical boundaries means that rock chemistry is equally unconstrained and to provide for this, averages are given. Listing of average ultramafic and ultrabasic rocks is valuable, and could have been extended to include average alnöite, melilitite, and leucitite as well. Averages without ranges are always a mixed blessing, and one can only boggle at the Siberian kimberlite average (623 samples) showing 18.7% H_2O^+. For this reason, the chemical composition range diagram is a good idea, but the limits shown do not encompass all the data tabulated, and the marked average positions do not correspond with those in the table. Analyses of dyke and sill kimberlites are usefully separated in another table (some of these such as Benfontein being 'virtually uncontaminated by xenoliths') and even here the ranges they exhibit are still staggering, e.g. K_2O contents from 0.05% to over 5%. Not only is kimberlite a hybrid *rock* but the analyses quoted seem consistent with the claims of some other workers that kimberlite 'liquid' itself is an inhomogeneous mix. In the present state of knowledge, expressions such as 'pristine kimberlite' (p. 53), 'the kimberlite liquid' (pp. 49, 65, etc.) and 'kimberlite magma' (pp. 41–2, etc.) must be recognized as conceptual, for (as the author indicates on p. 223) they are not susceptible to any precise definition: indeed, the singular noun itself may be delusive. Dawson's use of 'complex, hybrid' continually alerts us to the difficulty, and with the addition of the trace element and isotope geochemistry, and a comprehensive chapter on mineralogy, the book happily provides an up-to-date view of the scope and complexity of the materials that currently come under the name kimberlite.

Xenoliths are easier to categorize than the kimberlites they contaminate, but it is their diversity that makes kimberlite so hard to pin down. So much has been written about them that to produce a review in itself is a major undertaking. In Chapter 7 Dawson classifies first on probable depth of origin, and then after a summary of the crustal xenoliths, concentrates on the mantle samples. These are grouped into four clear categories (peridotites/pyroxenites; eclogites; metasomatized peridotites; and glimmerites) plus a fifth group for miscellaneous xenoliths (which turns out to comprise only the 'alkremite' group of xenoliths, plus one other specimen). The complex mass of data is sifted, summarized, and well presented with the aid of tables, diagrams, and photographs. The following chapter provides an equally skilful view of the megacrysts in kimberlites.

In the coverage throughout the book, and in the bibliography, the reader is treated to the distillation of many years of active experience in the study of these fascinating rocks. Somewhat disappointingly, the finished product is flawed by many typographical and textual errors, but if someone throws a lifeline across a rising flood of information, do not complain unduly where it is rough or tangled: grab it and be thankful. I shall certainly hang on to my copy!

D. K. BAILEY

Morse, S. A. *Basalts and phase diagrams: an introduction to the quantitative use of phase diagrams in igneous petrology*. Berlin, Heidelberg, and New York (Springer-Verlag), 1980. xvi + 493 pp., 241 figs. Price DM 62.00 ($36.60).

This is one of those curious books which has a sub-title giving a very different emphasis from the title and a text which is a hybrid between the two. The sub-title immediately raises the question of whether this is supposed to be a book about the geometry of phase diagrams or a latter-day version of Yoder's monograph on basalts. The answer lies in the sub-title. The core of this admirable volume is an exceptionally elegant and detailed exposition —written in a lucid and pungent style—of both crystallization and melting in the principal phase diagrams which are commonly used in attempts to understand the evolution of basic magmas at low pressures. The level of detail may be judged by the example of the description of the system diopside–anorthite–albite at one atmosphere. This occupies a complete chapter of 43 pages, including 29 meticulously drawn diagrams. The analysis of forsterite–diopside–silica requires 35 pages and even albite–anorthite is dissected at a level of detail running to 14 pages. This display of geometric gymnastics and the accompanying clear expositions of such matters as the phase rule should make the book a necessity for anyone working or studying in this field.

But what is the field? Dr Morse clearly considers it to be the genesis and evolution of basic magmas