The three initial chapters are devoted to the fundamentals of electron-probe instrumentation, X-ray generation, and quantitative analysis, and high-resolution scanning electron microscopy. They are followed by reviews of the application of electron-probe microanalysis in the fields of solid-state electronics, geology, ceramics and glass technology, analysis of biological materials, and the analysis of free particulates. An especially useful feature of these chapters is the extensive bibliographies: there are, for example, some 1000 references to applications in the geological field, classified under the broad headings: analysis of coexisting minerals, new minerals, tektites and impact glasses, etc.

Chapters on soft X-ray spectroscopy, cathodo-luminescence, and the Kossel X-ray diffraction technique complete the section concerned with analytical methods depending on electron excitation.

The comprehensive, though necessarily smaller sections devoted to laser and ion-microprobe techniques give a clear exposition of instrumental development, the complex interaction of the incident beam with the specimen, and of the problems associated with the quantitative interpretation of measured intensties.

In recognizing that coverage of this very wide field of research is an almost impossible task for a single author, one must also accept the practical limitations of an edited collection of specialist articles and inevitably, a degree of incoherence, overlap, and omission. *Microprobe Analysis* is relatively free of these defects, although under this title one would have liked to find an extension of the treatment of high-resolution scanning microscopy to include an assessment of the present performance of electron-microscope-microanalyser combinations in quantitative analysis and a tentative forecast of the analytical possibilities with very thin sections afforded by scanning-transmission electron microscopes using field-emitting electron sources. Further, space devoted to a short review of the situation in the field of proton-probe exitation rather than to electron-beam fabrication techniques might be more appropriate in a volume concerned with analysis. It is clear too, that this volume has been in preparation for some time: an extension of the practice adopted in one chapter of including more recent references at the proof stage would have delayed the need for revision, which in some sections will become necessary in the quite near future.

These are, however, minor criticisms of a useful compilation that can be recommended both to established workers and newcomers to the field.

J. V. P. LONG

DOBRETSOV (N. L.), KHLESTOV (V. V.), and SOBOLEV (V. S.). *The facies of regional metamorphism at moderate pressures.* Transl. from the Russian by D. A. BROWN. Canberra (Australian Nat. Univ. Press), 1973. viii+297 pp., 57 figs., 16 tables. Price $A8.95.

This volume, the third of the four-volume series prepared under the editorship of V. S. Sobolev and translated into English by Professor Brown, must, like its two predecessors, form essential reading for all metamorphic petrologists. The extensive coverage

of the Russian literature combined with the very adequate summaries of the more familiar Western accounts render this a unique and unrivalled reference work. The first two chapters are concerned with the Bipyroxene-gneiss facies (granulite facies) and the accounts, with maps, of the Ukrainian and Siberian shields are particularly valuable. However, the Western reader, weaned on Turner's translation of Eskola and all that has followed, must steel himself to some surprises. 'The facies of regional metamorphism at low pressures' are taken to comprise all rocks regionally metamorphosed at pressures less than those of the andalusite–kyanite and the sillimanite–kyanite univariant curves. We thus find the bipyroxene facies (= Eskola's granulite facies) slashed in two with virtually no mention of the Central European granulites and in particular the work of Smulikowski and his colleagues on the Silesian granulites. No doubt these will find a place in the fourth volume on high-pressure metamorphism; but the division adopted here, cutting across naturally related associations, is to me irritating and artificial.

The third to sixth chapters concern the amphibolite facies; the epidote–amphibolite facies; andalusite–sillimanite sequences (seven regions discussed); and the greenschist facies. Here too the rejection of kyanite has some curious consequences. In the Scottish Caledonian, for example, the 'Buchan' sequence falls within the scope of the book, and is described in Chapter V, on metamorphic assemblages of the andalusite–sillimanite type. The low-grade assemblages of the 'Barrovian' zones fall within the scope of Chapter VI, on the greenschist facies, but the higher, kyanite grade associations of this sequence must perforce be omitted. It is perhaps this artificial separation that has encouraged the authors to resurrect the hoary chestnut that 'Buchan' metamorphism is a subsequent, post-tectonic superimposition on an earlier, syntectonic pattern of 'Barrovian' zones.

In general, however, the authors eschew such judgements and confine their accounts to factual summaries of the mineral associations developed, illustrated by maps of the metamorphic zonations observed in various regions, with little petrogenetic analysis. An interesting exception, Chapter VII on 'Low-Temperature metasomatic processes and regional epigenesis', treats the zeolite facies from a strongly metasomatic viewpoint, including a brief account of sea-floor metamorphism and spilite formation with a curious emphasis on the occurrence of rhodusite (*not* crocidolite) in low-grade metamorphism.

As in the previous volumes the translation appears to be excellent and the printing, by photo-offset, is clear. G. A. CHINNER

MILLIMAN (J. D.). *Recent sedimentary carbonates. Part I. Marine carbonates.* Berlin, Heidelberg, and New York (Springer-Verlag), 1974. xvi+336 pp., 94 figs., 39 pls. Price DM 66.00 ($27.10).

This first part of a two-volume treatise on carbonate sediments is an attempt to synthesize man's knowledge of calcium carbonate in the marine environment in terms of composition, sedimentation, and diagenesis. Discussion is restricted to marine