

Holocene materials, and thus ancient limestones, freshwater carbonates, and subaerial diagenesis are not considered. The text, based upon the author's considerable experience and an impressive number (about 1300) of cited references, is arranged into four parts: I, carbonate mineralogy; carbonate equilibria in seawater; and a brief discussion of the various analytical methods used to investigate modern carbonate sediments. II, a comprehensive description of the different types of skeletal and non-skeletal components found in present-day marine sediments. III, carbonate sedimentation (*a*) in shallow water environments such as coral and other organic reefs, (*b*) on the continental shelves, and (*c*) in the deep-sea. IV, diagenesis, including carbonate degradation processes, cementation, and dolomitization. Two appendices provide a guide to the identification of carbonate components in both thin-section and under reflected light.

Treatment of the subject-matter is reasonably well balanced, up to date, and generally well illustrated, although information in many of the photographs is obscured by their unusually small size. It is unfortunate that greater care was not exercised in the spelling of generic and specific names, and that deep-water coral deposits are considered reefs when even the cited authors refer to them as banks rather than reefs, preferring to reserve the latter term for wave-resistant structures. As a work of reference, the volume suffers from an inadequate subject index. A reader searching for 'continental shelf' and 'coral', for example, will find these entries between the words '*Coccolithus*' and '*Coccospheres*'. Much more annoying, however, is the failure to subdivide index entries; under 'calcite' one is referred to 97 different pages without any further indication of what aspect of the mineral is under consideration. Despite these minor reservations, however, there is little doubt that this book represents a major, important contribution to the literature on carbonates, and it is likely to remain so for some time to come.

J. N. WEBER

HUTCHISON (C. S.). *Laboratory handbook of petrographic techniques*. London and New York (Wiley-Interscience), 1974. xxx+527 pp., 148 figs. Price £10.60.

Descriptions of many of the petrographic techniques in everyday use are often only to be found scattered in the literature or passed on from laboratory to laboratory. It has been the author's intention to remedy this situation by bringing together many of the commonly used techniques generally applicable to igneous and metamorphic rocks. This book includes methods for staining techniques, modal analysis, photomicrography, conoscopic methods for the polarizing microscope, the spindle stage, mineral separation, X-ray powder diffraction, determination of specific gravity and refractive index, individual chemical determinations (e.g. ferrous iron, water, fluorine, CO₂), XRF, AAS, and DTA techniques, and the recalculation and plotting of results.

The emphasis here is on keeping theoretical discussion to a bare minimum so that the techniques will be available not only to the experienced research worker but also to students and laboratory technicians who normally would not consult original

articles in which theory and practice are not always easy to separate. Throughout the text there are copious references to the literature but the reader is sometimes left wondering which techniques the author is recommending from personal experience as opposed to simply assembling a recipe book.

Inevitably in a book of this type one looks for one's own familiar problems hoping to find new solutions. In the chapter on mineral separation the sub-section on flotation is welcome, particularly for the suggestions for separating oligoclase from quartz. Although the individual techniques of magnetic separation and density separation are each given in detail there is a need for an over-all plan of campaign; whether a ferromagnesian or a light mineral is sought, the rock powder should be split first into more-magnetic and less-magnetic fractions on the separator before even considering the possible use of heavy liquids at a later stage. The use of a hand magnet and a corked glass tube is an easier and much cheaper way than the ferromagnetic separator for separating highly magnetic grains before the sample is fed to the isodynamic separator. Clerici's solution darkened by overheating can be cleared by filtering through powdered charcoal.

The chapter on the recalculation and plotting of data will be of interest to most petrologists and it is useful to have the full rules for calculating the C.I.P.W. and Niggli norms (though most research students nowadays use a computer programme for this and hence often fail to appreciate the meaning of their results). The recalculation of mineral analyses is explained and various different methods of expressing chemical analyses of minerals in terms of end-members are given, with examples for pyroxenes and amphiboles but not for the recalculation of a garnet into its end-member molecules.

No really comprehensive account of petrographic methods has been produced since the now classic *Petrographic methods and calculations* by A. Holmes, published in 1921; the present work largely replaces this, and in addition covers modern XRD, XRF, and AAS techniques. Brief mention is given of the production of polished specimens and the determination of microindentation hardness but none of the measurement of reflectivity or of etch techniques; ore mineralogists, however, have their own specialist literature and one would not expect to find full details in this general manual. It already covers a large field and covers it well, with the addition of very full references and a selected list of companies that supply equipment and materials for the techniques described. This is a book not so much for the library as for the laboratory shelves and for the shelves of all mineralogists and petrologists.

R. A. HOWIE