

BOOK REVIEWS

Mandarino, J. A. and Anderson, V. *Monteregian Treasures: the Minerals of Mont Saint-Hilaire, Quebec*. Cambridge & New York (Cambridge Univ. Press), 1989. xiv + 281 pp. Price £60.00.

Mont Saint-Hilaire is about 40 km east of Montreal and is unique in the large number of mineralogical species found in a very small area. A suite of igneous rocks occur as a funnel-like mass of peralkaline syenites, nepheline syenites, sodalite syenites, phonolites and intrusive breccias that contain xenoliths of kaersutite-bearing gabbro and hornfelsed shales and siltstones. Some 221 mineral species have been recognized so far, including 126 species of silicates, 30 carbonates and 20 oxides. In this book there are 161 individual species descriptions and 20 group descriptions (including 60 species). Each description includes details on the physical properties, paragenesis, optical properties, chemical data and crystallography (unit cell data and morphology). The text is illustrated with 75 line-drawings or black-and-white photographs and by 90 colour photomicrographs. Numerous appendices provide X-ray diffraction powder data, a tabulation of the species and the environments in which they occur, and the results of numerous microprobe or chemical analyses.

The authors note that an important aspect was the decision of the quarry operators to allow collectors to visit the quarries and to obtain specimens. The discovery by an amateur collector of a pink mineral in large euhedral crystals, later identified by Perrault as serandite, and the description of this and several micromount species from Mt Saint-Hilaire at two scientific meetings, started a rush to the mountain by professionals and amateurs alike. The professional interest was spurred on by field trips e.g. during the International Mineralogical Association meeting in Montreal in 1972, but it is nevertheless true that it was the amateur mineralogists who did most to promote the locality.

Fifteen species have been found for the first time at Mont Saint-Hilaire and several other new species are currently being studied. This book thus represents an eclectic mix of high-quality scientific data on each of the 221 established mineral species, together with aesthetically

appealing colour photomicrographs of such items as a long, purple, prismatic crystal of cancrinite, an octahedron of pyrochlore implanted on an aegirine needle, a twinned sixling of epididymite and both cubic and octahedral crystals of villiaumite. There are a few places throughout the world where various processes have acted on local concentrations of different chemical elements to give large and diverse suites of minerals. The Franklin–Sterling Hill deposit in New Jersey and the Långban district in Sweden are two well known examples, but nepheline syenite complexes in the Kola Peninsula, Norway and Greenland are equally prolific. Mont Saint-Hilaire must now join the list of unique mineral localities where a large number of species are found in a very small area. This book is not only an artistically attractive ‘coffee-table’ volume, but also a definitive scientific record of this important assemblage.

R. A. HOWIE

Van Loon, J. C. and Barefoot, R. R. *Analytical methods for geochemical exploration*. San Diego and London (Academic Press), 1989. x + 344 pp. Price £34.40.

This timely book fulfils admirably its stated objective of providing the practicing analyst with proven methods for geochemical exploration. It does not purport to explain the detailed theory of the three main analytical techniques that it considers, namely atomic absorption, plasma source atomic emission and X-ray fluorescence. The emphasis is rather on providing the complete methodology required for the application of these techniques to the analysis of exploration samples, such as rocks, sediments, soils and herbage.

The strengths of this book lie primarily in the level of experimental detail that has been transferred from the original publications of the methods. Particularly important is the inclusion of the data quoted for the validation of the methods, both for precision and accuracy. Other strengths include the discussion of the potential errors that can arise in the often neglected operations of the physical preparation of the samples. A chapter devoted to field-based methods updates the

options available from traditional colorimetric methods to include an evaluation of more sophisticated portable instrumentation, which may revive interest in this approach to exploration.

There are a few weaknesses. The omission of consideration of instrumental neutron activation analysis is perhaps understandable given the limitations imposed by the modest size and price of this volume. A greater degree of constructive criticism of some of the quoted methods would however have been welcome. The method described for the determination of tellurium, for example, has been validated only at low concentration levels in two silicate reference materials, and interference investigated from only two elements. This method is a useful contribution but the inevitable uncertainties of its applicability to general exploration samples should be stated.

I would also have liked to see more comparison of the relative merits of the various techniques for certain analyses, particularly their particular suitability with regard to accuracy and susceptibility to interference for difficult types of sample.

Overall I'm sure that this volume will provide a valuable resource for analytical geochemists working both in exploration and more general areas of geochemistry.

M. H. RAMSEY

DePaolo, D. J. *Neodymium Isotope Geochemistry: an introduction*. Berlin, Heidelberg and New York (Springer-Verlag), 1988. xii + 187 pp. Price \$49.50.

At last after a decade and more of significant advances in petrogenesis as a result of the Sm-Nd isotopic technique, a text devoted to the subject written by one of the pioneers. It is divided into three parts: I) Principles and Processes; II) Nd isotopic variations—a planetary perspective; and III) Nd isotopic variations—petrographic studies. For most geologists and geochemists section III is perhaps the most important. Most topics are covered to a satisfactory degree, others much too briefly. Despite the 1988 publication date and an extremely up-to-date reference list for the author's work, a considerable amount of work published several years previously has been omitted. This is unfortunate because such a text above all could be a very valuable reference source for students. One of the most inexplicable omissions is the highly significant application of the Sm-Nd technique to problems associated with diamond genesis and the implications of micro-inclusion work for our understanding of Archaean pro-

cesses and Earth evolution (e.g. Richardson *et al.*, 1984, 1985). Acknowledgement of this work would have helped give a less biased view in the petrogenetic section with regard to the existence of a major trace element repository in the lithosphere which reaches 200 km in depth under the Archaean crust (see page 110). Otherwise an interesting and timely text that unfortunately will not land on the desks of the graduate students who should read it due to the price.

M. A. MENZIES

McMurray, G. R., ed. *Gorda Ridge: a Seafloor Spreading Center in the United States' Exclusive Economic Zone*. Berlin, Heidelberg and New York (Springer-Verlag), 1990. xv + 311 pp., 122 figs. Price DM 182.00.

Some 39 authors contributed to the 22 papers in this book reviewing work on the 300 km long Gorda Ridge which lies off the Pacific coast of northwestern USA. Being the only spreading ridge in the US 200 mile EEZ declared in 1983 it was guaranteed detailed attention, and the discovery of hydrothermal vents in 1988 ensures that more studies can be expected. Though concerned with what, after all, is only a short section of the global ridge system, and certainly a feature which is atypical of Pacific ridges, being deeper and slower spreading, the book describes every facet of that Ridge as it was known in 1986 with updates to 1988. As such the book is an all embracing reference to the techniques which may be brought to bear in the study of ocean ridges. Nearly half the book is concerned with the mineral potential of the Ridge, the remainder being equally divided between technologies for ridge exploration and exploitation and the ridge's benthic ecology. Well illustrated and well referenced, it represents good value at DM 182.

A. J. SMITH

Daly, J. S., Cliff, R. A. and Yardley, B. W., editors. *Evolution of Metamorphic Belts*. London (Geological Society: Special Publication No. 43), 1989. x + 566 pp., 72 figs., 50 maps. Price £80.00.

The papers in this volume were accepted for presentation at a joint meeting of the Metamorphic Studies Group (of the Mineralogical and Geological Societies) and IGCP Project 235 (Metamorphism and Geodynamics) held in Dublin in 1987.