

BOOK REVIEWS

Kristjansson (L.), Editor. *Geodynamics of Iceland and the North Atlantic Area*. Dordrecht and Boston (D. Reidel Publishing Co.), 1974. viii+323 pp., 141 figs. Price \$30.00, Dfl. 75.

There is much of interest to petrologists in this volume [M.A. 76-1343], which contains the proceedings of a NATO Advanced Study Institute held in Reykjavik in July 1974. There are papers on many aspects of crustal structure in the North Atlantic region, including the results of magnetic, bathymetric, gravity, seismic, and heat flow studies. About a third of the book is devoted to petrology and geochemistry.

Aumento and Sullivan describe deep drillings into the North Atlantic crust at three sites: on the axis of the Mid-Atlantic ridge at 45° N., on the Bermuda seamount, and on São Miguel Island, Azores, and draw a diagrammatic cross-section of the Mid-Atlantic ridge based on the petrology of the core samples. Keen and Clarke compare the chemistry of Tertiary basalts west of Greenland with those of Iceland and the Reykjanes ridge, and assuming the latter to be a 'hot spot' postulate an analogous former hot spot in the Baffin Bay region. Brooks and Jacobsson review the chemical variation in North Atlantic ridge basalts. The predominant types are FETI (Fe, Ti-rich) and MORB (mid-ocean ridge basalt) tholeiites, with quantitatively insignificant alkali basalts in areas of deep-seated fracturing. An independent origin of the MORB and FETI tholeiites is favoured, rather than differentiation of one to give the other. Sigvaldason and Steinthorsson discuss the origin of Icelandic tholeiites in more detail, and like several of the other authors have chosen to adopt the idea of hot spots and mantle plumes. Two papers by Walker describe the structure of eastern Iceland and eruptive mechanisms in Iceland. Arnorsson discusses the composition of thermal fluids in Iceland, distinguishing between high-temperature areas where water is heated by shallow intrusions, and low-temperature areas where water is heated by hot rocks during deep convection. Temperature, rock composition, and seawater influx are believed to be the main controls of fluid composition, and the high sulphide contents of some hot waters maybe have a juvenile source. A. HALL

Gonser (U.), Editor. *Mössbauer Spectroscopy* (Topics in Applied Physics, vol. 5). Berlin, Heidelberg, and New York (Springer-Verlag), 1975. xviii+241 pp., 95 figs., 1 pl. Price DM 70 (\$30).

This book is intended to provide an introduction to the principles and applications of Mössbauer spectroscopy in solid-state science. In the reviewer's opinion the book achieves this object reasonably well, although the scope of the subject has necessitated the omission of several topics that would have been of mineralogical interest.

The first chapter (by U. Gonser) begins with a description of γ -ray resonance spectroscopy and the significance of Mössbauer's discovery of the recoil-free fraction of emitted γ -rays. It proceeds with a clear discussion of the important Mössbauer parameters, isomer shift, quadrupole splitting, nuclear Zeeman effect, etc., and concludes with a brief description of the techniques of spectral measurement.

The remaining five chapters [M.A. 76-100] are devoted to the application of Mössbauer spectroscopy in the following disciplines:

Chemistry. The dependence of quadrupole splitting and isomer shift on oxidation state, bond type, and molecular symmetry.

Magnetism. The sign of the internal magnetic field. Magnetic structure and magnetic transition studies.

Biology. A discussion of the oxidation and spin state of iron in haemoglobin and of the structural information obtained from studies of iron-sulphur proteins.

Lunar Mineralogy (by S. S. Hafner). The determination of the oxidation state of iron in lunar rocks and of the relative proportions of superparamagnetic and ferromagnetic iron metal in the soil. The author discusses the determination of site populations in pyroxenes and plagioclases and their use as indicators of cooling history. Because of the restriction to lunar material there is no discussion of a number of important mineral groups (amphiboles, garnets, and micas, for example) for which Mössbauer data are available.

Metallurgy. Information on order-disorder and structural arrangements in alloys. Phase equilibrium and precipitation studies.

Much of the introductory chapter is, unfortunately, duplicated in chapters 2, 3, 4, and 6 to the exclusion of more than a brief discussion of Mössbauer isotopes other than ^{57}Fe . Description of non-crystalline states and of the effect of pressure on the Mössbauer effects in solids would also have been of interest. Despite these criticisms the book is a useful source of information and references for those wishing to find out about the applications of Mössbauer techniques.

B. J. WOOD

Anderson (B. W.). *Gemstones for Everyman*. London (Faber & Faber), 1976. 368 pp., 29 figs., 25 pls. (9 in colour). Price £15.00.

The *sobriquet—maestro*—is not usually employed in assessing scientific attainment but a sufficient aesthetic *aura* surrounds precious stones to permit its occasional use for a gemmologist. It is peculiarly appropriate for the writer of this latest book on gemstones. The author, already well known for his *Gem Testing*, which has demanded eight editions since 1942, has the experience of forty-six years in the London Precious Stone Laboratory, which, although it explains the origin of his confident authority, fails to reveal the source of the limpid lucidity that permeates this delightful book—sufficient that it is there for the reader's pleasure.

The first third of the volume comprises an easily digested general section concerning definitions and nomenclature, occurrence and extraction, cutting and polishing, followed by some elementary crystallography, optical mineralogy, and physical properties of gemstones, the whole accurately pitched at a selected level for 'everyman'. It must not be criticized for failing to attain a depth that was not intended. Indeed there is a deftness and surefootedness in the way these topics are disposed of that testifies to the author's proficiency as a teacher. Here, as in the whole book, the narrative is ornamented with light-hearted asides and digressions, which impart a sort of breeziness to the writing altogether quite refreshing. A condensed account of the history of diamond extraction (9 tons in 1971), how to detect a genuine crystal ball from a spurious glass example and what to pay for it, is information to be savoured by the curious and not easily come by.

The middle third of the book deals with the conventional precious and semi-precious stones in more detail than the title of the book would lead us to expect. Geographical varieties are described together with the history of their discovery and exploitation. This account is well illustrated, the coloured plates of gems being admirably faithful. The astonishing predilection for deception in the jewellery trade must warn all mineralogists that gemmology is not some minor accomplishment lightly to be taken up for the purposes of passing an opinion but a specialism to be respected in its own right. The question of imitation composite and synthetic gemstones forms a chapter in the last third of the book, which also deals alphabetically with the minor semi-precious stones, often of more interest to collectors of faceted stones than for their demand in the jewellery trade. This section contains superb digressions on taafeite and