BOOK REVIEWS

Nicholson, K., Hein, J. R., Bühn, B. and Dasgupta, S., Eds. *Manganese Mineralization: Geochemistry and Mineralogy of Terrestrial and Marine Deposits*. London (Geological Society: Special Publication No. 119), 1997, vi + 370 pp. ISBN 1-897799-74-8. Price £69.00 (Price to Members £34.00).

The book is a collection of papers that were an outgrowth of three IGCP 318 meetings in Germany, the UK and India. After a short introduction by the editors and an overview by S. Roy, the remainder of the book is broken into three sections. The first describes the manganese deposits of the Precambrian, the second describes those of the Cenozoic, and the third is a mixture of papers dealing with the geochemistry or mineralogy of manganese in general.

The overview by S. Roy is a good synopsis of the types of manganese deposits that occur, how they vary through time, and their methods of formation. This paper and those that follow show the importance of manganese deposits as being much greater than just their economic value. Manganese deposits reflect the changes that were taking place in the Earth's atmosphere and hydrosphere during that time, and give us a window into this evolutionary process. There is a reason, as pointed out in these papers, why high-grade manganese deposits are scarce in the Archaean and Proterozoic, but abundant in the Phanerozoic, and it is related to the chemistry of the oceans and how they evolved from the Earth's early history to more recent times. In order to form manganese deposits, the manganese must be able to be chemically separated from the iron that it normally travels with. In the Phanerozoic, large quantities of Fe were removed from the oceans in the form of pyrite, allowing the Mn to later precipitate in oxidizing conditions without the diluting effect of the iron, thus forming giant shallow-water manganese deposits. In the Precambrian, less of the iron was removed as pyrite. Therefore the iron and manganese precipitated together to form banded iron formations with only diluted concentrations of manganese.

Many other factors also control the amount of manganese deposits through time, as pointed out by these authors. Global periods of manganese deposition have been correlated to periods of glaciation and palaeotectonic events, such as the breakup of supercontinents. In addition to the general discussions of the manganese deposit formation, the majority of the papers in this volume dealt with specific deposits or types of deposit, with all of the detail needed for researchers in these topics.

Some of the most interesting articles in this book, from my parochial point of view, were those in the last section on the geochemistry and mineralogy of manganese. Articles are included that covered the behaviour of manganese in low-temperature solutions, the ability of manganese oxides to adsorb other cations, the metamorphism of manganese sediments, and last, but definitely not least, determining the oxidation state of the manganese in minerals using the shape of its X-ray emission peaks.

In general this is a very comprehensive book that covers the important aspects of manganese mineralization. It is well worth the read for those interested in this group of mineral deposits, how they form and what they can tell us about the Earth's history itself.

P. McSwiggen

McGuire, W. J., Jones, A. P. and Neuberg, J., eds. *Volcano Instability on the Earth and Other Planets*. London (Geological Society Special Publication No. 110), 1997, viii + 388 pp. ISBN 1-897799-60-8. Price £35.00.

Interest in the instability of volcanoes increased hugely with the catastrophic eruption of Mt St Helens in 1980 and this topic has become a major area of study for volcanologists throughout the world. This volume, which resulted from a conference of the same name held in 1994, brings together 26 papers. The range of topics is as wide as is suggested by the title from studies of terrestrial volcanoes to those on other planets of our solar system. The volume begins with two reviews of volcano instability, the first from a general point of view (McGuire) and the second which emphasises the planetary perspective (Head). Only two other papers concern instability on planets other than Earth: one examining calderas on Mars (Crumpler) and the other Modified domes on Venus (Bulmer and Guest). Five papers cover possible

different causes of instability including: dyke intrusion (Elsworth and Voight; Tibaldi); pore pressures (Day); regional stresses (Russo *et al.*) and basement geology (Van wyk de Vries and Borgia). Unsurprisingly there is a strong emphasis on European volcanoes, in particular there are five papers alone concerning instability on Mt Etna. These include: coastal elevation changes (Firth *et al.*); slope stability and eruption prediction Murray and Voight); aseismic creep (Rasà *et al.*); the boundaries of large scale collapse (Rust and Neri) and recent seismicity (Montalto *et al.*). In addition there are seven other papers covering aspects of other volcanoes in Southern Italy and Sicily.

The different ways in which volcanoes may undergo instability are tackled by the bulk of the papers. There are four papers on caldera formation. These include Mars (see above), Deception Island (Marti *et al.*); Bracciano, Italy (DeRita *et al.*) and Roccamonfina, Italy (DeRita and Giordano). Gravitational landsliding particularly on island volcanoes and the Tsunami related hazards are represented by papers on the Canary Islands (Carracedo), Hawaii (Garcia) and Kick 'em Jenny in the Eastern Caribbean (Smith and Shepherd) and Piton de la Fournaise, Réunion (Labazuy).

Details of the deposits or products of instability are covered by only two papers both of which cover a range of deposit types on Mt Vulture, southern Italy (Duncan *et al.*) and Hokkaido, Japan (Yamagishi). I would have welcomed more on debris avalanche deposits although this is only a minor complaint as any book which covers such a wide theme as volcano instability will always have some omissions.

Other papers cover subjects such as spectral analysis of volcanic tremor on Stromboli (Carniel *et al.*), recent up lift on Ischia, Italy (Buchner *et al.*) and topographic characterization of volcanoes (Garvin).

Generally this volume is comprehensive and I would recommend it to anyone working in the important field of volcano instability. P. D. COLE

Hochleitner, R., von Philipsborn, H. and Weiner, K. L. (Kristallzeichnungen von Rapp K.). *Minerale: Bestimmen nach äußeren Kennzeichen. 3. Auflage der 'Tafeln zum Bestimmen der Minerale nach äußeren Kennzeichen' von Hellmut von Philipsborn.* Stuttgart (E. Schweizerbart'sche Verlagsbuchhandlung/Nägele U. Obermiller), 1996. vi + 390 pp. ISBN 3-510-65164-2. Price DM 98~OO.

This is the third edition of a book which has a long tradition in the German mineralogical literature. Various versions of these tabulated mineral properties have existed since their first publication in 1866 by Albin Weisbach, the Professor of Mineralogy at Freiberg. The philosophy of the book is in many ways similar to the early versions of Dana's Mineralogy, where it was argued that Mineralogy was a subject which cultivated the powers of observation, "a most essential element in the education of young people of both sexes."

The book is essentially a tabulation of mineral properties grouped according to the two most obvious macroscopic features – the colour of the streak, and secondly, the hardness. The Introductory chapter (60 pages) gives a broad outline of the chemistry of minerals including atomic weights and symbols of the elements in alphabetical order, and follows with a description of properties such as hardness, tenacity, density, streak, colour, lustre and so on. A further section deals briefly with mineral genesis in magmatic, sedimentary and metamorphic environments. The chapter concludes with a section on the external crystallographic features of minerals, dealing with symmetry and morphology in a traditional way.

The main body of the book lists, in over 300 pages, tabulations useful for mineral identification. It begins with an index defined by the principal chemical constituents, so that it is possible to refer to all sodium-bearing minerals, for example. A second table lists 487 minerals according to the streak-colour and the hardness. Each of these minerals, tabulated in the same sequence, is described in the rest of the book. The descriptions all follow the same format and are tabulated in rows and columns across facing pages. Each mineral is given a name, formula and general chemical analysis; the physical properties are listed, a drawing of a typical morphology included, and the crystal habit described. Another column comments on paragenesis and finally, a note is made of other similar minerals.

The book concludes with a section containing 64 colour photographs which group minerals according to some aspect of their appearance, such as crystal habit, symmetry, twinning and colour. The plates are of excellent standard although they could have been larger by making better use of the space allocated (4 prints to a page). There is also a list of terms used to describe minerals, with translations into English, French, Italian and Spanish.

Although nowadays electron microprobes and powder diffraction methods have replaced traditional mineral identification methods in many Universities, there is something to be said for being able to identify a mineral from a relatively few basic observations. For anyone needing to determine minerals from their physical properties in hand specimen, this will be a very useful book. It is very well produced and beautifully set out. A. PUTNIS