

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 deposi-

tion 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