

mentioned and mineralogy is often very simplified. However, this book appears to me, as a geologist, to be an invaluable guide to recovery of the precious metals, containing many tricks of the trade, based on practical chemistry, avoiding high tech methods and black boxes. The author makes precious metal recovery look easy.

H. M. PRITCHARD

Eckert, A. W. *The World of Opals*, New York and Chichester (John Wiley & Sons, Inc.), 1997, xiv + 448 pp. Price £60.00 (ISBN 0-471-13397-3).

This is the first comprehensive book on opals for over thirty years and claims to give a complete guide to the science and history of this gem material. After a definition of exactly what constitutes an opal, the author provides a new look at opal formation, and this is followed by chapters describing opalized fossils and pseudomorphs, the mythology of opals (the 'bad luck' popular image being blamed on the one of Sir Walter Scott's Waverly Novels *Anne of Geierstein*), famous and otherwise noteworthy opals, types of opals, the world's major opal occurrences, and a glossary of opal-related terms; there is also an extensive bibliography and an index.

The chapter on the mode of formation of opals is based largely on the thesis that most of what has been taught about opals has been based on theories now proven, in part at least, to be incorrect. The author's style is distinctly idiosyncratic, and it is difficult to unravel the use of such terms as atom migration [metasomatism ?] and the definition of an electrolyte as "a liquid carrying a chemical that generates an electrical pathway through anything". The work of Sanders and Darragh in 1965 using electron microscopy to demonstrate that precious opal consists of aligned lepispheres and voids giving rise to a three-dimensional diffraction grating is acknowledged, but we are told that the refutation of part, if not all, of the other theories on the basic formation of opal must take place because of experiments carried out by a man from Lightning Ridge, New South Wales, who has succeeded in growing opals from 'opal dirt' in a liquid in glass jars in an incredibly short time (a few days to six months, followed by the secret electrolyte being siphoned off through a small hole in the container's cover, allowing air contact to dry the stone). These opals are said to be indistinguishable by sight from

natural opal, but have not yet been scientifically analysed; a lot of work has been done, but the experimenter quite reasonably wants to publish the results himself. We are thus left with various statements, but a lot of the author's work reminds one of a current British advertising campaign on the lines of "... I don't know the answer but I know a man who does". Nevertheless, the evidence of fossil pseudomorphs leads one to the conclusion that opalization does not necessarily require a geological time-scale in which to operate.

Putting aside these reservations, this book does succeed in giving an overall account of the occurrence of opals, not only in Australia, the United States and Mexico, but also in British Columbia, Honduras, Austria, the Czech Republic, Slovakia and Hungary. The descriptions of opal deposits in Opal Butte, Oregon, and the Virgin Valley area of Humboldt County, Nevada, are described in detail, and in the section on noteworthy opals, details are given of the Roebing opal (2560 carats) and the Bonanza opal (25 586 carats) both from Virgin Valley. Opal being what it is, many of the black-and-white photographs in the text are uninspiring, but 22 colour plates demonstrate the amazing variability in play of colour to be, seen in opals even from the same mine. A book that manages to be both provoking and informative, while we await the promised definitive work on the geology and chemistry of opal by the 'man who does'.

R. A. HOWIE

Harlow, G. E. (ed). *The Nature of Diamonds*, Cambridge (Cambridge University Press), 1997, x + 278 pp. Price £55.00 (hardback, ISBN 0-521-62083X); £19.95 (paperback, ISBN 0-521-62935-7).

In this comprehensive, large-format book, published in association with the American Museum of Natural History, a dozen or more experts on the geology, mineralogy, gemmology and social-economic aspects of diamonds cover every facet of this mineral.

After an introductory chapter, the nature of colour in diamonds is discussed (E. Fritsch), and this is followed by a chapter on the origin of diamonds and the involvement of relatively cool harzburgite keels at the base of the thickest, oldest parts of the Earth's crust (M.B. Kirkley), later subduction of basaltic oceanic crust resulting in some portions of it adhering to the bases of the