

Euler angles; there is a description (by H. R. Wenk) of FORTRAN programmes for computing the angles. In the third part on optical migration curves (by E. Wenk), there is a description and commentary on the data used in the preparation of the seventeen plates of optical diagrams, which contain the essence of this book. These individual plates, most elegantly drawn and provided with captions in German, French, and English, are contained in a cover separate from the book to facilitate laboratory use. In the last part Parker and H. R. Wenk provide all the numerical data, which could conceivably be of use in compiling plagioclase optical diagrams. The book also includes extensive references and is well indexed.

In brief this volume must find a place in the bookshelves of all mineralogist-petrologists who intend to make more than a cursory optical examination of plagioclase, not least because of the plates, which contain the essential data succinctly presented for non-German readers.

P. GAY

BOLDT (J. R., JR.). *The winning of nickel*. Methuen and Co., Ltd., 1967, xiv+486 pp., 55 figs.+frontispiece. Price: £5.

This book, published under the auspices of the International Nickel Corporation, is a comprehensive review of the nickel mining industry. It was prepared by Joseph Boldt Jr. with the help of a panel of consultants, under the editorial control of Paul Queneau. The arrangement of the book is in four sections, the first on geology, the second on mining, and the last two on the extraction of sulphide and oxide ores. The text is supported by eight pages of references. The information is extremely well presented and abundantly illustrated with excellently reproduced figures and photographs, some in colour. Reproductions of woodcuts from *De Re Metallica* and extracts from the Hoover translation of that work are interspersed with the text. It is, however, surprising that with all the care that has obviously gone into editing none of the ten locality maps bears any figure number.

The section on geology is unfortunately the shortest. It describes the various nickel minerals, the two basic types of deposit, and methods for their exploration. There then follows descriptions of a selection of the better known nickel deposits of the world. More detailed information could profitably have been incorporated into this section; in particular, the allotment of only a page and a half for the genesis of sulphide ores is disappointing.

In contrast, the section on mining contains a considerable amount of detail. Shrinkage stoping, square-set mining, and block caving are explained together with excellent diagrams and photographs to illustrate them. The latter part of the section is concerned with open pit mining. Examples of actual mining operations, a great many of them from the Creighton ore body, support the text.

Extractive metallurgy occupies more than half the book. Sulphide ores are considered in Section 3, which commences with a generalized description of methods ranging from primary crushing, through grinding and classification, to flotation and filtration. This is followed by examples of practice at different mills, all Canadian with the exception of Outokumpu. Part II of the same section covers pyrometallurgy, again working from the general to the particular, and also hydrometallurgy. Part III covers electrolytic and vapometallurgical refining. The pyrometallurgy and hydrometallurgy of the oxide ores are considered in Section 4: examples here are drawn, necessarily, from non-Canadian mines.

For those who wish for a comprehensive picture of the nickel industry, this book is invaluable, but it is intended for the technical rather than the general reader. There is much within this book that the general reader could understand, but he must also accept a great deal of more technical detail.

J. W. B.