BOOK REVIEWS

Dixon (C. J.). *Atlas of Economic Mineral Deposits.* London (Chapman and Hall Ltd.), 1979. 143 pp., 53 maps and diagrams (in 3 colours). Price £35·00.

In this book, forty-eight mineral deposits or groups of deposits are described, and there are world distribution maps for five selected groups of commodities. Each of the descriptions of mineral deposits consists of one page of details, including the history, geological background, geology of the deposits, mining methods and production, and selected references; on the facing page are the location and geological maps and plans, generally accompanied by two or more sections. Thus at one opening the reader can obtain and appreciate the basic facts about a deposit or mining district. The deposits chosen are almost all those in current production—one of the few exceptions noted being the classic section of the Dolcoath main lode.

In Section 1, deposits in geological environments at the Earth's surface are dealt with, including the bauxite deposits of Jamaica and Surinam, the nickel deposits of New Caledonia, the Nsuta manganese mine (Ghana), Malaysian tin deposits, the beach-sands of Stradbroke Island (Australia), the Witwatersrand gold–uranium deposits and the uranium deposits of the Blind River area, the Esterhazy potash deposits (Saskatchewan), the Sulphur salt dome (Louisiana), and the iron deposits of the Northampton district, the Mesabi Range, and the Itabira district. These thus cover a wide range of types both geologically and in the ore concerned.

Section 2 deals with mineral deposits in sedimentary rocks, but here the mineralization is exotic to the environment of deposition. Deposits described are the Luanshya copper district (Zambia), the Ambrosia Lake uranium field on the Colorado Plateau, the Laisvall lead–zinc deposits (Sweden), the Picher lead–zinc field of the Tri-State district, the zinc, lead, and baryte deposits of the Silvermines district of Ireland, the zinc–lead deposits of the Pine Point district of the North-West Territories and the Sullivan orebody, British Columbia, and the Broken Hill deposit, Australia.

Section 3, dealing with deposits associated with felsic magmatic environments, covers the Helen iron mine north of Lake Superior, the pyritic deposits of Tamasos (Cyprus), the Skorovas pyritic deposits (Norway), the Rio Tinto mining district, the Noranda area, the deposits of the Kosaka district, Japan, the Almaden mercury mine, the MacIntyre–Hollinger gold–quartz veins (Ontario), the Homestake gold deposit and the Bunker Hill silver deposit, the El Salvador porphyry copper and Chuquicamata copper deposit of Chile, the Bingham Canyon copper and Climax molybdenum mines, the Butte district, the Mexican Santa Eulalia orebodies, the south-west England district, the Pine Creek tungsten mine, and the Bikita pegmatite.

Section 4 covers mineral deposits in basic and ultrabasic magmatic rocks and deals with Merensky Reef platinum, the chromite of the Great Dyke, the Sudbury nickel mines, the Tellnes ilmenite deposits (Norway), the chromite of the Muğla district of Turkey, the Thetford asbestos mines, the Palabora complex, and the Mwadui kimberlite pipe in Tanzania.

The world distribution maps cover Cu, Pb + Zn, Fe and ferro-alloy, light metals, and precious metals. There is a useful glossary of mineral names, a list of S.I. units (e.g. 1 μg/g = 0.633 dwt per long ton or 0.0291 troy ounces per short ton), and a key to stratigraphical names.

The author, wishing to emphasize the use of maps, plans, sections, etc., has termed this work an Atlas, but there is a much higher ratio of the written word to maps than in most atlases. Unfortunately the use of this term combined with the width being the greatest dimension (37.5 × 24 cm) means that librarians will tend to arrange this very useful work on a separate shelf or in the atlas section, which may lead to its not being as readily available as it should be.

It is clearly impossible to do justice to the various arguments concerning, for example, the genesis of the Witwatersrand deposits or the complex Broken Hill orebodies but the numerous hypotheses are explained briefly and the suggestions for further reading are helpfully annotated to guide the reader to alternative points of view. The introduction is in itself a very succinct seven-page essay which touches on prospecting, exploration of mineral deposits, mineral processing, the economics of mineral working, the relationship of mineral deposits to host rocks, genetic interpretation, and the classification of mineral deposits, all with a light but authoritative approach which is sustained in the two-page introductions to each of the five sections. The wide coverage of this book and its selection of deposits for description both geographically and geologically make it ideal for students and teachers alike. All texts inevitably contain a few printing and drafting errors but this one suffers more than most in this respect:

most of the mineral names are still recognizable, e.g. lucoxene, kalinite, colphane, silliminite, eucriptite, speryllite, pentalandite, andalalusite, and hyperstehene; 'granitold' is an attractive term as is 'the calc-alkaline suit', but the flavour can be represented by the statement (p. 40) that copper is also found in 'fluvatile, lacastrine and esturine' sediments. These blemishes can be easily rectified, however, in the later impressions which will surely be needed; this book will meet with widespread approval in almost every aspect except its very high price.

R. A. HOWIE

Ramdohr (P.) and Strunz (H.). *Klockmanns Lehrbuch der Mineralogie.* Ferdinand Enke Verlag, Stuttgart, 1978. 876 pp., 261 figs. Price DM 168.

This sixteenth edition of the classical German-language mineralogy text follows its predecessor after an interval of some eleven years. The layout has changed little since 1967. Part I (Crystallography, 337 pages) remains largely unaltered apart from the sections on crystal optics which are completely revised and extended. Part II (Mineralogy, 503 pages) now includes short descriptive sections on meteorites and lunar rocks. The systematic mineralogy section occupies 417 pages, an increase of nearly 30 since 1967, reflecting the inexorable growth in the number of minerals granted species status. The welcome addition of an appendix to this section includes minerals described up to the latter part of 1978.

A. M. CLARK

Yariv (S.) and Cross (H.). *Geochemistry of colloid systems for Earth Scientists.* Berlin, Heidelberg, and New York (Springer Verlag), 1979, xii + 450 pp., 86 figs., 32 tables. Price DM 110.

Colloid or surface chemistry has long been recognized as an important branch of physical chemistry. It is surprising that so few texts have set out to cover its principles in the context of 'earth science' phenomena. The one notable example is van Olphen's *An introduction to clay colloid chemistry* which was published as long ago as 1963 (Wiley Interscience). Although Yariv and Cross cover much the same ground in their treatment of theory, the scope of this new text is very much wider. A real attempt at comprehensive coverage of 'earth science' phenomena has been made and this must be welcomed.

The introduction is concerned with defining terms and summarizing properties insofar as they fall within the scope of colloid science. Rather surprisingly a section on silicate structural chemistry is included. In my opinion this would be better placed (and expanded) in Chapter 1 as a prelude to the description of clay mineral structures, chemistry, and properties. This forms part of a discussion of colloids in the sedimentary cycle. Other examples of geological colloid systems are also given: magmas and volcanic eruptions, the Ocean, and the Atmosphere.

Having 'set the scene' the authors devote Chapter 2 to a fairly detailed account of the theory of the physical chemistry of surfaces. A good reference list should allow the reader to pursue any of the topics further without difficulty. This 'slice' of theory is then applied to dissolution and precipitation processes in natural systems (Chapter 3). A useful section dealing with aluminium and iron in natural water is included. Surface coatings on rocks and mineral grains is the subject of Chapter 4 and it is good to see this important topic treated on its own. A return to theoretical treatment follows in Chapter 5 where the kinetic properties of colloid solutions are summarized and discussed. Thereafter two interesting chapters are devoted to the 'colloid geochemistry' of silica and clay minerals respectively. I should have welcomed a rather more comprehensive treatment of silica diagenesis (section 2.2.4) but this perhaps reflects my own interests. Nevertheless it is an area of great interest at the present time. Chapter 8 deals with interactions between solid particles (both gaseous and liquid systems) and this is where the all-important 'double layer' forces are treated.

Rheological properties of colloid systems are dealt with in Chapter 9. After another brief introduction to theory, the rheological properties of both dilute and concentrated clay-water suspensions are considered. The final chapter then considers the colloid geochemistry of argillaceous sediments. This more or less amounts to a review of the literature of burial diagenesis with attention drawn to surface phenomena or their consequences. It is neither very thorough nor very comprehensive but will serve as a useful introduction for workers or students not familiar with the field. Section 4 is entitled 'Diagenesis of organic matter and oil generation in argillaceous sediments' and lasts from page 419 to page 426. The publisher's claim that '... and the literature of specialised areas of colloid and petroleum geochemistry is covered comprehensively' does not seem well justified.

In summary, this text provides adequate coverage of the theoretical background to colloid science. Its real value, however, lies in its literature