

which looks as though it was written in a hurry, without so much as a glance at Darlington, and contains a number of errors.

There are large sections on the systematics of Recent and fossil reptiles by Guibé and Ginsburg respectively. They survey the groups down to family level. In the Recent reptile chapter much new information has been incorporated into the characterization of the higher taxa; I found very few errors. The fossil reptile chapter has an extensive discussion of the phylogeny of reptiles; the author rejects the major division into Saurapsida and Therapsida and adduces support for the recent suggestion of Reig that the Archosaurs originated from Pelycosaurs. There are some interesting innovations, with supporting arguments, in the placement of some forms, such as *Bolosaurus* and *Trilophosaurus*.

There are fewer cases than in the first "fascicule" of the same species occurring under different names but some of the literature citations are deplorable. In one chapter I counted 190 references to the work of other authors (some several times). For 108 of these I either could not find in the literature list a publication of the cited date or, in the case of 62 authors, any mention of the name at all! The contributors to and the purchasers of such an expensive and well turned out volume deserve better than this.

GARTH UNDERWOOD

Electron Microscopy

Principles and Techniques of Electron Microscopy: Biological Applications, Vol. 1. By M. Arif Hayat. Pp. xiv + 412. (Van Nostrand Reinhold: New York and London, February 1971.) £9.75.

In the preface the author states that "... the primary objective of this book is to provide the reader with the foundation in biochemical concepts governing the preparatory procedures". Essentially he has succeeded in doing this, and has provided, at the same time, a very readable volume covering the important practical techniques of fixation, embedding, sectioning, staining, and supporting of sections for examination under the electron microscope. The integration of basic chemical considerations and practical details of technique is particularly satisfactory: it is unfortunate, however, that some of the structural formulae, particularly in the section on embedding, are inaccurate or incomplete.

The problem of where, and how, osmium is deposited in biological tissues, central to the interpretation of the "unit membrane" structure, is fully covered in the chapter on fixation. There is, however, some repetition of

the data on the oxidation of double bonds by OsO₄ on pages 40 and 41. The proposed migration of reduced osmium from the apolar layer to the polar groups of the phospholipid is dealt with in a less than precise manner; it is suggested that the osmic acid monoester group (shown as covalently bound to the lipid alkyl chain) migrates by virtue of an electrostatic interaction with the polar head group. Presumably even this would not be possible if the very stable diester were to be formed, this reaction being put forward as the explanation for lipid fixation by osmium tetroxide. The author rightly comments that further information is needed to elucidate the role of the lipid polar groups in the fixation of biological tissue by osmium tetroxide.

The chapters on fixation, embedding, and sectioning contain a considerable amount of practical information, and the one on sectioning is particularly good: this chapter does, however, contain the extraordinary statement that sodium hydroxide is entirely volatile! A table of defects appearing during sectioning is included, and this consolidates much of the information contained in the chapter, as a practically useful "trouble-shooting" guide.

The presentation is generally good, but it is unfortunate that so many typographical errors remain in the text: it seems that text has been omitted on pages 59 and 60, and that the legend to Figure 1-8 is incomplete.

This book may be recommended for graduate students, and for more experienced research workers who may wish either to become acquainted with the general preparative procedures associated with electron microscopy, or to have access to a compendium of practical techniques for use in the laboratory. There is a comprehensive bibliography and author index, as well as an appendix with information on the making-up of fixing and buffer solutions, together with details of certain special fixing procedures. The list of reagent suppliers should be of special use to those workers in the United States, rounding off as it does a clear and comprehensive volume on this aspect of electron microscopy.

R. A. KLEIN

Metallurgy Writ Large

Physical Metallurgy. Edited by R. W. Cahn. Second revised edition. Pp. xxi + 1333. (North-Holland: Amsterdam and London; Elsevier: New York, 1970.) £18.65.

The first edition of this monumental work was a success. The appearance of a second edition so soon afterwards is no reflexion on the quality of the first, but, rather, is indicative of the rapid

development of the subject. Practical metallurgy has evolved over many centuries more as an art than a science whereas physical metallurgy, the basic science of metallurgy, has developed in the past fifty years or so in parallel with modern techniques of structural examination of solid materials—X-ray and electron diffraction, electron microscopy, electron-probe analysis, and the like.

The subject is now presented, with extensive revision and an additional chapter on the physical metallurgy of steels, in a logical and authoritative manner in twenty-three chapters by different authors. In my opinion, two topics are still inadequately covered—first, deformation and re-crystallization textures and associated anisotropy and, second, structure and properties of the metallic surface.

The text is already extensive and the volume is beyond the pocket of the average student. The work, however, has established itself as the standard text for all technical libraries. It is hoped that the authors will continue to revise and bring their contributions up to date.

Although it is essential that there should be a full and authoritative text on physical metallurgy, one cannot help feeling that the practical metallurgist has been left far behind. There is clearly a need for a further text on applied physical metallurgy in which the basic principles so well propounded in the full text are directly related to the practical problems of metal manufacture and usage.

T. LL. RICHARDS

Microbial Corrosion

Microbial Aspects of Metallurgy. Edited by J. D. A. Miller. Pp. 202. (Medical and Technical Publishing: Aylesbury, 1971.) £3.40.

THE ever-increasing interest in, and importance of, environmental and interdisciplinary science has created a need for a book of this nature and on this subject. It is a disappointment, therefore, that a better job has not been made of it. This is not to decry the amount of information packed into this small book but rather the method and style of presentation. The book is based on a short series of lectures given at the University of Manchester Institute of Science and Technology and has retained the digressions and amicable dalliances on matters of small relevance that enliven a short course, but that only serve to irritate when translated into print.

The first chapter on introductory microbiology is specially prone to these faults, attempting to cover too wide a