numerical data, even as an appendix, would give value as a research work to a volume which, in its present form, is basically only a teaching manual.

E. H. ASHTON

Ancient invertebrates

Paleobiology of the Invertebrates: Data Retrieval from the Fossil Record. By Paul Tasch. Pp. xxv+946. (Wiley: New York and London, August 1973.) £10.

THIS book is intended as an advanced textbook of invertebrate palaeontology, and is a very ambitious undertaking for a single author. It is comprehensive, detailed and profusely illustrated. Unfortunately, however, it gives the impression of having been written much too quickly for its thickness. Altogether it is a most exasperating book, despite its compendiousness, and it is not worth the price.

There are countless spelling mistakes. These are not trivial since, after all, zoological names need to differ by only one letter to be validly distinct. Thus, on page 159 alone, *Aulacophyllum* is written as *Aulocophylum*, *Phillipsastraea* as *Phillipastrea* and *Zaphrentis* as *Zaphrenthis*.

More serious are errors of fact. Nemerteans are never parasitic (contrast page 445). There is no reason why a type subspecies need occur earlier than a non-typical subspecies (page 853). Pogonophora are not a genus of hemichordate (page 810) and ascidians are not hemichordates either (page 635). The anal pyramid of eocrinoids had to do with defaecation, but this is not the same as excretion (page 709). The segments of an ophiuroid's arms are not the same thing as its vertebrae (page 736). The word "asterozoan", contrary to the muddled discussion on page 736, is not synonymous with "asteroid". Hedgehogs, indeed, have never been included in the echinoderms (page 631). Most of these mistakes are slips of the pen or due to stylistic slovenliness, but they have been printed nevertheless, and wait in ambush for the student.

The author has a pretentious habit of using 'cybernetic' terminology whenever he sees the opportunity: the questions at the end of each chapter are called "feedback", the bibliography is called "storage", the anatomy of a group comes under "encoded data" and its stratigraphy and palaeoecology under "derivative data". The advantages of this procedure escape me. On the other hand, such necessary words as "haemocoel" (page 313), "lobe" and "saddle" (page 386) and "metapinnule" (page 739) are used without explanation of what they mean.

There are several banal discussions on problems that are insoluble in principle, such as why groups died out. The last of the arthropleurids apparently became extinct "probably through failure to yield adequate numbers of viable offspring" (page 606). Parablastoids and edrioblastoids died out from a "continual decrease in the number of reproducing individuals" (page 725). But echinoids are ready for a great expansion in the future (page 695).

Concerning the index, I tried to look up the word '*Halycystus*', used on page 127, suspecting it might be identical with '*Haliclystus*', which happens to be the correct spelling, on page 129. After some search I found it, with the wrong spelling, under 'S' for 'Scyphozoa'. Is this the data retrieval referred to in the title?

It may be that a new advanced textbook of invertebrate palaeontology is now needed, but this book is not the one.

R. P. S. JEFFERIES

Glass

Glass Science. By Robert H. Doremus. (Series on the Science and Technology of Materials.) Pp. viii+349. (Wiley-Interscience: New York and London, August 1973.) £9.

THIS is an authoritative well written book in an area where relatively few books are available. The dust cover note says that this book "will be used as a text for advanced undergraduate and graduate level courses in glass science and by technologists of diverse backgrounds who are involved in the manufacture and use of glass in industry". The author himself states that his object is to describe the state of glass science in 1972, a much more satisfactory description of the scope of the book if one interprets the title to mean "the physics and chemistry of glasses". The title has some unfortunate suggestion of a special kind of science, a comment which the author tends to invite by his generosity in quoting opinions and hypotheses.

Readers of the book are expected to be conversant, for example, with X-ray diffraction and its interpretation by means of pair distribution functions, the Mössbauer effect, NMR, infrared and Raman spectroscopy, and solution thermodynamics. A copy of Morey's well-known book *Physical Properties of Glass*, long since out of print, unfortunately, is assumed to be available.

The book contains five parts; 100 pages on the formation and structure of glasses, 113 pages on transport processes of which 80 deal with diffusion and electrical conduction, 60 pages on chemical and surface properties, 40 on strength and 14 on optical properties. The choice of subjects reflects the author's own interests. Each of the eighteen chapters has on average sixty references to original papers so the book is an excellent entry to the literature. The author has succeeded in his aim of reviewing the information available in 1972.

The book will be especially useful to people who have recently taken up work in this field. It should certainly be on the reading list for advanced students of glasses.

R. W. DOUGLAS

Biological *bouchées*

Cell Differentiation. By J. M. Ashworth. Pp. 64. *Cellular Development.* By D. R. Garrod. Pp. 64. *Functions of Biological Membranes.* By M. Davies. Pp. 62. *Biochemical Genetics.* By R. A. Woods. Pp. 64. (Outline Studies in Biology.) (Chapman and Hall: London; Halsted (Wiley): New York, May 1973.) £0.90 each.

THE breakdown of the barriers between biological disciplines in university teaching has made it difficult to find adequate textbooks, for few reflect the broader approach now appropriate. A similar difficulty exists in providing suitable reading material for the increasing number of students who combine a variety of shorter courses in some form of integrated degree course. This new series of readers, each containing the equivalent of a short lecture course on a selected topic, could make a valuable contribution towards solving some of these difficulties and is therefore extremely welcome.

Ashworth, on *Cell Differentiation*, has selected a set of model systems that illustrate increasing levels of complexity from prokaryotic and eukaryotic organisms, and has shown how the basic behaviour can be analysed by genetic and biochemical techniques. He also gives an account of the characterisation (mainly biochemical) of such classic systems as chromosome structure in *Drosophila*, RNA synthesis in *Xenopus* and protein metabolism in different tissues, covering a wide range of experimental approaches. Ashworth contrasts the total analysis that is apparently possible in the simpler systems with the approach to these classic systems in which some exaggerated feature is studied. This conveys very clearly the decisions that have to be made by the intending research worker.

Garrod's book on *Cellular Development* complements the first book. He concentrates on pattern formation, and includes slime moulds (already discussed by Ashworth), hydra, limb bud formation, insect cuticle, nerve connections and embryonic systems. Simple models suggestively mimic the patterns of development, but the lesson that comes across is that these models are too