

he has succeeded. The style is clear, and the general principles of estuarine ecology are well explained, but condensation has meant oversimplification to the point of error in some places. Estuarine plants are dealt with in four pages, and it is implied that there is a simple gradient of water logging in salt marshes. In fact one frequently finds that the *Juncus* zone at the top of the marsh is more water logged than the middle zones, so that algae present on the lowest part of the marsh reappear on the upper marsh, although absent from the middle.

In general the information in the book is accurate, but there are a few errors. The diagram of the burrow of *Arenicola* shows a simple U-tube open at both ends, and on page 40 it is stated that *Nereis diversicolor* appears to avoid low salinity regions.

References in the text are always a problem in a book of this type, and their use in the present volume is erratic. No references are given in the text of the chapter on plants, but a considerable number are given in the chapter on animals. A point which I found disturbing was the attribution of some figures to secondary sources rather than to the primary ones. For example, Fig. 14 is attributed to Kinne, but Kinne correctly attributes it to Pantin; Fig. 16 is attributed to Lockwood, but Lockwood himself correctly attributes it to Ellis. Even in the text at one point the well known work of Wells, on the oesophageal pacemaker of *Arenicola* is attributed to a secondary source. These points are probably more important to the advanced reader who likes to know who actually did the work.

In spite of these criticisms of details the book will be most useful as a first introduction to the ecology of estuaries.

J. GREEN

## Hydrides

*Hydrides of the Elements of Main Groups I-IV.* By E. Wiberg and E. Amberger. Pp. xv+785. (Elsevier: Amsterdam, New York and London, September 1971.) Dfl. 290.00; £33.85; \$80.75.

THIS is a scholarly and comprehensive monograph which provides a detailed and reliable source of information on all aspects of the chemistry of the hydrides of the elements in main groups I-IV. The authors are internationally respected authorities in this field and their coverage of over 3,500 original references extends to 1970.

The book is extremely well organized and the skilful use of diagrams and tables enables a tremendous amount of factual information to be recorded while leaving the cursive text free to develop the significance of the data. Only in the

introductory chapter (twelve pages) does this approach fail—the compression here is so great that the general review of hydride chemistry, the presentation of theoretical models of hydrides and the general summary of preparative procedures are less informative than many accounts in undergraduate textbooks.

The unique feature of the book is the extensive and perceptive discussion of the chemistry of the hydrides; there is a depth of understanding and insight here which is a welcome change from the approach in many recent books. Too often these days there is an apparent belief that inorganic chemistry begins and ends with a description of the spectroscopic and structural properties of complexes, and little regard is paid to the synthesis, reactions and reactivity of the compounds being discussed. It is refreshing to see some chemical chemistry again.

Two chapters deal successively with the hydrides of the alkali metals (30 pages) and the alkaline earth metals (38 pages). Each starts with a brief historical introduction and general review of the group, followed by a detailed discussion of the preparation, physical properties and chemical reactions of the hydrides of the individual elements.

The most extensive chapter (274 pages) concerns the boron hydrides. These compounds and their derivatives have been much reviewed in recent years but this new approach to their chemistry adds a new dimension to the literature on the subject which undoubtedly enhances our understanding of their subtle and intricate chemistry. Some 170 pages are devoted to synthesis, conversions, reactions and mechanistic schemes and this is followed by extensive tabulation of the physical properties of the boranes and their derivatives (sixty pages) and a bibliography, classified by compound, of references to infrared, raman, nuclear magnetic resonance, ultraviolet, microwave, electron spin resonance and mass spectra, and to structural determinations and molecular orbital calculations (thirty-five pages). A brief section on carboranes is also included in each section and, in all, 1,400 references are cited.

A similar approach is adopted in subsequent chapters, the length of each reflecting the amount of work published: aluminium hydrides (sixty-two pages), other group III hydrides (nineteen pages), silanes (177 pages), germanes (eighty pages), stannanes (thirty-eight pages) and plumbanes (eight pages). There is also an appendix (keyed to the main chapters) reviewing the work which appeared in some 150 papers during the early part of 1970.

Throughout the book the diagrams are a particularly pleasing feature and they enhance the text considerably. The style of writing is impeccable and great attention has also been paid to the general

format, display of equations and clarity of print. Indeed the book is beautifully produced except for one ghastly mistake: in the review copy at least, pages 673–688 were missing and pages 641–656 were bound in twice. It is also unfortunate that the price will put the book out of the range of virtually all private individuals and most libraries. No doubt it will occur to many (however reprehensible the thought may be) that it could be Xeroxed for private study for less than one quarter of the published price always provided that a sufficiently affluent library could be located to borrow it from.

N. N. GREENWOOD

## Glacial Ages

*The Late Cenozoic Glacial Ages.* Edited by Karl K. Turekian. Pp. xii+606. (Yale University: New Haven and London, August 1971.) \$20; £9.

THIS book is a collection of essays by leading authorities on diverse aspects of Cainozoic glacial ages, presented at an international colloquium held in 1969 to honour the retirement of R. F. Flint. The editor of the book, K. K. Turekian, points out that glacial ages are now known to have occurred before the classical glacial Pleistocene, and that it is therefore necessary to consider the phenomena associated with glaciation as properties of the Late Cainozoic. Much of the new evidence concerning environmental history in the Late Cainozoic comes from studies of ocean sediments and many of the twenty-one essays in the book concern this aspect of the subject. The essays thus supply a geophysical and marine geological background against which we may view the more classical aspects of the Quaternary ice ages.

There have been huge advances in our knowledge of Late Cainozoic environments, both marine and continental, in the past ten years; for example, the knowledge of climatic history provided by oxygen isotopes in marine faunas and in Arctic and Antarctic ice, and the knowledge of vegetational history provided principally by pollen analysis. The value of this book lies in the synthetic accounts written by those who have been responsible for much of the important research of the past two decades. It is not possible to make a detailed inventory of the contents. The essays concern the Late Cainozoic history of the oceans (including plate tectonics), and of Antarctica, the climatic records found in ice cores (a very important recent development), carbon-14 variations in the atmosphere, eustasy and isostasy, glaciation and vegetational history in North America, the floral record of the European Late Cainozoic, faunal history in Europe and Asia and hominoid evolution in East Africa.