

on the dust-jacket showing the whole plant set against a mountainous background is probably the best; but many have unreal colours, a few are actually out of focus, a high proportion show inflorescences without leaves, and only about 10 per cent (a liberal estimate) show the plants growing in a recognizable habitat. The line drawings are excellent.

For those who do not need or cannot afford to buy a comprehensive work such as the *Flora Europaea* (which is as yet incomplete), the present work is a most commendable substitute.

A. R. PERRY

DIVERSITY OF FLOWERING

The Induction of Flowering

Some Case Histories. Edited by L. T. Evans. Pp. 488. (Macmillan: Melbourne and London, July 1969.) A\$20.

ONE of the dominant themes of contemporary molecular biology and biochemistry is the essential unity of living matter, so that we are understandably more impressed by the similarities in cell structure and metabolism of widely different organisms than by their differences, and we feel justified in extrapolating from unicellular algae to beans and apple trees, or even "from peas to people". When we come to consider whole organisms, however, they manifestly are different, both in structure and in physiology, and it becomes more difficult to extract general principles from a mass of particular detail. Since the importance of day length and winter chilling (vernalization) in controlling flowering in many plant species was first clearly established about 50 years ago, an impressive body of observational data has been accumulated for a large number of species. From these detailed facts certain generalizations have emerged, such as the probable universal involvement of phytochrome in photo-periodic control, which constitutes an excellent example of the inductive method in science. Success of this sort encourages us to seek other unifying concepts, such as a universal mechanism of flowering, involving a single "flower hormone".

This book, which comprises a series of case-histories of twenty species of plants which have been extensively used in studies on the physiology of flowering, is a salutary antidote against a too-ready assumption that there is a single, universal mechanism of flowering control in all higher plants. Twenty authors have each contributed a chapter which brings together and summarizes all the available information on the physiology of flowering of a selected species.

The aims of this study are stated to be "to expose the diversity of flowering behaviour rather than to neglect it or confine it within a few generalizations", and there is little doubt that this aim is achieved. One might have hoped, however, for some new insight into the flowering processes through the bringing together of all the information for single species to form an integrated and consistent picture. But in these studies each chapter remains essentially a separate case-history in which the facts are presented with little attempt at interpretation, although there is a valuable final chapter by the editor, Dr L. T. Evans, in which he critically examines some of the major concepts in the physiology of flowering.

The chosen species were selected primarily on the grounds that they had been extensively used for experimental studies and only a few, such as chrysanthemum, strawberry, pea, tomato and hemp, are of economic importance. The book is likely to be of value primarily to specialist research workers in the field of flowering physiology, and will provide a valuable reference work, as I have already found for my own work. It will also be useful to those responsible for the teaching of advance courses in plant physiology and to postgraduate students working in this field.

P. F. WAREING

PROPERTIES OF SEAWATER

Marine Chemistry

The Structure of Water and the Chemistry of the Hydrosphere. By R. A. Horne. Pp. xxii + 568. (Wiley (Interscience): New York and London, November 1969.) 190s.

IN spite of its obvious and rapidly growing importance, the subject of marine chemistry has been largely neglected by the authors of textbooks. This is a complete contrast to most other branches of marine science, such as physical oceanography and marine geology, for which many excellent texts are available. This book, by R. A. Horne, is therefore welcome, particularly because it deals with the subject from a physico-chemical standpoint, unlike earlier works which have been largely descriptive. The author intends it to be used as general reading by marine scientists, as an advanced text by graduate students, and also as a source of available tabulated data of the properties of seawater.

The book is divided into four parts which it is convenient to discuss separately. Part one deals with the structure of water and the physical chemistry of electrolyte solutions with particular reference to seawater. As befits the author's distinguished research career in this field, this is the best section in the book. His treatment of this difficult and controversial subject is extremely lucid and could be read with profit by all marine chemists.

In comparison with the overall excellence of part one, the remaining three parts which deal chiefly with processes occurring in the sea are poor and ill-balanced except where they abut onto physical chemistry. I was left with the feeling that the author has been very selective in his reading and that he is unaware of much of the recent work on these subjects. It is unfortunate that there is not even a short account of the oceanic water circulation pattern, or of the processes causing mixing, because these to a very large extent control, or modify, the distribution of the chemical parameters in the sea.

Part two is devoted to a discussion of the chemical composition of seawater and the factors influencing it. The dissolved gases and chemical species in seawater are competently discussed (although it seems extraordinary to state (page 18) that the Ca/Cl⁰/₁₀₀ ratio is quite constant, when it has been known since 1884 that it is not, and to accept uncritically the controversial variation of the Sr/Cl⁰/₁₀₀ ratio). Some extremely important subjects, however, are treated in an extremely skimpy fashion, for example, the micro-nutrient elements—nitrogen and phosphorus—are dismissed in a mere 130 lines. Some other sections are rather out of date, and tend to be hotch-potches of rather ill-digested material, some of which has little relevance to the subject. This is particularly true of the chapter on the biochemistry of the ocean—thus, I would question the need for Fig. 9.2, showing the α -helix of the milk protein molecule, and Table 9.6, giving the amino-acid compositions of some proteins, not one of which is marine in origin.

The third part is concerned with the chemistry of the marine interfaces, and this includes a section on marine sediments. The latter consists of a number of isolated topics, evidently chosen from the literature in an unselective way, without any attempt to discriminate between important and trivial aspects of marine sedimentary geochemistry. This is revealed particularly by the author's choice of tables. In part four, a number of selected topics are discussed. These include marine corrosion, recovery of raw materials from the sea, and the origin of life in the sea. The book concludes with a very useful 60 page appendix containing tables of physical and physico-chemical properties of seawater.

The book is well printed and bound. It is marred, however, by an excessive number of printing errors, a few examples of which are: the temperature of -607°C