liquids, and gases. The remainder is devoted to the phase rule and phase diagrams, and rings the changes on a large proportion of the possible permutations of two- and three-component systems. Part 2, the self-consistent theory of high-temperature, high-pressure processes, is a detailed compilation of recent data on systems involving silicates, sulphides, and solutions, and of geochemistry.

The author's unusual approach makes for discussions of interest to the research worker, but for the student it can scarcely be recommended, the presentation being obscure. Furthermore, while it is clearly a matter of opinion where major emphasis should be placed in a field so diverse as that which this book attempts to cover, *Physical Geochemistry* lacks balance; one gains the strong impression of reading a collection of notes, some detailed, some scanty. This impression arises partly from inappropriate headings—for example, the chapter entitled "Igneous and Metamorphic Rocks" includes "Composition of the Cosmos and the Sun" and "Sedimentary Differentiation". One may contrast the detail in which three-component condensed systems are discussed with the virtual ignoring of the effect of changing oxygen fugacity on iron-bearing systems of petrogenetic importance. On the other hand, the attention directed to sulphide systems is a welcome precedent.

The illustrations are equally variable, both in scale and conception. A readily comprehensible diagram consisting of merely a few lines will be spread over virtually a complete page; a highly complex diagram will be crammed into a few inches of space, often with a minimum of explanation in either caption or text. In the chapter entitled "Phase Diagrams", 84 complicated diagrams (counting separately those labelled *a*, *b*, *c*) compete with text for 57 pages.

The bibliography is comprehensive, and an unusual feature of the index of 35 pages is that entries refer as often to the bibliography as to the text. In accord with the claims of this book to be a text-book, 108 problems are provided. No answers are given. G. A. Chinner

MARINE BIOLOGY

Advances in Marine Biology

Vol. 1. Edited by F. S. Russell. Pp. xiii + 410. (London and New York: Academic Press, 1963.) 84*s*.

Volume 1 of *Advances in Marine Biology* represents the first of a new series and contains five contributions to quite different aspects of marine biology.

The large-scale culture of bivalve mollusc larvæ in the laboratory is an important aspect of applied marine biology. Drs. Loosanoff and Davis, pioneers and leading authorities in this field for many years, have contributed an article which, giving a most comprehensive account extensively, and indeed expensively, illustrated—will be most welcome to workers on this subject; a detailed description of the installations, methods and results of the Milford Laboratory is presented. To the more general reader, to whom presumably the series is largely addressed, the detailed description, reading at times almost like a laboratory notebook, is tiresome. The approach of these workers to their subject has always been severely practical and, in view of the terms of reference under which they have worked, this cannot be criticized. It is a pity, however, that in view of their ability and wide experience the authors did not in this review attempt to relate their work to general problems associated with the culture of marine organisms and to show its relevance to other and more academic investigations of larval development.

For more than thirty years Johs. Schmidt's 'solution' of the eel problem had been considered one of the classical investigations of biological oceanography and it was little wonder that Tucker's rejection of Schmidt's hypothesis seemed to some to smack of iconoclasm and that it engendered much scientific heat; perhaps if Tucker had been a little less forceful and some of the elder statesmen a little less unreceptive the energies of both could have been more profitably employed! That feelings were aroused is evident by the vigour with which the late Dr. Bruun—always a gentle and much-loved character—defends the position of his colleague. In his contribution, each of Tucker's arguments are in turn critically examined and a very good case is made out for the older hypothesis. One of the fundamental questions concerns the identity or otherwise of the American and European eels, and the discussion prompts the question as to why fishery biologists do not apply more modern and more sophisticated techniques for comparisons based on morphometric data. It is not difficult to suggest ways of 'testing' the two hypotheses; the article brings out clearly how difficult it is to apply an experimental approach in biological oceanography and how dependent we are on deductive reasoning from such data as are available.

The three remaining contributions to this volume are more conventional reviews: Dr. J. A. C. Nicol's article on photoreception and vision in fishes may be said to be at the organ-level; Prof. C. M. Yonge's on the biology of coral reefs at the community-level; and Drs. Blaxter and Holliday's on clupeid biology at the species-level. The style adopted by the various authors is different—but none is the worse for that. Nicol restricts his attention to photobehaviour and the functioning of the eye in marine environments; Yonge gives a general account of the biology of coral reefs, adding some of the historical background against which the investigations have been set. Blaxter and Holliday review clupeid biology in a most comprehensive manner, and their contribution will be of great use not only to those working in the same field but also to all those who wish to develop a soundly based biological programme of fisheries research; they are to be congratulated.

All the papers are well referenced; the misprints are few, obvious, and of minor importance; the index is perhaps a little sparse. The volume is well produced.

H. Barnes

FOOD BIOCHEMISTRY

Introduction to the Biochemistry of Foods

By Dr. J. B. S. Braverman. Pp. xv + 336. (Amsterdam, London, New York: Elsevier Publishing Company, 1963.) 70*s*. net.

Biochemistry began as an extension of organic chemistry, and involved chiefly the investigation of the chemical constituents of plant and animal tissues. In the 1920's and 1930's, under the influence of such pioneers as F. Gowland Hopkins, this static approach gave way to the dynamic, and the biochemist began to study the transformation of the chemical constituents of the cells and the enzymes which brought them about. The reactions which have been mostly investigated are those concerned with the release of energy, leading, for example, to the elucidation of the complex pathways of glucose oxidation.

In a sense, the biochemistry of the plant and animal products which we use as food has combined both the static and the dynamic approaches. We now know a great deal about the structure of cellulose, vitamins, proteins, chlorophyll and essential oils. We also know a great deal about the steps by which they are synthesized in living tissues, the reactions in which they participate during life, the changes which occur after killing or collecting, and the ways in which these may be modified by the processes to which foods are projected before they are consumed.