

precision and vast extent, rich in results of theoretical interest, and of practical value, which affords an unequalled discipline in education when rightly applied". Two-thirds of a century later geographers may have lost some of this evangelical fervour and would probably express their point of view a little more cautiously. But when the Congress comes again to Britain in 1964 geographers intend to seize their opportunity once more, and in their advance planning they will be fortified by the valuable reminder of the history of the recent past with which they are provided in this volume.

R. W. STEEL

PHOTOGRAPHIC INTERPRETATION OF GEOLOGY

Photogeology

By Victor C. Miller, assisted by Calvin F. Miller. (International Series in the Earth Sciences.) Pp. vii + 248. (New York: McGraw-Hill Book Company, Inc.; London: McGraw-Hill Publishing Company, Ltd., 1961.) 104s. 6d.

THIS book is an elementary introduction to the principles of photographic interpretation of geology. It is a lavish production and contains eighty half-tone reproductions of stereopairs or single photographs which illustrate 'text-book' examples of different geological structures or geomorphological features, all from the United States or Canada. Each example is supported by a brief analysis of the features which can be interpreted from the photography and there are outline maps of the localities which can be used for practical exercises. The reproduction of the photography is excellent, and the plates can be examined through an ordinary lens stereoscope of small magnification without serious loss of quality. The book is specially bound with a ring back to allow the pages to lie flat for stereoscopic examination.

Although this book is worthy of serious study for the sake of these examples, the remaining text is of uneven quality. The chapters relating to the qualitative interpretation of geological features are elementary but sound. The author rightly emphasizes the importance of geomorphological analysis as the basis of any photo-geological interpretation.

The preliminary chapters which describe the elementary geometry of the aerial photograph, the principles of stereoscopy and the methods of measurement and plotting are the least satisfactory part of the book. It is reasonable to assume that a book of this sort should instruct the geologist how to transfer the results of his interpretation to a base map by simple graphical methods. Moreover, the ability of the geologist to use a parallax bar, or even a third-order photogrammetric plotter, greatly increases the scope of the work which can be done by allowing him to use quantitative techniques also. These subjects are referred to in the early chapters; but many of the essential elements are treated superficially and some are not mentioned at all. For example, the perspective geometry of a tilted photograph is only described for the representation of a plane surface; relief displacement is only considered for the truly vertical aerial photograph. The combined effects of tilt and relief displacement are not described although these effects occur in practically every aerial photograph which the geologist will examine. The method of plotting principal point base-lines which is described depends on the assumption that the image of each

principal point can be transferred from one photograph to the next by inspection. There is no mention of the methods which have to be used in the common case of these points lying in areas of comparatively featureless terrain. The section describing stereoscopic parallax is most unsatisfactory. The parallax equation, which is introduced without proof, is incorrect and there is no explanation of the kinds of errors which will be experienced in determining height differences from simple parallax measurements on tilted photographs. The radial line assumption is glossed over in no more than a sentence and the use of anharmonic ratios as an alternative method of transferring detail from the photograph to the base map is not mentioned. A variety of second order and third order photogrammetric instruments are splendidly illustrated, but the reader is left in some doubt about how these instruments can be used or their relative merits for compilation of photogeological maps.

D. H. MALING

BIOLOGY OF PARASITES

Parasitology

The Biology of Animal Parasites. By Prof. Elmer R. Noble and Dr. Glenn A. Noble. Pp. 767. (London: Henry Kimpton, 1961.) 82s 6d.

THIS book does not, so its authors say in their preface, attempt to duplicate the contents of a text-book of clinical parasitology. It attempts, in fact, the difficult task of summarizing our knowledge of the biology, rather than other aspects, of parasites of all kinds. One of the aims of its authors is the admirable one of offering parasitology to the undergraduate as a major field of study, and the undergraduate thought of is the one who has already completed at least one year of introductory biology or zoology and yet is surprisingly called by the authors "advanced". The research worker, however, is also catered for. He is warned that he will not find in the book exhaustive consideration of his own field of work, but he will, the authors hope, find the various fields of general animal parasitology summarized and brought up to date.

This combined aim of trying to cater, in one volume, for the needs of the young undergraduate and the research worker is bound to be difficult; some will doubtless feel that it is impossible. So much will depend on what the young student has already been taught, and on how it has been taught and on whether the undergraduate can advance beyond the facts he has already. There is so much detail in the text of the book, and also in its illustrations, that some students may be intimidated by the complexity so rightly recorded here. On the other hand, there will, one hopes, be other students who will welcome this complexity and will find in it a challenge which will lead them on to serious, independent work and later to discovery.

For senior workers the book contains much that will be valuable. Its first eight chapters deal with the biology of parasitic members of the main taxonomic groups of animals, including an all too brief chapter on the parasitic mesozoans, coelenterates and other groups which standard text-books, dealing only with species of economic importance, often leave out. In Chapter 9 the physiology and biochemistry of the parasite are discussed. In Chapters 10-14 we learn about their ecology, and in Chapter 15 about their evolution. At the end of each chapter there is

a useful brief bibliography. Well printed and handy in size, the book gives us many illustrations, most of which are good, while some are unique, and others could have been improved. Most of them are borrowed from other books or from research papers.

But the main value of the book is the fact that it brings together our knowledge, not so much about the systematics, structure and great economic importance of the parasite, but about its biology and about the basis of the parasitic mode of life. It was high time that such a book was prepared. If it contains here and there some statements which can be criticized, it should be remembered, not only that it is easy to criticize and very difficult to write a book of this kind, but also that nobody yet has written a book that does not, in some respect, arouse controversy. It is good, in fact, that it should be so, for the senior reader can, from his own experience, correct what he does not accept; and the student can refer to him whatever may puzzle him.

So far as I am concerned, I am glad to have this book. It breaks new ground and illustrates the gratifying fact that parasitology, which for so long has been one of the 'Cinderellas' of biology, is nowadays getting the attention it has always deserved. The parasite, as will be realized by the reader of the early pages of this book, may be, perhaps, indefinable, but it does take us, the more deeply we study it, far beyond biology and straight to the very roots of our general philosophies.

G. LAPAGE

CUP FUNGI

British Cup Fungi and Their Allies

An Introduction to the *Ascomycetes*. By R. W. G. Dennis. Pp. xxiv + 280 + 40 plates. (London: The Ray Society, 1960. Sold by Bernard Quaritch, Ltd., 11 Grafton Street, London, W.1.) 80s.

NO more generous publication has been offered the student of British ascomycetes. By a handy, well-printed and copiously illustrated volume this flora of myriad fungi from *Eurotium* to *Morchella* has been reopened. "Most of the genera said to occur in Britain are illustrated." About 1,000 species in 450 genera are described. For some 180 species taxonomic points are explained in twenty figures of line-drawings. Forty colour plates depict fructifications and spores of nearly 500 species. Most, if not all, descriptions and illustrations in the tradition of Kew mycology are original; they reflect the patience and skill which has been devoted over many years to this artistic product.

The keys to the families and genera are concise and appear to be satisfactory; but in the case of large genera, for which numerous species are described, the absence of specific keys is annoying. The major key to the orders is strange. It is not, as stated, a key to the larger ascomycetes but one to all the ascomycetes in minutest detail, such as will baffle the beginner. The name 'cup-fungi' has been retained throughout the book, and pyrenomycetes are mixed up with discomycetes inasmuch as these two standard groups are, without explanation, completely passed over. Plectascales are associated with Tuberales, and *Nectria* becomes a cup-fungus. A great opportunity has been missed both to help the beginner and to explain the new alternative. The book is stern, but it will make its way overseas because most genera are cosmopolitan and a comparable introduction is scarcely available. Lexicographers will find hidden in the text new combinations.

In all this advantage there is a vexatious omission. Has the author, so expert in this group, turned his back on science? "Taxonomy . . . not a science but an art" (p. xvii). Many of these fungi have been objects of research. To have left this knowledge out merely pales the introduction but, names having been changed and the clue to research residing in the twisted thread of synonymy, to have left this out is ungracious. Where is *Ophiobolus graminis*, and is it rightly named? Where is *Peziza aurantia*, the standard cup-fungus of modern botanical teaching? Without explanation it becomes *Aleuria aurantia* (not ascertainable from the key on p. 1). *Aleuria* is "one of a residual assemblage of genera defined largely by negative characters". *Peziza* becoming *Aleuria*, *Aleuricae* become *Pezizeae*, and vice versa, as one might swop *Amanita* and *Lepiota*. The student is referred to a monograph where this *Peziza* is called *Aleuria* (cum *Galactimia*), and the author toys in small print with the popular name "Orange peel *Peziza*". Scientists try to respect taxonomy. When, artfully or artlessly, it gets in this mess, minds begin to work on a new and scientific taxonomy. The stirrings are abroad, and this book, with its great appeal, will promote them.

E. J. H. CORNER

HYDRA

The Biology of Hydra and of some other Coelenterates

1961. Edited by Howard M. Lenhoff and W. Farnsworth Loomis. Pp. xv + 457. (Coral Gables, Florida: University of Miami Press, 1961.) 4.50 dollars.

THIS book consists of twenty-three papers delivered by North American workers at a symposium in Miami during March 1961, with thirteen exclusively on *Hydra*, and six more general in nature. Topics covered include: electron microscopy, nematocysts and their toxins, nutrition, growth and differentiation, regeneration, colony formation, and sexual differentiation.

Here is an unusually good example of a single animal treated by widely varying techniques, and it will prove stimulating to alert readers who, if prepared to think for themselves, will achieve some of the "interdisciplinary synthesis" aimed at by the editors. This is helped greatly by the inclusion of the discussions which followed the papers and the additional one on the nervous system of *Hydra*.

Its main value, however, even if rather ephemeral, is for research workers, and for them the aggregation of such diverse material, much of it previously unpublished, under a single cover must be applauded. Most chapters are followed by an almost invariably up-to-date bibliography. Unfortunately, comment on the systematics of *Hydra* is omitted yet frequent discrepancy apparently within species is described.

This is a well-produced volume. Its tables, diagrams and plates are variable but generally adequate and sometimes good; many of the electron micrographs are excellent though occasionally spoilt by the absence, or only obscure insertion, of a magnification indicator.

It is more than two centuries since Trembley's *Memoire* appeared and yet the problems of nematocyst discharge, nerve net and sexual differentiation in the coelenterates still remain unsolved.

MARY CAMPION