for 3.2 billion years but have been studied for less than 200. Their place in the literature of microbiology is incommensurate with their importance to the biosphere. Knowledge of them is scattered, of varied quality, and difficult to collate. The authors succeed well in tying recent advances to the prescient observations and speculations of older workers in the field. This is especially so in the discussion of cellular structure, a subject of current excitement stemming from the replacement of inadequate optics and instrumentation by the electron microscope and adequate analytical tools. The reader is able to assess interpretations of electron photomicrographs in the light of the classical observations and experiments pertaining to the prokaryotic nature of the blue-green algae. The discovery and description of the gas vacuoles and vesicles as well as the new insight into the structure and function of heterocysts make absorbing reading.

With respect to physiology and biochemistry, the authors have provided an easily assimilated digest of current knowledge about photosynthesis, chemosynthesis, heterotrophy, respiration, and nitrogen metabolism and have skillfully related data from other organisms to data peculiar to the blue-green algae. This section, however, requires careful attention and may be considered heavy reading by all but experts.

In the sections dealing with the ecological impact of the blue-green algae in marine and freshwater environments, the volume adequately illuminates problems that are unsatisfactorily resolved. Far too little is known about the individual species—which number over 1500 in the Cyanophyta—to permit total understanding. What information is summarized does nothing to dispel the impression that these organisms play a far greater ecological role than previously suspected.

A reviewer is hard put to find any significant contribution to the field that has been omitted from the over 1000 references in the bibliography. Readers will be disappointed by the absence of an author index, and the inclusion of so much literature has made unavoidable the cryptic style so annoying in the *Annual Review* series. This is nevertheless relieved by a wealth of insight into the problems and frequent reference to unpublished data. Occasionally contradictions between observations and accepted interpretations are inadequately explored—as in the case of the location of the phycobilins in the thylakoids—but such flaws are rare. The authors treat contradictory information in an objective fashion without denigrating the contributions of those whose views have been superseded. By rejecting erroneous hypotheses of their own, they treat conflicts with a good humor rare in scientific writing. For the phychologist or student this is a thoroughly competent and graceful text. The professional phycologist will want it at his elbow.

ROBERT W. KRAUSS
College of Science,
Oregon State University, Corvallis

Invertebrates

Biology of the Turbellaria. Papers from a symposium, Chicago, Dec. 1970. NATHAN W. RISER and M. PATRICIA MORSE, Eds. McGraw-Hill, New York, 1974. xxviii, 530 pp., illus. $25. McGraw-Hill Series in the Invertebrates.

This compilation is designated "Libbie H. Hyman Memorial Volume" and consists of amplified versions of papers read at a symposium held in her memory at the AAAS meetings in 1970. Thirteen of the 23 authors are European.

Seldom has a zoological symposium been organized with such concern for broad, scholarly, and thorough coverage. Rather than being simply a review of past research, this volume contains an abundance of new material. Karling properly sets the pace with an introductory chapter on the anatomical affinities of turbellarian orders. Detailed anatomy is at its best in a remarkable chapter by Bedini and Papi on the electron micrography of the turbellarian epidermis. Other anatomical material is contained in chapters on sperm biology and fertilization and on copulatory organs in the Polycystididae.

Physiology is represented by a chapter bringing comparative digestive physiology up to date and accounts of the nerve plexus in polyclads, neurosecretion (*sic*) in freshwater planarians, and inhibition of planarian regeneration.

The largest portion of the volume is ecologically oriented, with chapters on such topics as salt-marsh Turbellaria, Texas cave flatworms (fascinating reading!), Black Sea littoral species, polyclad reproductive ecology, distribution of Japanese freshwater species, competitive planarian ecology, and an impressive long chapter by Ball on the phylogeny and biogeography of freshwater triclads.

Three chapters are devoted to phylogenetic curiosities and descriptions of new taxa: Rieger on Kytorhynchidae, a new typhloplanid family; Sterrer and Rieger on Retronectidae, a new catenulid family; and Poulter on *Pericelis hymanae*, a new polyclad species from Hawaii.

There are unusual chapters on the genetics of fissioning in planarians and on reproduction as a function of age in *Dugesia*, and a short history of the study of Turbellaria in North America. Riser concludes with an epilogue consisting of brief comments on significant items not discussed in the volume, as well as speculations about future turbellarian research, especially on marine species.

Some of the original manuscripts submitted were too long for the volume, and the editors worked diligently to bring them down to reasonable length. There are only a few typographical errors, but the publishers apparently "forgot" the frontispiece and "lost" figure 12 on page 267. On the other hand, they have produced a volume that contains only the finest illustrations. Line drawings, graphs, and electron micrographs are all excellent.

Appropriately, this book contains a short biography and a complete bibliography of Libbie Hyman. She would have been graciously pleased to know that this outstanding work is dedicated to her.

ROBERT W. PENNAK
Environmental Biology,
University of Colorado,
Boulder

Bases of Salt Tolerance

Structure and Function of Plant Cells in Saline Habitats. New Trends in the Study of Salt Tolerance. Translated from the Russian edition (Moscow, 1970) by A. Mercado. B. Gollek, Transl. Ed. Halsted (Wiley), New York, and Israel Program for Scientific Translations, Jerusalem, 1973. vi, 284 pp., illus. $30.

Intensified water use has led to deterioration of water quality, evidenced in irrigated areas by marked increases in salinity. Agriculture would benefit greatly if the salt tolerance of crop plants could be increased significantly, for saline waters could then be used more efficiently. To improve salt tolerance we need to know the mechanisms by which salinity injures plants, the