J. Euk. Microbiol., 40(3), 1993, pp. 392–393

BOOK REVIEWS

Coombs, G. H. & North, M. J. (eds.). 1991. *Biochemical Protozoology.* Taylor & Francis, London and New York. ISBN 0-7484-0000-1. 635 pp. $165.00 hardcover, $66.00 softcover.

Despite recent advances in the field of protozoan biochemistry, a comprehensive presentation of current knowledge in a single volume has not been attempted since 1977. This book, edited by Coombs and North, 55 chapters by 90 contributors, is intended to fill the gap. The content of the book is based on a symposium *Biochemical Protozoology as a Basis for Drug Design* held at the University of Stirling in 1990. The aim of the editors, however, was to offer more than just a symposium proceedings. The book provides information on protozoan metabolism, enzymes and transmembrane transport, with emphasis on the potential use of biochemical peculiarities of parasites as targets for chemotherapy. Also included are reviews on the mechanisms of drug action and drug resistance. Topics overlapping molecular biology and biochemistry, as well as those dealing with macromolecular synthesis and turnover, were not included or are mentioned marginally.

The contributions concentrate mostly on protozoa of importance in human medicine, few animal parasites are mentioned and one review discusses the biochemistry of rumen ciliates and their importance in rumen ecosystems. Among the most represented organisms are trypanosomes, leishmanias and malaria parasites. Several contributions deal with anaerobic or microaerophilic protozoa such as trichomonads, *Giardia,* and *Entamoeba histolytica.* One comprehensive review is devoted to biochemistry and potential targets for chemotherapeutic attack of *Pneumocystis carinii.* There is an excellent overview on the biochemistry and physiology of *Plasmodium.* Readers would doubtless appreciate a review of this type for each major group of organisms represented.

The numerous contributions detail various topics of protozoan biochemistry including: energy metabolism of saccharides, amino acid catabolism and recycling, polyamine metabolism, biochemistry of lipids, metabolism of antioxidant thiol compounds, proteinases and phosphatases. Polyamine biosynthesis, glutathion and trypanothion metabolism, purine metabolism, folate metabolism, protein synthesis and methionine recycling are examined in separate chapters as specific targets for drug action. Proteinases are emphasized (13 papers); these enzymes increasingly attract the interest of parasitologists due to the variety of effects they can have on life cycles and nutrition of parasites and their host-parasite relationships. Most of the work at present is descriptive and the roles of these enzymes in parasitic organisms largely remains unconfirmed. A thought-stimulating review on energy metabolism of anaerobic protists brings the data obtained with different organisms into a broader context. Apparent from these considerations, anaerobic attributes need not be considered as ancestral or primitive. Several contributions discuss functions of cell organelles, such as the glycosomes of Kinetoplastida, the hydrogenosomes of anaerobic protists and the mitochondria of trypanosomes and malaria parasites. Transport of ions and substrates across parasite membranes and modifications of membranes and transport mechanisms in parasitized host cells are discussed in context of drug action, uptake or resistance. The book concludes with a chapter considering the possibilities for new antiprotozoal drug development from the standpoint of the World Health Organization (WHO) Special Programme for Research and Training in Tropical Diseases.

The majority of reviews assembled in this book give comprehensive information and reflect the expert knowledge of their authors. New data are included. Papers dealing with too narrow a subject or chapters that present general discussion and ideas without sufficient support in published data are exceptions. Still, the consistency of this multiauthor work would gain from a greater editorial selectivity toward the material submitted by symposium participants. In my opinion there are too many chapters on diverse subjects, some being rather remote from the conceptual framework of the book (e.g. structural variations of surface lipophosphoglycans). There also are some under-represented areas (pyrimidine metabolism and purine and pyrimidine salvage), while others (e.g. proteases) seem over-represented. Nevertheless, in general the book is well edited. Short papers are balanced with more comprehensive texts, there are useful cross-references between the chapters and each chapter provides essential references to the primary literature.

As admitted by the editors, the book is not totally comprehensive but offers a valuable source of information on the current status of research in biochemistry of parasitic protozoa. It should be particularly useful as an introductory source for scientists, advanced students and teachers who would like to expand their knowledge. The book is highly recommended to every laboratory engaged in the study of the biochemistry of protozoa or the development of antiprotozoal drugs.—JAROSLAV KULDA, *Department of Parasitology, Charles University, 12844, Prague 2, Czechoslovakia.*

Foissner, W., Berger, H. & Kohmann, F. 1992. *Taxonomische und ökologische Revision der Ciliaten der Saprobiensystems. Band II: Peritrichia, Heterotrichida, Odontostomatida.* Informationsberichte der Bayerische Landesamtes für Wasserwirtschaft (Lazarett Str. 67, WD-8000, München 19. FRD). Heft 5/92. ISSN 0176-4217. 502 pp.; 1,730 figs. 80 DM.

This atlas of ciliates of the saprobiont system is the second of four volumes forming the largest work on the subject in the world. It will cover over 350 species in a total of some 2,000 pages and over 4,000 figures. It is a monumental work and all the more remarkable as classical natural sciences (e.g. zoology, taxonomy, morphology) are suffering from a "recession." Infusorian fauna are significant in evaluation of fresh water pollution. The importance of ciliates is thus clearly established in this field but identification is often very difficult. The authors of the series provide exhaustive documentation, considerably facilitating identification of saprobiont limnic ciliates, satisfying both ecologists and taxonomists.

Volume 2 covers 51 ciliate species belonging to 20 genera. It starts with general observations concerning the ecology of saprobiont ciliates and physiological and biochemical data (41 pages, 55 tables). More detailed ecological information (completed by tables and graphs) is provided for the better-known species and their position in the saprobiont system is defined.

A reminder of the fundamental rules of the International Code of Zoological Nomenclature (ICZN) introduces the descriptive section. Too many biologists still seem to be insufficiently acquainted with this. Systematic study of each taxon begins with genus and species identification keys; these are very clear and instructive and are accompanied by numerous drawings and diagrams. Beginners have no trouble in following.

Each species is given full coverage preceded by modern synonyms and a complete bibliography. Comparative descriptions include a large number of figures (*Platycola decumbens* is illustrated by 59 figures and most other species by an average of 25 to 35 drawings and photographs). The authors wish both to do

justice to older work (and save readers tedious bibliographical research) and also enable fruitful comparison between descriptions of live material and more modern descriptions using silver impregnations. Drawings are agreeably accompanied by a great number of perfectly printed photographs on excellent paper. This photographic documentation deserves special attention. It is the first time that so many high-quality photographs of ciliates have been published. Some interferential contrast images of live material and of protargol impregnations are admirable. Likewise, most of the scanning electron micrographs are very fine (many published for the first time). As observed by T. Fenchel (1992. *J. Protozool.* **39**:441-442; a review of Vol. 1) the qualitative and quantitative importance of the illustration of these books has set a new standard for this type of publication.

Some readers may consider that such plentiful illustrations are an expensive luxury. I feel that the authors were right in drawing on forgotten authors such as Stein or Ebrenberg and as many genera and species are still not very well known, enough unpublished photographs should be printed to improve knowledge of these ciliates. Finally, this is a sumptuous but still affordable book. The authors love "infusorial animalcules" and I understand this very well.

The detailed study of saprobiont peritrichs is rather disappointing as many species are still not well known and there is often no information about their buccal infraciliature. The authors sometimes have to resort to differential description of several neighboring morphotypes whose precise taxonomic value is not known (e.g. *Vorticella aquaedulcis*-Komplex). Fairly few *Metopus* species are described (the majority are saprobionts) as most are not well known for lack of modern investigation based on silver impregnations, morphometry, morphogenesis and scanning electron microscopy. The book clearly shows that it is more useful to re-describe poorly known existing species correctly than to ceaselessly attempt to find new species. Original photographs provide valuable information on the difficult morphology of the genera *Spirostomum, Stentor* and *Coenomorpha.*

A few minor criticisms can be made. The loose-leaf binding of these large volumes is doubtless more economical and pages can be removed and used as "cards" (convenient for comparison of several species), but they are fragile and must be handled carefully. Although the photographic plates are admirably reproduced, the same does not apply to the tables, graphs, diagrams and drawings. They have probably been photographed from the original publications and the reprinting sometimes lacks sharpness. A few are over-inked and some tables are over-reduced and difficult to read. There is also slight loss of quality in the reproduction of very detailed drawings (especially some of the documents by Stein, Faure-Fremiet, and Tuffrau). The typeface used for the legends to drawings is not very pleasant, and neither are the texts and the general graphic design of the determination keys. The scales of drawings are in a few cases not very appropriate. Finally, one regrets that a work of this importance is published only in German.

In conclusion, the book is an admirable sequel to the first volume of the series and we await the next two volumes with impatience and curiosity. They are attractive, admirable tools of rare quality. They appear to me to be indispensable and will be an asset in any protozoology library. I should like to congratulate not only the authors but also the publishers who dared to put out such a monumental publication against the difficult background of a world economic slump.—JEAN DRAGESCO, *394 Bd. du Grand Devois, 34980 Saint-Clément de Rivière, France.*