

of protozoa" (comparable with the review by Mast in the 1941 volume), "Movement of protozoa by flagella, cilia and other fibrous organelles" and "Movement of protozoa by cytoplasmic streaming". There is an immense amount of information in this chapter, and Jahn and Bovee have produced an excellent guide to the literature, although the omission of such structures as haptonemata and axostyles from their account of motile organelles is regretted.

In his review of "Respiratory Metabolism" William Danforth has given an admirable general introduction and followed this by a systematic survey of our knowledge of respiration in protozoa. It is admitted that evidence is mostly too scanty for generalizations, which makes it more difficult to convey the information coherently. The author makes it plain that protozoa have exploited this aspect of their biology to an extent comparable with that known for more overt features, and his article is a valuable source of information about the common laboratory species. Dr Danforth must be disappointed that his article was delayed in publication, for his literature review was completed in mid-1963.

Problems of osmotic regulation, ionic regulation and excretion, with special reference to the functions of contractile vacuoles, are discussed in a comprehensive and authoritative, but commendably brief, chapter by J. A. Kitching. The author has taken pains to illustrate his article with well-chosen figures and micrographs, and the reader is led to feel that he can really understand what is known of the subject from this chapter alone.

Information on "Nutrition and Growth of Protozoa", reviewed by R. P. Hall in the last article, must necessarily overlap parts of the article on respiratory metabolism, but it is valuable to see such information dealt with from different viewpoints in the two chapters. Parts of Hall's chapter make rather dull reading, with lists of species which have been shown to require various minerals or growth factors; surely this information could have been given adequately in tables, and the author could have spent more time discussing such aspects as the sources and uses of the required materials. There is a great deal of useful information in this chapter, but it could have been presented in a more palatable form.

This book clearly must be present in every protozoological library, but it could have been made more widely useful in teaching as well as research if more thought had been given to the subject divisions and the method of presentation; it would then be a book that every protozoologist should have on his personal bookshelf. The problem of keeping a library provided with information about research in protozoology could be solved more adequately by annual or biennial volumes of shorter review articles which would allow topics to be reviewed as frequently as advances in that topic demand, and could provide a more rapid means of publication. The present attempt to produce a comprehensive contemporary review of protozoological research appears from the first volume to be only partially successful; it is to be hoped that the future volumes will contain articles as good as the best in this first volume.

M. A. SLEIGH

## EUGLENA AND ITS RELATIVES

### Euglenoid Flagellates

By Gordon F. Leedale. (Prentice-Hall Biological Sciences Series.) Pp. xiii + 242. (Englewood Cliffs, N.J., and London: Prentice-Hall, 1967.) 56s.

AFTER having been for a long time a type in elementary courses in both botany and zoology, *Euglena* still features in modern biological teaching. At the same time, it continues to be the subject of advanced research in a variety of fields, notably the biochemistry of vitamin B<sub>12</sub>, the role of non-nuclear DNA, and photoreception. Its position in biology must surely be unique, and this book, which

surveys *Euglena* and its relatives, therefore promises to be correspondingly useful.

About one third of the book is devoted to the consideration of the position of euglenoid flagellates in the biological hierarchy and to matters of taxonomy. The system of classification presented is a revised one based, unfashionably but quite plausibly, on a phylogenetic scheme. The characters of order and genera are described and illustrated by clear line drawings. Together with a dichotomous key given as an appendix, these provide an introduction to the taxonomy which can readily be extended by means of the references given. A valuable feature is the inclusion of notes on individual species, indicating, among other things, which are available in culture.

The second part of the book deals with cytology and fine structure. This is lavishly illustrated with original photomicrographs and electron micrographs which, as one would expect from an associate of Professor I. Manton, are all of excellent quality. The various cell components, including pellicle, flagella, Golgi bodies, mitochondria and chloroplasts, are described clearly and concisely, examples being taken from many different genera. The inclusion of both light photomicrographs and electron micrographs of these various structures should be particularly useful to the teacher. Their function is touched on but not dealt with *in extenso* (physiological aspects were reviewed by J. J. Wolken in his book *Euglena: an Experimental Organism for Biochemical and Biophysical Studies*, 1961).

This book can be unreservedly recommended, both to the teacher wishing to refurbish his image of a familiar type and to the research worker seeking background information about his experimental organism. Both will be stimulated to find out more about this fascinating group, among the members of which are a great variety of physiological types providing excellent material for the investigations of problems suited to tastes ranging from that of the ecologist to that of the molecular biologist.

G. E. FOGG

## JUNIOR ENGINEERING

### The Engineer in Wonderland

By E. R. Laithwaite. Pp. viii + 172. (London: The English Universities Press, Ltd., 1967.) 27s. 6d. net.

It was a clever stroke to ask Professor Eric Laithwaite of Imperial College to give the 1966 Christmas Holiday Lectures for schoolchildren at the Royal Institution. Here was an engineer full of enthusiasm for his subject, yet able to make it comprehensible. Publishing the lectures as a book might have been a much worse idea, but it has come off splendidly well—the book has a pace and excitement which a collection of essays would find it hard to match. It is also very well illustrated.

For the first time, the 1966 lectures were televised by the BBC, and, as Professor Laithwaite points out, were seen by more people than had attended all the previous 136 series of lectures. The subject of the lectures, each of which had as a title a quotation from *Alice in Wonderland*, was electromagnetic induction, still a fascinating subject despite the ubiquity of its applications. Professor Laithwaite described and demonstrated a variety of electric motors of odd shapes and sizes, including the linear motor. It is interesting, perhaps, that he does not claim that the linear motor will be cheaper than other forms of power. It will, he says, be more reliable, having no moving parts, and this will come to have a much greater economic importance in the future. Reliability will be the crucial factor in the twenty-first century, replacing efficiency and power factor as the quality engineers strive for.

The most exciting moment in the series of lectures came when Professor Laithwaite and his colleagues succeeded for the first time in levitating a hollow aluminium sphere