

## BOOK REVIEWS

**Algal Physiology and Biochemistry:** by W. D. P. STEWART (ed.). Botanical Monographs, Vol. 10. Blackwells Scientific Publication, Oxford, 1974. 989 pp. £15.50.

**The Blue-Green Algae:** by G. E. FOGG, W. D. P. STEWART, P. FAY and A. E. WALSBY. Academic Press, London, 1973, 459 pp. £8.50.

These books are only two of what appear to be a veritable spate of new texts on algae which have either just appeared or which are planned for publication in the near future. In view of the relative neglect of these organisms by plant scientists, these two books are to be welcomed, particularly since there seems, so far, to be relatively little overlap between the different volumes. This book on the Blue-Green Algae by Fogg and his co-authors, for example, steers a different course from the other recent text on the Cyanophyta edited by N. G. Carr and B. A. Whitton (for review, see *Phytochemistry* 14, 604, 1975); it is more obviously an undergraduate textbook while the latter is intended for a more advanced audience of postgraduates and research workers.

The first book under present review on algal physiology and biochemistry, has also clearly been written at the more advanced level and indeed there will be few students who could afford over £15 for a textbook. It has been planned as a companion volume to Carr and Whitton's book and, of course, covers all 14 of the recognised classes of algae. It will be a key source book to anyone interested in comparative aspects of algal biochemistry since it considerably updates the earlier comparative review by Hegnauer in 1962 in Volume 1 of *Chemotaxonomie der Pflanzen*. The very first chapter by R. A. Lewin is entitled "Biochemical Taxonomy" and is a useful introduction to the rest of the book in that it pulls together many aspects of algal biochemistry and taxonomy which are dealt with in more detail subsequently. Since some of the most interesting and significant correlations between chemistry and taxonomy have been recognised among the algae—particularly in respect to pigment types, lipid synthesis and carbohydrate metabolism—I feel that Lewin's

chapter could have been more enthusiastic in outlook. He quite rightly points out the danger of making comparative statements regarding the biochemistry of an algal class based on an examination of only one strain of one species of a single genus. However, he fails to emphasize that at least with regard to some chemical features, adequate surveys have now been accomplished. For example, in the chapter by T. W. Goodwin on carotenoids and biliproteins, there is a table listing the distribution of siphonaxanthin and siphonein in some 90 green algae and, in a later chapter by the same author, it is clear that sterols have also been examined among an equal number of red algae. I firmly believe that the algae are one of the most fascinating plant groups for studying comparative biochemistry and phylogeny—a point which could bear emphasis in a work of this type.

Other interesting chapters for comparative biochemists include those of Beverley Green on "Nucleic Acids and their Metabolism" of B. J. B. Wood on "Fatty Acids and Saponifiable Lipids" and of W. Mackie and R. D. Preston on "Cell Wall Polysaccharides" and J. S. Craigie on "Storage Carbohydrates". A short chapter by J. A. Hellebust on "Extra-cellular products" reveals our lack of information on much of the chemistry of these organisms, e.g. regarding the volatile substances they produce and release into the environment. The recent interest in brominated phenols in algae should have been covered in this chapter; this is an important omission. The fact that some algae release toxins which can kill fish is mentioned and indicates there is an interesting field in chemical ecology here for further research.

In addition to the chapters on biochemistry there are an equal number of useful contributions on physiology including especially photosynthetic aspects and nitrogen metabolism. The book is well produced and illustrated, has both species and subject indices and is excellent value at present day prices.

The book on the procaryotic blue-green algae, as mentioned earlier, is a more straightforward biological textbook, written for advanced undergraduates. Although there are four co-authors they

appear to have worked well together as a team and have produced a unified treatment which reads very smoothly. A welcome feature in the first chapters are the numerous and excellent illustrations, some in colour, of the form and structure of these organisms. The book then deals with the general biology, physiology, some biochemistry and much on ecology; a final useful summarizing chapter describes the evolution and phylogeny of these organisms. The authors con-

clude the book, in a discussion on the symbiotic origin of chloroplasts, on the happy note: "it seems possible that the blue-green algae are something more than a lower branch of the evolutionary tree and represent a pervading and vital component which made possible the highest forms of plant life". For this reason, if none other, those working on higher plants should take note of this excellent text.

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*Phytochemistry*, 1975, Vol. 14, pp. 2314-2315, Pergamon Press. Printed in England.

**Membrane Transport in Plants**; by U. ZIMMERMANN and J. DAINTY. Springer-Verlag, Berlin, Heidelberg and New York. 473 pp. \$29.80.

This is a very good book. It reports the proceedings of an 'International Workshop on Membrane Transport in Plants' held at the Nuclear Research Centre, Jülich, West Germany, in February 1974. The subjects covered were: thermodynamics and electrochemistry of membrane transport (6 papers); water transport and osmotic processes (8); electrical properties of membranes (7); solute transport in algae and cell suspension cultures (13); transport in isolated chloroplasts (6); ATPases and transport (4); kinetics of transport (4); transport in organs of higher plants (10); regulating factors in membrane transport (6).

Almost all the articles are concerned with experimental data. They measure up very well to what is published in standard journals. The methods are clearly presented and the data presented merited publication. Quite a proportion have been published, sometimes subsequently, elsewhere but as I shall indicate, I would not want this to be taken as a criticism of the book. There are scattered through the text some helpful reviews of literature but in general the emphasis has been on the actual laboratory situation.

There are a number of reasons why this is a good book. It is excellently produced. The editing has been first-class. It is all too easy for those running a large meeting to lump the manuscripts into a volume and make matters even worse by adding the unedited transcript of discussions which took place. This sort of thing has happened with sufficient frequency to give published proceedings of meetings a bad name. But this volume

is a very welcome exception. The articles are clear and concise. Each has a simple straight-forward introduction and the reader is quickly made aware of what the article purports to show. The text is uniformly easy to read and the diagrams and tables are all extremely clear and well laid out. Zimmermann and Dainty and their helpers at Jülich have done an excellent job, particularly when one realises that publication of the volume was only about ten months after the meeting.

But I recommend this book over above its value as a very readable account of a meeting on membrane transport in plants. *In toto* the book makes an excellent statement about the present position concerning ion transport in plants. This is a book which can be recommended to a new postgraduate student who is entering the field. He will of course need a reasonable grounding in biophysics. But this should present no insuperable problem, since there are now good texts around e.g. 'Introduction to Biophysical Plant Physiology' by P. S. Nobel. Such a student will quickly learn about what is uppermost in the minds of workers in the field, what seems to be the technical difficulties and about those areas where there is distinct controversy. In almost all instances, everything is clearly presented and in terms of actual experimental situations. For once, the printed abstract of the discussions are particularly informative and they provide a valuable commentary on the text. The book can be read by tackling a section at a time or as a reference book, since there is a very good index. Of course a raw postgraduate would not be the only one who would benefit from having this book around. I feel certain that even those who think they are conversant with the field will value this book,