Book review

F. E. ROUND and D. J. CHAPMAN. *Progress in Phycological Research*, vol. 11. Biopress Ltd, Bristol, 1995. 370 pp. Price £59.

From the foreword to this volume, it is clear that the editors do not intend it to be a collection of reviews that centre around a single theme, nor a recurring update of particular areas of research. In some ways, this is an advantage, as it gives the editors scope for choosing particularly topical subjects. However, from the reader's perspective it has a significant disadvantage in that only a small fraction of the works are likely to be of immediate interest. As such, the purchase of the book by an individual may not be practical.

In the first chapter, Hutchins presents a detailed review of the evolution and current status of the hypothesis that primary production in large areas of the world's oceans is limited by iron. This work is fascinating from a number of perspectives, firstly because it draws together many disciplines, and secondly because it is an instructive tale of a scientific controversy. The review emphasizes not only the physiology of iron limitation, but also the chemical dynamics of iron and its supply and cycling within the oceanic ecosystem. There are a few shortcomings. The section on 'Measurements of iron limitation in natural communities' neglects certain enrichment experiments of the 1960s (e.g. Menzel & Ryther, 1961) which illustrate early technical problems, and the work of Sam Granick (see Mauzerall, 1992) is certainly relevant to the section on 'Iron and the evolution of early life'. However, on balance the chapter is very readable and will serve as a good introduction for those unfamiliar with the field, while providing a reference list that holds something even for specialists in the area. It is pleasing to see core journals from the oceanographic literature (e.g. *Limnology and Oceanography, Deep-Sea Research, Journal of Marine Research*) cited in a phycological context; in many ways these fields are too sharply demarcated.

Maier's chapter on pheromones (sexual attractants) in brown algae introduces a topic that many would associate exclusively with animals (or perhaps, more recently, perfume manufacturers!). The difficulties inherent in working with these compounds are perhaps illustrated by the recovery of 0·7 mg of fucoserratene from 252 kg of fresh female receptacles of *Fucus serratus*. The author has provided an excellent review including a comprehensive catalogue of compounds and their occurrence, detailed chemical structures, and a good summary of experimental techniques. The work is augmented by many high-quality micrographs. The review, however, caters mostly for the specialist. Many terms such as 'planogamy' are used without definition. It is disappointing that reference is not made to parallel studies in other algal groups (if indeed there are any), and that there is no attempt to generalize about similarities or differences in pheromone compounds among algae, higher plants and animals.

Chapter 3, by Berger and Brownlee, provides a review of developmental signals and their transduction in fucoid algae. Since macroalgae can be viewed as representing a fascinating intermediate level of organization between undifferentiated unicells and very highly differentiated groups such as angiosperms, cell signalling in these organisms is an interesting topic that can provide evolutionary insights. As with Maier's article, however, there is a disappointing lack of breadth and comparisons with other algal groups. The use of the fucoids as a model system is stressed, but the reader is given no indication of how applicable the model is to other groups, nor the state of research on cell signalling elsewhere in biology. A lack of integration in the volume is obvious from the fact that, despite overlap, this chapter does not refer to the preceding one. Notwithstanding these criticisms, the chapter provides a smooth union of electrophysiological and morphological data, as well as a good historical perspective on research in the field.

Canini and Caiola provide an overview of the symbiosis between a cyanobacterium and ferns of the genus *Azolla* in Chapter 4. Algae provide some of the most fascinating and elegant examples of symbioses in biology, and this chapter is a superb compilation of work on biochemistry, ultrastructure, physiology and ecology. However, as in previous chapters, there is a distinct lack of breadth to the review. The opportunity is missed to discuss some of the many other examples of cyanobacterial symbioses (e.g. Villareal, 1992), that could lead to generalizations and broader insights.

In the fifth chapter, Ribera and Boudouresque review the increasingly common situation of the introduction of non-native marine plants. The review is broad (including angiosperm examples), and in-depth. There is a excellent set of definitions, details of how introductions can be recognized, and a description of the typical phases of an 'invasion'. Special consideration of organisms that have been genetically modified or are aquacultural hybrids is presented, and practical sections on legislation and recommendations are included. Because aquaculture of animal species faces similar problems and issues and has a slightly longer history, the authors might have considered reference to at least part of the vast literature on this topic.

Moving from the ecosystem level to the subcellular level, Cosson *et al.* present a review on carageenans and

other polysaccharides in the red algae. The article is a very useful update to the classical reviews of Craigie and Leigh from the mid-1970s. The chapter is a very good summary of the state of the field and includes not simply the chemistry of the compounds, but also their functions within the algae, and the ecology of seasonal changes in plant composition. The methodology presented is perhaps too detailed (on p. 279 we are shown an extraction protocol), but in general its inclusion is appreciated. Once again, however, the review is too narrow in scope for a volume of this type. There is little reference to compounds outside the red algae and no attempt to make any comparison of the distribution of compounds or the evolution of synthetic pathways. Given the commercial importance of the compounds, some reference to attempts to produce these compounds synthetically might also have been in order.

Finally, Tyler and Vyverman provide a broad review of meromixis, the phenomenon of long-term, multi-year, stable stratification of a water body. The geographical coverage of the article is impressive: lakes from Tasmania to Scandinavia are considered. Despite this enormous horizontal scale, the authors emphasize that vertical distributions of organisms in meromictic lakes vary on a scale of centimetres. Much of the review is devoted to the practical considerations of working within such finely structured environments. Arguably, too much detail is provided—for example, on p. 335 we are given a description of modifications to a dissolved oxygen bottle for anaerobic sampling. The review is more colloquial in tone than the others in this volume, and includes several 'action photographs' of collecting that provide some feel for the setting of the work. In contrast to many of the other articles in the volume, the approach to the meromictic community is extraordinarily broad, considering protists, monerans and metazoa. In fact this article is more about meromixis than about phycology; the algae often take second place to the fascinating community of photosynthetic bacteria.

It will be noted that many of the criticisms presented in this review relate to issues of the organization of the volume, which concerns the efforts of the editors and not the individual contributors. The editors must also face criticism for the quality of text editing. For example, 'fertilisation' alternates between having an 's' or a 'z', depending on the author's geographic affiliation, spelling of references is inconsistent (in the first chapter La Roche's name is spelled no less than three different ways), and there are some glaring typographical errors (in the fourth chapter "aquatic" is misspelled in the first sentence).

In future, the editors might consider having the authors follow a more standard format for their chapters. For example, the usefulness of the reviews could be improved very simply by ensuring that authors make broader reference to related work in other algal groups, and provide a concluding section describing key issues, remaining controversies and potential future directions. Also, an appendix of Tables of Contents of previous volumes in the series would be simple to include and would be most useful.

References

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