Cryptogamie, Algol., 2007, 28 (3): 307-308

Book review

McCARTHY P.M. & ORCHARD A.E. (eds) — *Algae of Australia: Introduction*. Canberra, ABRS; Melbourne, CSIRO Publishing, 2007, 744 p. (www.publishing.csiro.au; ISBN 9780643093775, price: Aus $180).

The ecological and economic importance of algae is generally well-recognised, although as a group they are not yet fully described or documented. The Australian Biological Resources Study, or ABRS, seeks to overcome this with a series of printed treatments on Australian algae. Several years in the undertaking, the ABRS "Algae of Australia" series are now beginning to be published. Oddly enough, *Algae of Australia: Introduction* is actually the second volume in the series to be published, having been preceded by John Huisman's (2006) *Algae of Australia: Nemaliales*. Despite this quirk, *Introduction* is a truly outstanding (and substantial) introductory volume to the Australian algal flora. It covers marine, non-marine and terrestrial algae, with contributions by many of the world's leading phycologists.

The volume begins with a history of systematic phycology in Australia, painstakingly researched in incredible detail by Roberta Cowan and Sophie Ducker (dec). The authors have managed to avoid what could have been a dry account of the history of phycology in Australia, and instead present a lively and truly fascinating account that undoubtedly reflects their passion for the subject. Due to the weight of collections and research, the chapter is dominated by marine macroalgae although all other groups (micro-, non-marine, fossil, symbiotic and introduced algae) are equally well researched and presented. Early European collectors, particularly the French, are given due recognition for their significant contributions to documenting the Australian algal flora. Not only does the reader learn of the numerous European expeditions and the resident naturalists/collectors on board, but at the same time the authors (perhaps) inadvertently give a wonderful overview of the maritime history of Australia. It is nice to see that modern contributors are also duly recognised, with each section detailing the recent crop of phycologists and their research in Australia.

In the second chapter the phylogeny and classification of algae, including what is meant by the term "algae", are dealt with by John Huisman and Gary Saunders. Throughout, the authors give a balanced and impartial account of historical and current schemes while conceding that an "absolute consensus" is yet to be reached. Considerable attention is given to the way in which algae have been classified – both historically and currently – including descriptions of the major conceptual or methodological advances such as ultrastructure (via electron microscopy) and genetic studies. Recognising the sometimes tenuous or distant relationships between algal groups, the authors then proceed to consider each of the current phylogenies separately. Although there remains a lack on consensus on nomenclature and classification of the algae, the chapter concludes by outlining the classification scheme that has been adopted for the *Algae of Australia* series.

The fossil record of algae follows, and begins by putting algae into perspective in the origin of life on Earth. Descriptions of the fossil algae are then divided into the three main groups depending on cell wall composition; namely calcareous, siliceous and organic walled algae. In each, the Australian fossil record in each geological era (where records exist) is put into context in the global record and the ecological significance is explained.

Undoubtedly the greatest challenge faced by trained and untrained taxonomists alike is the accurate identification of algae. Two chapters by John

Huisman and Tim Entwisle attempt to facilitate the identification process by providing dichotomous keys, tables of "superficial" characteristics and an extensive (though not exhaustive) bibliography of taxonomic and related literature. In compiling the keys to the divisions, classes and orders, the authors have tried to avoid diagnostic features that rely on ultrastructural and biochemical techniques, and have instead focused on producing keys that are both practical and useful. The combination of identification tools, literature and subsequent descriptions of divisions and classes included in this introductory volume give any phycologist the best possible starting point to the accurate identification of an alga.

The next 170-odd pages are devoted to comprehensive descriptions of the major divisions and classes of algae, beginning with the photosynthetic oxygenic prokaryotes (Cyanophyta and Prochlorophyta). While the format of each chapter is necessarily variable, most include sections on anatomy and morphology, cellular organisation, and distribution, along with relevant photographs and/or line drawings. Virtually all chapters include useful lists of characteristics of each class (and order, where appropriate). Each chapter is written by current specialists, ensuring that the most comprehensive and up-to-date overview is given for each algal group.

The ecology of algae is treated in a series of chapters on marine micro- and macroalgae, non-marine algae of streams, lakes and large rivers, wetlands, and terrestrial algae. Each serves as a valuable mini-review, providing a current state of knowledge and research and drawing on recently published data and case studies. Following chapters on the algal biogeography will appeal to the systematists and phylogenists, as well as those interested in discerning or utilising biographical patterns in the modern algal flora.

The final chapter concerns itself with the economic importance of algae – a subject which has been discussed numerous times in the past literature but, once again, in this volume is subjected to an up-to-date revision. Highly topical in today's environment are sections such as the role of algae in environmental remediation, carbon dioxide and global warming, and algae as sources of valuable biochemical compounds.

The volume concludes with a glossary of more than 1500 technical terms compiled to facilitate reading this and future volumes, but which would also be a valuable tool outside of the *Algae of Australia* series. Throughout, high-quality colour plates, black and white photographs and line drawings supplement the text. This volume will appeal to professional and amateur phycologists alike, to managers and decision-makers, and to tertiary-level educators, and would make a worthy additional to any library, herbaria or botanical institute with an interest in marine and freshwater biology. Subsequent volumes in the series will include traditional taxonomic treatments as well as habitat- or regionally-specific floras.

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