



BOOK REVIEWS

Phytoplankton Pigments in Oceanography: Guidelines to modern methods, edited by S. W. JEFFREY, R. F. C. MANOURA and S. W. WRIGHT, UNESCO Publishing, Paris, 1997, 661 pp., \$64. ISBN 92-3-103275-5.

Oceanic plant biomass and productivity is not a topic that captures the imagination but it is important to all of us, because events on the world's seas have a very real affect on life on earth. Plant biomass in the marine environment, over 25% of the vegetation of the planet, is the product of light-harvesting by macroalgae (seaweeds) and microalgae (phytoplankton) and in individual species involves variation on a theme of some 50 photosynthetic pigments. Moreover, the phytoplankton contributing to this process are diverse (some 30 000 species) and even closely related species within a family can have a different complement of pigments, the relative amounts of these varying in response to changing environmental conditions. Studies of the pigments in a microalga are fraught with difficulty; the organism has to be in axenic culture, the pigments are difficult to extract quantitatively, they may not be easily identifiable, degrade readily, and spectrophotometric methods for their estimation differ in significant respects from laboratory to laboratory. There are a different set of problems when samples of phytoplankton to monitor populations and track the flux, transformation and fate of phylogenetic carbon are being collected aboard oceanic research vessels; here the species contributing to the communities have to be recognised from the presence of 'signature' pigments. It was thus opportune for the Scientific Committee on Oceanic Research through its Working Group 78 to hold a series of meetings and workshops held intermittently over the period from the late 1980s to 1992 to evaluate present methodologies and to act as a focus for a report that would suggest best practice for the various experimental procedures. While the experimental comparisons were completed by 1990 it has taken an uncomfortably long time via period meetings to evaluate the data and co-ordinate it in this book: volume 10 in a series of monographs on oceanic methodology published by UNESCO. Fortunately, the lapse in time to publication is not as serious as it would have been in a scientific area where technology advances more easily.

The volume is divided into four parts, each with a series of subsections, and it encompasses an extensive set of appendices. Part I is a summary of the information in literature reviews of pigment oceanography. Throughout this part, and the rest of the volume, the editors alone or in combination are co-authors with other contributors of nearly all the sections and this does help in harmonising the style and avoiding undue

repetition in content. The sections on matters such as marine phytoplankton and their pigments, methods for studying pigments, pigment synthesis, function and chemical modification are informative and well-structured and the selection of cited literature generally sound.

Part II concerns the experimental work from the workshops. Here the topics include: culture of microalgae for sources of 'standard' chlorophylls and carotenoids and preparation of these; evaluations of methods and solvents for pigment extraction and estimations in cell extracts; and HPLC methods for routine and high-resolution separation and provisional identification of the pigments and their derivatives. These are excellent critical evaluations of the methods in current use, and the sections benefit from recommendations as to good practice. While part III is more specialised, in dealing with setting up of a HPLC system and with analytical approaches for samples collected at sea, the concluding part IV returns to matters of more general applicability. This is a compilation of data for the identification of some 50 pigments, and includes in summary form information on structure, UV-visible spectra in typical solvents, extinction coefficients, and HPLC chromatogram separations under defined conditions. Given that some early seminal reviews of some of these topics are no longer ready to hand in many libraries this section alone makes the volume useful as a reference source.

The appendices form an extensive collection of supplementary information (lists of abbreviations; HPLC suppliers; sources of reference algal cultures) and includes compilations of the influence of chemical modifications on the spectra of carotenoids; extinction coefficients of pigments; and equations for estimating pigment concentrations.

My overall view of the volume is very favourable. It is well-written. The presentation of figures, graphs and structures is good and although ease of interpretation falters for the occasional illustration there is so much that is positive that the odd blemish can be overlooked and put down to the fallibility in perception of the reviewer. Marine scientists will certainly want this book in their collection, but more significantly while its title suggests correctly a specialist view there are substantial sections that will be of interest to plant scientists generally. It should prove to be a valuable laboratory manual and reference book, and given the wealth of information it contains it represents good value for money. The editors should be congratulated on this successful outcome of their Odyssey.

Institute of Biological Sciences LYNDON ROGERS
University of Wales at Aberystwyth.