

ception is the experimental evidence for the Q-cycle, where Harold says that "one can intuitively work out how the configuration of a Q-cycle explains the peculiar redox interplay between cytochrome  $c_1$  and  $b-566$ ". Intuition, however, comes from experience of related phenomena (and experiments) and is not a reliable guide when trying to understand bioenergetics and, on the whole, Harold provides a superb text to help us in avoiding it.

The lists of references (with titles) at the end of each chapter are excellent, but there is no contents list, which, together with the limited index makes the book inconvenient for rapid reference. A more important flaw is the lack of information about structures. Other texts must be consulted to find the structure of ATP, NAD, FAD, haem, ferredoxin, phospholipids, proteins, etc. There is no doubt that many of the remaining questions of bioenergetics await, for their answer, a better

understanding of the relationship between structure and function of the electron transport and proton-translocating proteins. It would be a pity if such matters were to be disclaimed as irrelevant by those whose enthusiasm for bioenergetics is stimulated by this book.

It sometimes appears that those having an affinity for bioenergetics also have an affinity for the mystical or mysterious and, indeed, Harold's book concludes with this remarkable discourse: "What is the Buddha?" The Master replies, "go eat your gruel". "I don't understand," says the perplexed student. "If you don't understand, when you have eaten, wash your bowl" (The End).

Fortunately, this is not typical; Harold successfully demystifies bioenergetics, thus giving hope and inspiration to those perplexed students who have remained unenlightened even after washing their bowls.

Chris Anthony

## *Bioluminescence and Chemiluminescence: New Perspectives*

Edited by J. Scholmerich, R. Andreessen, A. Kapp, M. Ernst and W.G. Woods

*John Wiley & Sons; Chichester, 1987*

xvi + 600 pages. £55.00

This large book, with its attractive pale-blue cover, reports the proceedings of the Fourth International Symposium on Bioluminescence and Chemiluminescence, held in Freiburg during September 1986. Camera-ready copy was used, although the final appearance of the text is better than average for this kind of reproduction. Unfortunately, several glaring typographical errors were left uncorrected.

The book is divided into four parts, part 1 being devoted to cell-dependent chemiluminescence. It contains useful reviews of phagocyte luminescence and the low-level chemiluminescence of biological systems, plus a number of short papers reporting the use of luminescence methods (presumably based on posters or short communications at the

meeting). I found these to be less useful, since the authors did not have space to present or discuss their work in detail.

The pattern is repeated in part two, which is devoted to immunoassays. It begins with interesting reviews of enhanced chemiluminescent assays for peroxidase, and of photodetectors and solid supports suitable for use in immunoassays employing enhanced chemiluminescence. The short papers that follow are generally less informative, although some raise interesting points, such as that of Stott and Kricka on the purity of commercial luminol.

Part three of the book is devoted to luminescence biotechnology and biochemistry. J.W. Hastings gives an interesting account of

bioluminescence in dinoflagellates, which is followed by an account of structural studies on bacterial luciferase enzymes, as pursued by recombinant DNA technology. Many shorter papers follow, largely devoted to cloning and expression of luciferase genes and to the biochemistry of firefly luciferase.

Part four is entitled "luminescence – applications", although many applications had obviously been covered in the first three parts. Most of the papers in this section could have fitted into earlier sections, which is not to dispute their interest. For example, Kather and Wieland discuss applications of light emission in routine analysis of metabolites, whereas Hastings (J.G.M., not J.W.!) reviews the

use of luminescence in bacterial detection and identification. A luminescent ATP assay for prediction of the shelf-life of foods is described by Stannard and Williams.

Despite the fact that this book makes no attempt to report any of the discussions that took place at the conference, and its very sketchy subject index, it is still a useful compendium of papers that shows who is doing what. The review articles that begin each section are very helpful. Hence I recommend this book to people interested in the field, although a price of £55 for a camera-ready work may deter individual purchase.

Barry Halliwell

## *Techniques for the Analysis of Membrane Proteins*

Edited by C.I. Ragan and R.J. Cherry

*Chapman and Hall; London, New York, 1986*

xi + 441 pages. £48.50

The detailed study of membrane proteins has only really become possible in the last decade or so. As such, the literature in this area tends to be extremely fragmentary and widely dispersed. It is, therefore, a great pleasure to come across a single volume that brings together authoritative reviews on topics as divergent as the purification of intrinsic membrane proteins, their reconstitution into lipid bilayers and the study of the structural arrangement and motion of such proteins in the lipid matrix. It is equally rewarding to find that the authors of these different reviews have gone to considerable trouble to explain the basic principles of the methods that they describe and to point out the many potential pitfalls that exist for research workers whose familiarity with the techniques described is limited to more tractable experimental systems.

The one disappointing aspect of this book is one common to many review volumes of this type. It provides an excellent picture of the field at the time of writing but begins to date rapidly. The editors, as they point out in their introduction, are well aware that the study of membrane proteins is a field in which research is advancing at a great rate. It is, therefore, particularly annoying to find that many of the reviews contain no references later in date than 1983. Whilst it must be acknowledged that the volume originally appeared in 1986, it does seem that progress in publication has proceeded at a rather leisurely rate. Nevertheless, it is likely to serve as a valuable reference book for advanced students for a number of years to come and would be a useful addition to most libraries.

Patrick Williams