

cell biologist.

However, although the book claims to cover all the major cell components, this is not quite so. For those plant biologists who do not work on chloroplasts and photosynthesis, the treatment may appear somewhat unbalanced. For example, there are five chapters on the isolation of plastids and their components covering some 138 pages, while mitochondria are limited to one 8-page chapter. Cell walls are allotted two extensive chapters, whereas Golgi bodies and microbodies receive no discussion at all. The chapter on plasma membranes only considers phase partition methods, although density gradient centrifugation techniques are used by most

membrane biologists. It should also be noted that some chapters assume methodological details covered in other recent reviews.

Thus this volume does not really provide a fully comprehensive treatment of plant cell fractionation techniques; there are a number of notable omissions. However it does contain a good number of helpful chapters, is particularly thorough on plastids and cell walls, and thus is a useful, though expensive, addition to the plant cell biologist's techniques library.

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The Biochemistry of Energy Utilization in Plants: by D. T. DENNIS: *Tertiary Level Biology*. Blackie, Glasgow, 1986. 145 pp. Hardback £19.95, paperback £9.95.

The contents of this small paperback publication encompass the subject area commonly taught in first year university biochemistry courses on bioenergetics. In his preface, the author explains that the book is aimed at students who have some knowledge of biochemistry such as is covered in the well-known texts by Lehninger or Stryer, and that the objective is to bridge the gap between these books and the more advanced treatment accorded the subject in specialist articles of the kind found in *Annual Reviews of Plant Physiology*. Although the extent to which the author has been successful in bridging this gap varies, it nevertheless seemed a little odd at the end of one chapter to read that the material in this chapter is reviewed in more detail by Lehninger and by Stryer in their textbooks.

Beginning with an elementary account of thermodynamic concepts such as entropy and free energy, the book covers coupled reactions and the use of ATP in driving endergonic reactions. Other general themes range from redox reactions and redox potentials to electron transport and energy transduction. The plant biochemical emphasis of the text begins with consideration of the alternative (cyanide-insensitive) pathway of electron transport in plant mitochondria and continues with energy transduction in the chloroplast. The glycolytic and pentose phosphate pathways are then outlined and followed by

consideration of the tricarboxylic acid cycle. Unfortunately, in this context, the author does not seem to be aware that glutamate rather than succinyl-CoA is now accepted to be the precursor of chlorophyll. After a chapter on the path of carbon in photosynthesis, the subject of photorespiration is dealt with. An account of the physiology and biochemistry of C_4 plants is followed by a very brief outline of crassulacean acid metabolism. Two equally short chapters, of 2–3 pages, cover the interaction of the chloroplast and the cytosol, and the compartmentation of plant metabolism.

On the whole, the book is written in a relaxed readable style but at times this slides into unhelpful imprecision. I am not sure, for example, what information is conveyed to a first year undergraduate in biology by the description of cytochromes as "proteins of low molecular weight containing a porphyrin-type molecule, commonly called a haem, into which is bound an iron atom". I had to re-read several times a sentence explaining why β -oxidation is so-called. It is said to be "because it involves the carbon two atoms removed from the carboxyl carbon of the fatty acid". Despite minor shortcomings, this paperback should be a useful adjunct to the reading list of those first year students of plant physiology who are not also taking a full first year biochemistry course. It is adequately provided with references for further reading; diagrams are clear and well produced.

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