Phytochemistry, Vol. 26, No. 4, pp. 1235–1236, 1987.
Pergamon Journals Ltd. Printed in Great Britain.

BOOK REVIEWS

Progress in Essential Oil Research: edited by E.-J. Brunke. Walter de Gruyter, Berlin, 1986. 668 pp. £121.

This massive volume is an account of the proceedings of the 16th International Symposium on Essential Oils which took place at Holzminden-Neuhaus (F.R.G.), near to the centre of the German flavour and perfume industry, in September 1985. The book contains some 53 papers consisting of review articles, research reports and several brief 'poster-type' presentations. About two-thirds of the volume is given over to the composition, separation and analysis of essential oils. The remainder of the book deals mainly with aspects of synthesis, biochemistry and biotechnology. The editor has obviously had a difficult task in trying to mould such a wide collection of material into a coherent whole. Like a box of assorted chocolates, the finished product is certainly not to be taken all at once; its inherent qualities are only revealed when the contents are sampled slowly and savoured at leisure. I have derived much pleasure, and a great deal of useful information, by doing just this.

In view of the large number of contributions present in this work, I can only make special mention of a small fraction of the papers. One report that I found particularly interesting concerns the analysis of fragrances given off by springtime flowers. Headspace analysis reveals the presence of significant amounts of a number of volatile, nitrogenous components (for example 2-aminobenzaldehyde) which contribute markedly to the total odour of the flower. It is claimed that such components are present, at best, in only trace amounts in commercial flower oil. Clearly headspace analysis can provide vital information for the design of 'natural' perfumes, a view which is confirmed in several other contributions in this volume.

In considering the biotechnology and biochemistry of the essential oils, three papers deal with the interactions between the lower terpenes and microorganisms. Many monoterpenes interfere with respiration and electron transport in a variety of bacteria (hence their use in food preservation and cosmetic preparations) and detailed experimental evidence for such interactions at the membrane level is provided by Knobloch and coworkers. On the other hand, Janssen *et al.* discuss aspects of the screening of essential oils for antimicrobial activity using the agar-overlay technique and, interestingly, conclude that monoterpene hydrocarbons exhibit little such activity after purification. The chemistry of microbial interaction is considered by Kieslich *et al.* in a most interesting review covering biotransformations of mono- and sesquiterpenes. The authors conclude that such biotransformations might provide alternative methods of production for certain terpene derivatives and may also yield new clues concerning the mechanism of degradation of terpenes in animal systems.

The section dealing with the methodology of separation and identification of volatile oils is diverse and very informative. In particular, contributions by Schultze and his coworkers deal with the relatively new techniques of GC-coupled High Resolution Mass Spectrometry and Fourier Transform Infrared as applied to essential oil analysis. Both reviews are illustrated with specific examples that show quite conclusively the important advantages that are to be gained through the use of these new methodologies.

Indeed, the whole volume is a gold mine of useful information, and it is particularly helpful to see GC, MS and NMR data presented in spectral form. Although many of the analyses are of oils that have received much attention in the past, quite a few new compounds are reported or their discoveries reviewed in some detail. Unusually for conference proceedings, a reasonably complete index is available in order to access specific information quickly. Normally this work would certainly be included on my list of books recommended for purchase by the library. Sadly, however, at this price copies of the book are going to be very thin on the ground.

Dept of Biology,
King's College, London

BARRY V. CHARLWOOD

Cell Components: edited by H. F. LISKINS and J. F. JACKSON, Springer-Verlag, Berlin, 1985. 399 pp. DM 238.

The rigid cell wall and large central vacuole present special problems to the isolation of organelles and membranes from plant cells. However, in the last ten years or so, considerable advances have been made in the isolation of purified fractions using a wide variety of plant tissues. There are a number of reasons for this. The use of isolated protoplasts removes the need for high shear forces to disrupt the cell wall. An expanding knowledge of cell biochemistry provides a wider range of potential markers for cell components. Furthermore, we now have available a more extensive choice of gradient media and protective agents. Thus this volume, which is the first in a new series of *Modern Methods of Plant Analysis*, first introduced in 1954, aims to describe the methods available for the isolation and analysis of cell components and organelles.

There are eighteen chapters that deal with cell walls, protoplasts, markers, plasma membranes, vacuoles, protein and lipid bodies, various aspects of chloroplasts, mitochondria, the endoplasmic reticulum, polyribosomes, the nucleus and microtubules. Generally, these chapters include background information, descriptions of the methods used for the isolation and purification of these components from various types of tissue, and the means of identifying and analysing these fractions. Thus the book contains a great deal of practical information for the plant

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.

Department of Biology, J. L. HALL
University of Southampton

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.

Department of Biochemistry, E. G. BROWN
University College of Swansea