cence detected circular dichroism (FDCD) and circularly polarized luminescence (CPL) are now available and although there is a lack of commercial instrumentation the potential of these newer techniques is considered.

In considering fluorescence detection in chromatography, there is an introduction to liquid chromatography which is not necessarily relevant to the main theme of the book. Nevertheless, the application of fluorescence detection to thin-layer and high performance liquid chromatography is dealt with in some detail and the application to a wide range of organic molecules, including pharmaceuticals and natural products is given in tabular form. The final chapter on luminescence immunoassay focuses on the analysis of complex biological mixtures containing subnanogram quantities of the substance requiring analysis. The use of fluorescence labels instead of radioactive labels has obvious advantages and the present levels of detection are in the 10^{-12} M range. Applications tend to have clinical connections but this powerful technique has implications for the analysis of natural products.

The book is well presented, and indeed, it is of considerable benefit to scientists involved in sensitive assay techniques for the determination of a wide range of compounds including a fine selection of natural products.

The School of Pharmacy, University of London J. DAVID PHILLIPSON

Membranes and Compartmentation in the Regulation of Plant Function: edited by A. M. BOUDET, G. ALIBERT, G. MARIGO and P. J. LEA. Proceedings of the Phytochemical Society of Europe, Vol. 24. Clarendon Press, Oxford, 1984. 334 pp. £30.

This symposium volume, which contains 18 reviews and a summary chapter by D. J. Morré, has a pronounced gallic flavour and stems from a meeting held in Toulouse University during the summer of 1983. The rather vague title masks a great variety of contributions which centre around one common theme—the plant cell membrane. The chapters range from a consideration of the cellular compartmentation of the two secondary compounds, dhurrin and coumarin, by Eric Conn to the various actions of different herbicides on cell membranes by R. Scalla and C. Gauvrit. One new area of plant research centres around calcium ions, the protein calmodulin and membrane-bound protein kinases and three chapters are variously devoted to those subjects. P. J. C. Kuiper's review of membranes, salinity and low temperature brings out a number of new findings, for example that increases in membrane sterol levels may be correlated with salt resistance in some crop plants. Pierre Benveniste and his colleagues from Strasbourg also discuss here sterol biosynthesis in relationship to plasmalemma structure and function. More familiar themes also receive review treatment, such as auxin binding and membrane receptors, phytochrome action at the membrane, pH regulation and membranes and so on.

Once again, therefore, this review series has led to a successful volume. The book is produced to a high standard and there is a very adequate index. But it is a pity that the cover is so drab! And surely, the title of the symposium should appear on it somewhere?

Plant Science Laboratories, University of Reading JEFFREY B. HARBORNE

The Genetic Manipulation of Plants and its Application to Agriculture: edited by P. J. LEA and G. R. STEWART. Annual Proceedings of the Phytochemical Society of Europe, Vol. 23. Clarendon Press, Oxford, 1984. 318 pp. £24.

I well remember this symposium, since it was one of the most popular ever held by the Phytochemical Society and seats in the auditorium for the lectures were at a premium. The excitement and topicality of the subject were conveyed to an enthusiastic audience by a line up of distinguished scientists. Such events do not always transfer successfully to the printed page. Furthermore in such a rapidly expanding field, some contributions can become outdated even before they have been edited and prepared for publication. In this case, however, little seems to have been lost and the written version bears up well to later inspection. Indeed, in what is for the non-expert a relatively complicated field, there is much advantage in having time and leisure to comprehend the fascinating intricacies of molecular cloning, the dideoxy method of DNA sequencing, the restriction map of the legumin gene and so on, which make up the illustrations in these proceedings.

This meeting took place at the crucial moment in the history of plant science when the possibilities of geneti-

cally modifying crop plants by the techniques of molecular biology first became apparent. Clearly, the methodology has developed further since December 1983, when the meeting was held. Nevertheless, what is written here will remain valid for some time to come. Our understanding of the basic biochemistry of plants, for example, underpins any attempts to manipulate crops to photosynthesize more efficiently or to produce a more nutritious storage protein. Details contained here about Rubisco, the pathways of amino acid metabolism, the regulation of storage protein synthesis and the production of heat-shock proteins continue to be of importance and value. This book, therefore, represents a most useful guide to the comprehension of modern plant molecular biology and the agricultural applications and deserves to be as popular among plant scientists as the original meeting was.

Plant Science Laboratories, University of Reading JEFFREY B. HARBORNE

Plant Products and the New Technology: edited by K. W. FULLER and J. R. GALLON. Clarendon Press, Oxford, 1985. 319 pp. £24.

This volume is a record of the meeting of the Phytochemical Society of Europe which was held in Swansea in April, 1985. It is a multi-author work containing nineteen chapters dealing with many, and sometimes widely differing, aspects of applied botany.

In his introductory chapter, E. G. Brown explains that the improvement of crops by genetic manipulation and the commercial use of plant cell culture, topics well covered elsewhere, were not given great prominence in this symposium, attention being focussed on less well publicized developments. He emphasizes the importance of plants as sources of energy, industrial feedstocks, flavours, perfumes and medicinal compounds.

The energy content of plants and the relative importance of biomass energy in the developed and developing world are discussed by C. W. Lewis, while M. N. Sivak and D. A. Walker consider how photosynthesis may be manipulated to our advantage. M. W. Kerr and D. P. Whitaker deal with the complementary problem of reducing losses arising from photorespiration. Another apparent source of loss to a plant may be the exudates, secretions and cellular material which pass from the roots into the soil. It is emphasized by J. M. Whipps and J. M. Lynch, however, that the effect of rhizodeposition on the micro-organisms of the rhizosphere may on occasion be beneficial to the plant. In discussing the effects of plant growth regulators on standing crops, T. H. Thomas considers the ways in which these compounds can increase the production of major primary compounds such as sucrose, and minor but nevertheless important secondary compounds such as alkaloids of *Catharanthus roseus*.

Three chapters by J. Burley and L. A. Lockhart, C. J. Smith and B. Lockwood deal respectively with 'chemical extractives and exudates from trees', 'polysaccharide synthesis: implications for industry' and 'gelling agents'. The first two authors emphasize the need for rapid screening techniques for the identification of desirable chemical characteristics and methods for clonal propagation. The last two emphasize the potential of plants as sources of gums and gels, but also the need to achieve uniformity of composition in products for industrial use. Starch and starch-derived products as food and chemical feedstock are discussed by T. Galliard, while the biodegradation of lignocellulose and lignin are dealt with by D. A. Wood and by P. J. Harvey, H. E. Schoemaker and J. M. Palmer respectively.

M. Calvin reviews current developments and future possibilities for the production of fuel oils from higher plants. D. O. Hall *et al.* consider the possible use of immobilized algae for the photobiological production of fuels and chemicals. The chemosynthetic potential by immobilized systems is also dealt with by K. W. Fuller and D. J. Bartlett, while P. Cuendet and M. Grätzel discuss the prospect of achieving artificial photosynthesis.

The introduction of novel genes into plants is reviewed by J. E. Beringer and C. M. Lazarus and the production of new plants by tissue culture by M. G. K. Jones. The problems of patenting plants are considered by R. S. Crespi and the biosynthesis and biological activity of halometabolites by S. L. Neidleman and J. Geigert. It came as a surprise to the reviewer to discover in this interesting chapter that over 700 naturally occurring halogenated organic compounds have now been identified.

As is inevitable with symposium volumes, the quality of contributions is variable. Nevertheless, there is a great deal here that will provide food for thought and encouragement to anyone interested in the more efficient use of the world's plant resources. It provides a useful guide to recent developments and will be a welcome addition to phytochemists' bookshelves. It is well produced and good value for money.

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