

For the phytochemist this volume should be of considerable interest because it raises so many unsolved problems. For example it appears that there are distinct differences in chemical composition and in changes of enzyme activity with development in female and male plants of the same species. Why should hormones determine sex expression of plants, and at what level do they act? Some early work using immunochemical analysis of hemp indicate higher metabolic rates in female than in male plants of hemp, as a result of differences in gene activation. No doubt many of the early observations, particularly at the biochemical level should be re-exam-

ined using modern techniques, but the effort should be well worthwhile. The editorial remarks of K. V. Thimann add important additional information to this book. I would strongly recommend readers of 'Phytochemistry' to browse through this volume. They will find much information to interest them, and many problems which remain to be tackled, which are of interest to plant chemists.

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The Growing Plant Cell Wall: Chemical and Metabolic Analysis: by S. C. FRY, *Monographs & Surveys in the Biosciences*. Longman, Harlow, U.K., 1988, 333 pp, Paperback £19.50.

When we say a plant cell has grown or has differentiated we are referring to phenomena associated with the cell wall. It is one of the distinctive and diagnostic organelles of the plant kingdom and is tightly coupled to all stages of development. There has always been a thread of cell wall investigation running through plant physiology, but in the past it has been woven by only a few perceptive and tenacious workers, often with a reputation for eccentricity. This situation arose mainly from the sheer complexity of the constitutive chemistry, and the technical difficulties associated with interpretation. Indeed there has even been difficulty in defining what actually may be called a plant cell wall (Lampert, *Annual Review of Plant Physiology*, 1970). Despite these problems, the lack of input to cell wall experimentation is somewhat perplexing when we consider that any true understanding of, say, the hormonal control of cell extension or of differentiation can only be attained through a clear knowledge of the wall modifications.

With the publication of this book, I hope many more young workers will carry their studies to the level of the organelle most intimately involved. The first impression is that here is a format of an unusual but effective structure whereby the discursive text is heavily inter-

calated with boxed sections giving the technical schedules used in the appropriate study. Thus, we have both a story book and a D. I. Y. manual. I find this helpful and not at all confusing, although I am sure others will disagree.

The nuts and bolts of the book are well put together: the Content is informative, with a separate list of the recipe panels; an excellent reference list, and the index seems to work. There are 11 chapters dealing with the wall components, their chemistry and biosynthesis, the constituent enzymes and the basis of growth through wall loosening. In addition there are peripheral chapters including a review of the techniques of radioactively labelling cell walls and the relatively new field associated with biologically active wall fragments.

Stephen Fry has not set out to write a descriptive or comparative text on the biology of cell walls. He has instead put together a manual to encourage and guide more workers to join him in the elucidation of the multitude of outstanding problems. In this he has succeeded and deserves our appreciation. Those who buy this book will not just read it and then leave it on a bookshelf; it will usually be found lying open on a laboratory bench. Perhaps the publishers should have used a chemically resistant material in its production as this is the only book I know of that gives clear instructions on how to bring about its own destruction.

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Cell Culture in Phytochemistry, Volume 4 in the series **Cell Culture and Somatic Cell Genetics of Plants**, edited by F. CONSTABEL and I. K. VASIL. Academic Press, San Diego, 1987, pp. 314, \$59.

In this comprehensive series of books on plant cell culture and biotechnology, phytochemical aspects are being dealt

with in two volumes, the one under review and a second one, yet to be published on phytochemicals in cell cultures. Without having both volumes at hand, it is difficult to evaluate the completeness of the coverage of the topic, but a reading of this first volume indicates that the pair will probably provide a useful up-to-date review of a field, which has not been lacking in recent coverage through

the publication of symposium volumes. The advantage here is of a more methodical approach to the topic, with a series of chapters which more or less follow on in a sensible sequence. Thus in the first half of the book Michael Wink discusses the physiology of accumulation of alkaloids and then J. Guern and his co-workers from Gif-sur-Yvette consider compartmentation in tissue culture in some depth. This is followed by chapters on the regulation of synthesis by R. K. Ibrahim and on cell growth and secondary metabolite accumulation by M. Sakuta and A. Komamine.

The second half of the book covers such predictable topics as cell cloning, selection of mutants, genetic mani-

pulation, immobilised plant cells, plant regeneration, cryopreservation, continuous cell culture and immunoassays for the detection of cell products. However, the most notable contribution in this section to my mind is the one on elicitation of secondary metabolites in culture by U. Eilert, a topic which is reviewed in considerable detail. Almost every chapter contains summary tables and there are appropriate illustrations throughout the book. The references are nicely up-to-date and the book can be thoroughly recommended to the phytochemical reader.

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Experimental Phycology: A Laboratory Manual: edited by C. S. LOBBAN, D. J. CHAPMAN and B. P. KREMER, 1988, Cambridge University Press, New York, 295 pp. \$44.50 HB; \$16.95 PB.

The current interest in the biology and biochemistry of the algae, previously a somewhat neglected group, can be attributed possibly to a recognition of their potential for biotechnological exploitation. The publication of a laboratory manual on the topic of algae is, therefore, opportune. This text describes 32 experiments for undergraduate classes, some suitable for entire classes, others for groups or individual students. These experiments cover a broad range from microbiology through physiology to biochemistry. Some are suitable for a three hr practical session in a first year course while at the other extreme some experiments would only be appropriate for senior undergraduates and could involve three practical sessions. A classification of the experiments on this basis, perhaps as an appendix, would have been useful.

The truest assessment of an experimental manual is whether the procedures work in practice and thereby justify the confidence of the contributors, incidentally mainly from Canada, Germany and the U.S.A. and thus reflecting the origins of the editors. This test was for the most part beyond the purview and time of this reviewer whose judgement is to that extent subjective.

There is much to commend this book, not least the inclusion of useful information on a range of topics. It is well-presented and by current criteria represents good value. Nevertheless, there are some general criticisms and in some instances omissions or errors in definitions, explanations and procedures. In the first category, it is evident that the book is aimed at the U.S.A. market; this is seen in the listing of equipment and culture collections, where European sources are generally, though not al-

ways, overlooked. It is also arguable whether in all cases the organisms recommended are the best for undergraduate classes, though in this context the criticism is balanced by inclusion of a significant number of experiments using macrophytes, which is to be commended. It would also be unreasonable and carping to list all the errors though some should not pass unnoted. Here, the statement (Exp. 21) that a problem with K_s as a kinetic parameter is that its value is not independent of V_{max} , the implication of optimum temperature for an enzyme (Exp. 14) and the reassurance in an enzymic assay (Exp. 24) that a "reaction *need not* be completed" rather than "reaction *must* be linear over the time period of the assay" are notable. Elsewhere, the consistent use of 'g' forces for centrifugations rather than speed settings (Exp. 4) or rpm (Exp. 18) for unnamed centrifuges would have been far preferable, whilst the error in structures of the phycobiliproteins (Exp. 11) is not an uncommon mistake in books and reviews even by pioneers in the field; here, a survey of all the variants which appear in the current literature would be a salutary exercise!

Inevitably, readers with a background of working with algae will sometimes have different, and maybe better, methods than some of those included but on the whole the experiments appear well-designed and the materials and procedures comprehensively described. The most notable omission was that of the rigorous purification of an algal protein, where several suitable examples are now in the literature.

These criticisms do not detract from my overall view that this is a useful text, one which all teachers of phycology will want to consider seriously, and also students in departments where this is a major option.

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