Book reviews

L.G. Copping, J. Dalziel and A.D. Dodge (Eds.), Prospects for amino acid biosynthesis inhibitors in crop protection and pharmaceutical chemistry, BCPC Monograph No. 42. Farnham, Surrey U.K.: British Crop Protection Council, 1990. 217 pages. £25.00 (U.K.), £31.00 (elsewhere). ISBN 0-948404-31-0.

This monograph reports the proceedings of a conference organised by the Biophysical and Physiochemical Panel of the Society of Chemical Industry in September 1989. A total of 24 oral presentations were made over three days, of which 23 plus nine posters are reported in Monograph 42. The 23 full papers were presented in five sessions but these were not individually titled and apart from the first two, do not appear to have been grouped in any particular fashion. Three of the four papers in session one covered broad introductory issues but the fourth was much more specific and, therefore, seemed out of place.

Protein amino acids are synthesized in plants starting from a total of six precursor molecules and a general description of these pathways provided a good opening paper. The fact that there are far more amino acids not involved in protein synthesis than the twenty which are was made by the second speaker. Many of these more than 700 amino acids are inhibitors of specific enzymes and this group of compounds is a rich source of inhibitors, only partly tapped so far. This point is undoubtedly important but since the "success stories" of this area of work consist of interrupting the synthesis of the protein amino acids this paper seems a little out of place so early in the proceedings. The two remaining papers in the first session returned to the main theme as it were. In the first a broad-based theoretical approach to the search for new inhibitors is described while the second compares screening techniques from a more practical point of view. These both draw suitable attention to the need for caution when attempting to pin-point the site of action of an inhibitor. They draw attention to the fact that integrated metabolic pathways can sometimes behave like electrical circuits; when these are blocked the current often finds a way round the block. Metabolic pathways sometimes do the same, making it difficult to be sure of the exact site of action of an inhibitor. The identification of this site is, of course, critical for further development of the discovery.

The second session contains four papers grouped, perhaps, because they all use a molecular biological approach to some degree. These papers show how classical mutagenesis, antisense mutations, transformation and in vitro selection can be used in this area and they provide a nicely balanced account.

There were three more oral sessions and a poster session, containing 24 further pages. There was no written submission of the paper on polyamine biosynthesis inhibitors, which is unfortunate because of the growing interest in these compounds in plant developmental biology. These 24 papers all deal in some way with inhibition of amino acid biosynthesis and presumably reflect the state of the art. It is interesting to note, therefore, that 12 of them describe inhibition of acetohydroxyacid synthase. This is not surprising since a glyphosate-resistant enzyme was among the first to be engineered into glyphosate susceptible hosts. Enzymes on other pathways are being studied, however, and examples of these are described in the remaining papers.

The monograph, therefore, gives a very good overview of this important field as well as going into considerable depth in many areas. The reproduction of the camera-ready copy has been good and the variability from one paper to another will not deter an interested reader. BCPC monographs typically do not have indices which makes the reader more dependent on the contents pages. It is a pity, therefore, that there are discrepancies between page numbers here and on the articles themselves. The fact that acetohydroxyacid synthase is also referred to as acetolactate synthase, even within a single paper, could present a problem for uninitiated readers. I do not wish to end on a derogatory note, however, for I believe that this is useful monograph both for those already
The 70 papers in this book were presented at the 13th International Conference on Plant Growth Substances held in July 1988 at the University of Calgary. Following a brief preface by the editors, the proceedings start with two plenary papers on 'Hormones in lower plants' (Bopp) and 'Endogenous hormones in rice' (Takahashi) and are then subdivided into six subsections: 'Genetic approaches' (7 papers), 'Molecular aspects' (14 papers), 'Hormones and calcium' (3 papers), 'Hormone synthesis and metabolism' (18 papers), 'Hormone physiology and effects' (19 papers) and 'Practical applications and economic implications' (7 papers), respectively. Whilst the contents of this book provide an update of the present status of plant hormone research, it is unfortunate that it did not appear on the bookshelf until nearly 2 years after the meeting. Thus, considerable further progress has already been made in some areas since the papers were first presented, particularly in relation to molecular aspects of hormone action.

However, I found the section on the use of the plant mutants as research tools particularly interesting and still very much up to date. This provided a comprehensive survey of how biosynthesis and response mutants can be used to elucidate the physiological and biochemical control systems involving abscisic acid, auxins, cytokinins and gibberellins in plants. A short section on the role of calcium in plant responses explores the possibility of its acting as a messenger in signal transduction; however, much more information would seem to be needed before this possibility can be strengthened. Current thinking on the synthesis and metabolism of hormones is given a wide exposure and indicates the 'state of the art' in relation to the major plant hormones, the action of plant growth retardants and the ubiquitous jasmonic acid. A section on physiological effects of hormones covers such topics as photosynthesis, chilling, dormancy, cell differentiation, apical dominance, photoperiodism, flower initiation, wounding, winter hardiness and senescence. Whilst the final section indicates some practical applications of plant growth regulators, it would seem that there is still considerable emphasis on growth retardants and ethylene-generating compounds. Nevertheless, there is interesting speculation on the possibility of new plant growth regulators of microbial origin and the fascinating question of whether plant growth regulators can be used to alleviate herbicide cross-resistance in weeds.

In my view this book is well worth buying, the price is very competitive at DM 170.00; a library copy is a must for all plant physiology/biochemistry departments. It is well produced, the text is clear and the figures and tables well presented. It is just a pity it took so long to appear.

The 70 papers in this book were presented at the 13th International Conference on Plant Growth Substances held in July 1988 at the University of Calgary. Following a brief preface by the editors, the proceedings start with two plenary papers on 'Hormones in lower plants' (Bopp) and 'Endogenous hormones in rice' (Takahashi) and are then subdivided into six subsections: 'Genetic approaches' (7 papers), 'Molecular aspects' (14 papers), 'Hormones and calcium' (3 papers), 'Hormone synthesis and metabolism' (18 papers), 'Hormone physiology and effects' (19 papers) and 'Practical applications and economic implications' (7 papers), respectively. Whilst the contents of this book provide an update of the present status of plant hormone research, it is unfortunate that it did not appear on the bookshelf until nearly 2 years after the meeting. Thus, considerable further progress has already been made in some areas since the papers were first presented, particularly in relation to molecular aspects of hormone action.

However, I found the section on the use of the plant mutants as research tools particularly interesting and still very much up to date. This provided a comprehensive survey of how biosynthesis and response mutants can be used to elucidate the physiological and biochemical control systems involving abscisic acid, auxins, cytokinins and gibberellins in plants. A short section on the role of calcium in plant responses explores the possibility of its acting as a messenger in signal transduction; however, much more information would seem to be needed before this possibility can be strengthened. Current thinking on the synthesis and metabolism of hormones is given a wide exposure and indicates the 'state of the art' in relation to the major plant hormones, the action of plant growth retardants and the ubiquitous jasmonic acid. A section on physiological effects of hormones covers such topics as photosynthesis, chilling, dormancy, cell differentiation, apical dominance, photoperiodism, flower initiation, wounding, winter hardiness and senescence. Whilst the final section indicates some practical applications of plant growth regulators, it would seem that there is still considerable emphasis on growth retardants and ethylene-generating compounds. Nevertheless, there is interesting speculation on the possibility of new plant growth regulators of microbial origin and the fascinating question of whether plant growth regulators can be used to alleviate herbicide cross-resistance in weeds.

In my view this book is well worth buying, the price is very competitive at DM 170.00; a library copy is a must for all plant physiology/biochemistry departments. It is well produced, the text is clear and the figures and tables well presented. It is just a pity it took so long to appear.

The 70 papers in this book were presented at the 13th International Conference on Plant Growth Substances held in July 1988 at the University of Calgary. Following a brief preface by the editors, the proceedings start with two plenary papers on 'Hormones in lower plants' (Bopp) and 'Endogenous hormones in rice' (Takahashi) and are then subdivided into six subsections: 'Genetic approaches' (7 papers), 'Molecular aspects' (14 papers), 'Hormones and calcium' (3 papers), 'Hormone synthesis and metabolism' (18 papers), 'Hormone physiology and effects' (19 papers) and 'Practical applications and economic implications' (7 papers), respectively. Whilst the contents of this book provide an update of the present status of plant hormone research, it is unfortunate that it did not appear on the bookshelf until nearly 2 years after the meeting. Thus, considerable further progress has already been made in some areas since the papers were first presented, particularly in relation to molecular aspects of hormone action.

However, I found the section on the use of the plant mutants as research tools particularly interesting and still very much up to date. This provided a comprehensive survey of how biosynthesis and response mutants can be used to elucidate the physiological and biochemical control systems involving abscisic acid, auxins, cytokinins and gibberellins in plants. A short section on the role of calcium in plant responses explores the possibility of its acting as a messenger in signal transduction; however, much more information would seem to be needed before this possibility can be strengthened. Current thinking on the synthesis and metabolism of hormones is given a wide exposure and indicates the 'state of the art' in relation to the major plant hormones, the action of plant growth retardants and the ubiquitous jasmonic acid. A section on physiological effects of hormones covers such topics as photosynthesis, chilling, dormancy, cell differentiation, apical dominance, photoperiodism, flower initiation, wounding, winter hardiness and senescence. Whilst the final section indicates some practical applications of plant growth regulators, it would seem that there is still considerable emphasis on growth retardants and ethylene-generating compounds. Nevertheless, there is interesting speculation on the possibility of new plant growth regulators of microbial origin and the fascinating question of whether plant growth regulators can be used to alleviate herbicide cross-resistance in weeds.

In my view this book is well worth buying, the price is very competitive at DM 170.00; a library copy is a must for all plant physiology/biochemistry departments. It is well produced, the text is clear and the figures and tables well presented. It is just a pity it took so long to appear.

Tudor H. Thomas
Brooms' Barn Experimental Station
Higham, Bury St Edmunds,
Suffolk IP28 6NP

Y.P.S. Bajaj (Ed.), Somaclonal variation in crop improvement I (Biotechnology in Agriculture and Forestry 11), Berlin: Springer-Verlag, 1990. xix + 685 pages. DM 578. ISBN 3-540-50785-X.

Somaclonal variation is a broad term used to describe genetic variation which is manifested in cultured plant cells or tissues, or in organs or plants regenerated from such plant tissue cultures. This variation may be undesirable if clonal micro-propagation is desired, but may be of value as an added source of genetic variation on which to base crop improvement. As well as covering what is known about the underlying causes of somaclonal variation (which are many), this book deals with both positive and negative aspects, although the
use to which somaclonal variation may be put receives greater attention.

The book is divided into four sections. The first section covers 10 widely ranging topics, including the molecular and chromosomal basis for somaclonal variation. Some of the chapters in this section have a broader coverage than just somaclonal variation, such as gene amplification and evolution, and environmentally induced variation in DNA. Other chapters are much more specific and deal with salt tolerance and nematode resistance in plants and what can be achieved through in vitro techniques.

The second, third and fourth sections relate to somaclonal variation in cereals, vegetables and fruits, and ornamentals and forages respectively. Each of the 19 chapters within these three sections deals with an individual crop or genus, and includes considerable information on general aspects of in vitro culture as well as somaclonal variation. Most of the chapters also finish with an assessment of future prospects for the technology. This means that even for crops such as sugar beet, where relatively little has been published on somaclonal variation, the book is well worth consulting as a literature source for current in vitro techniques.

What of the scientific quality of a book which has been written by 46 contributors? Some of the authors I know well in terms of the definitive value of their research, including for instance Saunders, Doley and Theurer writing on sugar beet, Angela Karp providing the account on potato, and Bajaj who has provided the introductory chapter. Others are also not without scientific reputations, and this must therefore point to the value of this book as a major scientific reference work. Each chapter includes a fairly comprehensive reference list, even up to 1989 in some cases, and there is an adequate general index at the end of the book.

I am extremely pleased to have this book on my book shelf, which, because of the price, would be unlikely if I had not received the book to review. It will get regular use both in research and teaching.

Brian Ford-Lloyd
School of Biological Sciences
The University of Birmingham
P O Box 363
Edgbaston
Birmingham B15 2TT
One might expect a book on methodology to be rather turgid, but the general style of the authors make this surprisingly interesting to read. The layouts of the chapters vary considerably and it is possibly the freedom that the authors have been allowed that results in the reader-friendly text. The chapters dealing with RNA and DNA must have been very difficult to write because of the enormous amount of information now available in the field of molecular biology and, particularly, recombinant DNA technology. Examination of the chapters reveals that the authors have quite sensibly concentrated their efforts on plant-specific aspects of the nucleic acids and have referred extensively to other texts for more general information. Whilst both authors make it clear that they are not attempting to cover all of the methods that have been developed, the 48 pages devoted to these chapters seems too short to ensure that the reader is aware of the technological explosion that has occurred in this area over the last twenty years. This area of the book overlaps with recently published plant molecular biology manuals.

The book represents a valuable collection of reviews on the handling of a range of molecular species. Because of its emphasis on techniques, few workers are likely to be keenly interested in more than one or two of its chapters and this may be reflected in the level of personal sales. However, one would hope and expect that copies are obtained for reference by institutions involved in plant research.

H.J. Newbury
School of Biological Sciences
University of Birmingham
Birmingham B15 2TT

J.L. Harwood and J.R. Bowyer (Eds.), *Lipids, membranes and aspects of photobiology. Methods in plant biochemistry*, Volume 4. P.M. Dey and J.B. Harbourne (Series Eds.). London: Academic Press, 1990. xi + 353 pages. £49.95. ISBN 0-12-461014-5.

This book is arranged in three parts; the first part (six chapters) is concerned with lipid analysis, the second (three chapters) with the measurement of light regulated events and the third, the final chapter, deals with the study of the physical properties of membranes. The volume is well laid out, clearly printed, and the references are up-to-date.

The first six chapters describe, in varying detail, experimental procedures for the analysis of different classes of lipids. The book begins with a chapter on the structural identification of fatty acids (Gunstone), presenting the reader with a straightforward description of the various separation and identification procedures without going into the detail of experimental protocols. The two chapters which follow are sufficiently detailed to be regarded as essential reading for new workers making their first foray into lipid analyses. Both Stobart and Stymne (triacylglycerol biosynthesis) and Moore (phospholipid analysis) introduce and describe their analytical protocols in an interesting way. The chapter by Douce et al., perhaps provides the one plausible link between the two halves of the book. These authors' describe glycolipid analysis and synthesis in plastids and include the added bonus of detailed procedures for plastid isolation.

Chapter Five on waxes, cutin and suberin (Walton) details the techniques involved in their extraction isolation and analysis. This complex subject is competently and comprehensively dealt with by the author. The final chapter in this part of the book (Lam and Hansen) concerns the analysis of the plant protectant and regulatory substances, the polyacetylenes and related compounds. It includes sections on the chemistry of these substances, their occurrence, identification, bio-synthesis and biological activity.

The second part of the book is concerned with aspects of photobiology and begins with an excellent description of the isolation, purification, molecular characterization and phototransformations of phytochrome (Pratt et al.). Sections are also included on methods for the identification of UV/blue-light photoreceptors and DNA-protolyases. Optical techniques used in the study of photosynthesis is the subject of the next chapter (Mathis). This covers the measurement of light absorption and emission, and the use of vibrational spectroscopy to provide, for example, information about molecular interactions between pigments and proteins. The last chapter in this part deals with the study of chlorophyll fluorescence tran-
sents (Horton and Bowyer). It covers the measurement of chlorophyll fluorescence changes from the picosecond time domain through to long-term quenching and it also usefully outlines experimental problems and how to avoid them.

The final and shortest part of the book, comprises a single chapter about the structure and dynamics of plant membranes (Quinn and Williams). This begins with a section on the isolation of plant cell membranes, which discusses general strategies rather than experimental procedures. The same approach is adopted in the descriptions given in the other sections of the chapter, on the structure of membrane constituents and membrane dynamics. This tends to make it appear more like a review, but nevertheless, the chapter makes interesting reading.

I have two major criticisms of the book. First, there is no mention of sterols, which should be included in a volume dealing with methods of plant lipid analysis; perhaps this aspect is to be included in another volume. The second concerns the hybrid nature of the book; my feeling is that the two major topics covered by this book do not fit well together; a feeling compounded by the lack of cross referencing between the parts of the volume. This book should find a market among post-graduate workers, but to obtain value for money it might be more economical for a lipid biochemist and a photobiologist to buy one copy between them and cut it in half?

D.T. Cook
Long Ashton Research Station
Bristol, BS18 9AF