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BOOK REVIEWS

Nucleic Acids and Proteins in Plants I: edited by D. BOULTER and B. PARTHIER. Vol. 14A, Encyclopedia of Plant Physiology New Series, Springer, Berlin, 1982. 768 pp. DM 268 (*ca* £67).

After a long period of comparative neglect, there has been a marked revival of interest in plant proteins. Much new material has accumulated in the last decade and this first volume of two in the Encyclopedia of Plant Physiology series has some considerable ground to cover. From the subtitle of Vol. 14A 'Structure, biochemistry and physiology of proteins' it should be clear that proteins predominate, although nucleic acids are inevitably included to some degree, most noticeably in the more physiological chapters.

Some idea of the rate of recent progress on plant proteins can be gauged from the excellent chapter of J. A. M. Ramshaw on amino acid sequences. In 1969, only six complete sequences for plants were available, compared to over 230 from other sources. By 1979, the cut off date for most of the chapters in this volume, 107 complete sequences had been published variously for 28 different proteins and in addition many partial sequences (e.g. of plastocyanin) were available. The longest sequence must be that of the large subunit of RuBP carboxylase from *Zea mays* which has 475 residues. Interestingly, this sequence was determined indirectly from the DNA of the coding gene. Other sequences available include those of a variety of enzymes and electron transfer proteins, as well as those of toxins and sweet proteins. Sequence data for DNAs do not appear in detail in this volume but those for transfer RNAs are included *inter alia* in a valuable account by J. H. Weil and B. Parthier of transfer RNAs and aminoacyl tRNA synthetases in plants. The processes of protein synthesis receive separate treatment in a chapter on ribosomes by A. Marcus. Protein synthesis, of course, begins with amino acids and a succinct review of amino acid metabolism by B. J. Miflin and P. J. Lea opens the volume. The final steps of protein elaboration, i.e. post-translational modifications, are comprehensively reviewed by L. Beevers. The processes of protein turnover and degradation are then dealt with separately by D. D. Davies and by P. Mathile.

One of the reasons for renewed interest in plant proteins lies in their increasing nutritional importance to man and it is appropriate that seed proteins should be extensively reviewed here. Two chapters, by M. N. Miège and by P. I. Payne and A. P. Rhodes, provide the reader with authoritative accounts of recent developments. Topics discussed include legumin and vicilin, cereal seed proteins, lectins, isozymes and high-lysine barley and maize. Protein changes during seed germination and development are discussed by J. D. Bewley and K. Muntz in further chapters. Leaf proteins are not forgotten, since there are chapters by R. C. Huffaker on their biochemistry and physiology and J. L. Stoddart and H. Thomas on their changes during leaf senescence. Finally, the proteins and other macromolecules of the cell wall receive some attention in a more general chapter by D. H. Northcote on cell wall differentiation.

Other chapters not so far mentioned deal with plant peptides, tubulin and immunology. Some minor gaps may be noted but in general very little of importance is omitted. Personally, I would have welcomed more on the enzymic properties, but of course certain plant enzymes, notably those of photosynthesis, have already received adequate coverage in earlier volumes. In all, the editors are to be congratulated on assembling together such a talented band of contributors. This volume is a wide-ranging and comprehensive account of a most important subject, which makes it a valuable addition to the plant biochemistry literature.

Plant Science Laboratories, University of Reading

J. B. HARBORNE

Anthocyanins as Food Colours: edited by P. MARKAKIS. Academic Press, New York, 1982. 263 pp. £23.20.

The major justification for this publication is the possibility that the coal tar-based dyes that have been used in the food industry for many years might be replaced in the near future by either natural anthocyanin concentrates or by closely related synthetic flavylium salts. The problem, remains, of course, that such preparations require toxicological testing, a highly costly hurdle to surmount. It is clear from the final chapter in this book, which is provided by the editor, that it may be some time before anthocyanins are widely employed for this purpose. However, the book contains much useful information on anthocyanin chemistry and biochemistry and it will, therefore, be welcomed by all those involved with these fascinating but contradictory natural colouring materials.

While anthocyanins provide intense and vivid colours *in vivo* in flower, fruit or leaf, it has not been entirely clear how these colours are achieved since *in vitro* anthocyanins are unstable in solution and at the pH of the cell sap they show only weak visible absorption. Studies of the reactions anthocyanins undergo in solution are the bases for comprehending how they are stabilized in nature by copigmentation, by acylation or by self-association and it is very fitting that an experimenter who has recently extended our knowledge of these reactions in solution,