

Soviet literature in the field, which is not well-known. Barber (Chapter 3) expands this discussion of ion movements, membrane potentials and their effects on chloroplast metabolism. His account is a well-timed contribution as it is becoming clear that ion-movements during photosynthesis play an important role in regulating both the light-reactions and also CO_2 -fixation.

Hall (Chapter 4) reviews the evidence for the mechanism of photophosphorylation in chloroplasts and provides an extremely useful compilation of the results obtained by different workers. Critical review of these results leads him to conclude that two ATP molecules are formed for every 2 electrons transferred from water to NADP^+ . This view is balanced by Chapter 5 (Krause and Heber) who believe that the $\text{ATP}/2e^-$ ratio is 'flexible' but usually less than 2. Both chapters are extremely well-written and should be required for anyone who contemplates working in this field.

Heldt (Chapter 6) gives an incisive account of the transport systems present in the envelope of chloroplasts from C_3 -plants. One only wishes that our knowledge of the transport systems in mesophyll and bundle-sheath chloroplasts in C_4 -plants were as good: such knowledge would help us to understand mechanisms of C_4 -photosynthesis a great deal better. Coombs (Chapter 8) reviews present knowledge of C_4 -photosynthesis: it now seems to be generally

accepted that the Calvin cycle operates only in bundle-sheath chloroplasts, although he does well to point out that present schemes of metabolite shuttling between the two types of cells raise many questions. This chapter can be read with profit not only by newcomers to the field but also by workers in it!

No book on 'the intact chloroplast' would be complete without a chapter by Walker (Chapter 7), who was the first to isolate chloroplasts capable of high rates of CO_2 -fixation. He discusses the control of CO_2 -fixation in chloroplasts, with special reference to photosynthetic induction.

Sulphate metabolism in chloroplasts is lucidly explained by Schwenn and Trebst (Chapter 9) and amino acid and phospholipid metabolism by Leech and Murphy (Chapter 11). Ellis (Chapter 10) provides a useful review of the present state of knowledge of protein and nucleic acid synthesis by chloroplasts. The book ends with a well-placed chapter by Raven on chloroplast/cytoplasm interactions.

Overall, this is an excellent book which can be recommended without reservation to research workers and final-year undergraduates. It should find a place not only on library shelves but also on the desk of anyone interested in chloroplasts. I only hope that further volumes in the series are as good as this one.

B. Halliwell

Concanavalin A as a Tool

Edited by H. Bittiger and H. P. Schnebli
John Wiley and Sons; London, New York, Sydney, Toronto, 1976
xv + 639 pages. \$38.50, £19.50

This book is the most important contribution to the literature about concanavalin A (con A) to date and should rapidly become a standard work. It comprises 61 detailed descriptions of methods for the preparation and application of con A and its products to a broad spectrum of biological problems, mostly by authors prominent for developing the techniques

they describe. The editors have ensured the quality of the book by imposing a uniform, brief and informative style and by careful selection and organisation of the contributions. The result is a source book and laboratory manual of the highest standard in terms of usability, comprehensiveness and quality of experimental work.

The chapters are divided into six sections; these divisions are real, and there is little or no overlap or repetition of any kind. There is adequate detail for the competent worker to follow the techniques described, and each paper contains a short evaluation of the method and results obtained. The many illustrations, including micrographs, are of good quality. About 1500 references are quoted; this list includes most of the significant papers dealing with con A. The index is not as long as it could be, but this is offset by the comprehensive titling of paragraphs throughout the text.

The Introduction provides basic information about con A. G. L. Nicolson contributes a short intensive review covering its history, properties, and applications. A chapter on con A preparation follows, then a detailed account of molecular structure. The section concludes with a brief but well-referenced chapter on binding specificities. The next section (Microscopy) contains all the common techniques for the visualisation of con A by conjugation and is followed by a

section on Quantitation in which aspects of radio-labelling, particularly with ^{125}I , and methods for quantifying the binding of con A to membranes, receive detailed treatment. The next section (Agglutination) covers nine techniques and also contains a theoretical discussion of the process. H. P. Schnebli makes some very useful points about parameters which affect the results of agglutination experiments. The next section (Separation Methods) deals primarily with the application of immobilised con A by affinity chromatography and contains many figures showing eluate separations. A special subsection deals with solubilization of membrane glycoproteins. The last section, Biological Applications, contains chapters by prominent authors on specialised techniques and applications. Although probably already well known to workers in these areas, the information is presented here in convenient form. Finally, a short appendix lists some current sources of con A-based reagents.

P. Whur

Laboratory Techniques in Biochemistry and Molecular Biology
Vol. 6. Part I: Density Gradient Centrifugation

by R. Hinton and M. Dobrota

Edited by T. S. Work and E. Work

North-Holland; Amsterdam, London, New York, 1976
xi + 290 pages. Dfl 47.00, £13.00

This essentially practical book, which deals almost exclusively with preparative rotors despite the cover illustration, is generally well conceived and demonstrates the wide applicability of density gradients. Although the authors could not be expected to assess all the centrifuge and ancillary equipment available, they list suppliers and present criteria by which potential buyers may govern their choice. They provide many useful suggestions, advising on the tailoring of gradient characteristics and selection of rotors for efficient separations.

Sound recommendations made include the following. Elaborate gradients often have little advantage

and may be dispensed with entirely if differential pelleting is adequate for the separation sought. At low loads 'streaming' can frequently be ignored. The reviewer endorses the caution about estimating absolute sedimentation coefficients in preparative equipment. Whilst the comments on pp. 14, 79 about rate zonal separations are valid for large particles, satisfactory work of this nature has been done in angle rotors with macromolecules. The allusion to the minor effects of high salt concentration on many lipo-proteins could well have included glycoproteins.

Some printer's errors are trivial, but in the theory