

but, alas, examination of the contents does not support these hopes. This book is, in fact, the published proceedings of a Symposium held at Long Ashton Research Station, Bristol, in the summer of 1967, and it suffers from all the usual faults of such volumes. Thus some papers are so short that they are valueless while others are clearly research papers which should have been published in an appropriate journal in the normal way. Furthermore, there are introductory addresses, votes of thanks etc., which the general reader hardly wants to have to wade through. Fortunately, there are also some excellent review papers in the book and these are sufficient to justify its appearance on the plant biochemists' bookshelf.

The first of the three sections the book is divided into is devoted to nitrogen fixation and includes a valuable discussion by Hewitt and his co-workers of the status of hyponitrite and hydroxylamine as possible intermediates in nitrite reduction. There is also a fascinating account by Sims, Folkes and Bussey of the complex mechanisms involved in the regulation of nitrogen assimilation by the plant. It is clear, however, from the introductory chapter by Chatt that we are still abysmally ignorant of the basic chemical processes involved in nitrogen fixation itself.

In the second section on amino acid and protein synthesis, D. D. Davies provides a useful summary of what is known of amino acid metabolism in higher plants. Following two routine papers on the biosynthesis of putrescine and the properties of diamine oxidase, there is an authoritative review by Fowden and his colleagues on the specificity of amino acid biosynthesis, knowledge of which has mainly been gained by metabolic studies of the non-protein amino acids of plants. The third section covers the physiological aspects of nitrogen metabolism and contains useful review papers by Luckwill (effect of plant growth regulators), Markham (effect of virus infection), Pate (photosynthetic aspects) and Hill-Cottingham (effect of environment).

Some of these later chapters are very good and active workers in the field of nitrogen metabolism will want this book on their shelves; other plant biochemists will do well to dip into it. However, a well-balanced modern account of this field of research, which is not only fascinating biochemically, but also of immense practical importance in agriculture, has yet to be written.

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Transport and Distribution of Matter in Cells of Higher Plants. Edited by KURT MOTHES, EBERHARD MULLER, AXEL NELLES and DIETER NEUMANN. Akademie-Verlag, Berlin, 1968. 215 pp.

I READ through the papers of this symposium with increasing disappointment. When I first received the volume and read the title, I turned to the text with a great deal of anticipation. The facts about the movement and distribution of solutes in higher plant cells continue to elude us and I had hoped that the papers, which were presented at the meeting held at Castle Reinhardtbrunn in East Germany in October of last year, would go some way towards separating fact from fiction and towards suggesting future work in this most important field of plant physiology. It was not to be and my hopes have in no way been realized.

The reader of this review can gauge my dissatisfaction with this symposium volume if I say that of the twenty-two articles, five are devoted to ion relations of algae, two to model systems and one to regulation of transport in bacteria. The remaining articles are of variable

quality. Those by Anderson on water movement in roots, Cram on cytoplasmic and vacuolar ion contents in higher plant cells, Higinbotham on cell electropotentials, Jeschke on the connexion between electron transport and ion transport, Kursanov on the transport of metabolites in parenchymal tissue and Schnepf on transport of materials in membrane-bounded vesicles are of a high standard from the point of view of their presentation and of the stimulating ideas which are put forward. The other articles on transport in higher plant cells are very much less rewarding.

I was disappointed in a more general sense, in that the articles on the whole represented that consensus of what is right and proper to study with respect to the transport of substance in plant cells in general—and those articles about higher plant cells in particular also reflected this consensus—rather than any effort to indicate how the subject might advance particularly with respect to the higher plant cell. There seemed to be too much focusing on minutiae and not enough consideration of the broad issues. Besides, the volume contains all too little information on such important topics as organic acid metabolism, knowledge about compartmentalization of solutes in cells from metabolic studies, the symplasm theory and the transport of auxins which are all of direct relevance to any understanding of transport processes in higher plant cells and tissues. When dealing with the higher plant in relation to such transport processes, there is very much more to it than inserting electrodes into the cells and measuring ion fluxes. This symposium volume fails to establish this.

However, if one ignores what one supposes that the symposium must have been trying to do, the volume can be considered as containing some useful review articles. Details about those concerning higher plant cells have already been given. Articles by MacRobbie on active transport in giant algal cells and by Raven on ion transport in *Hydrodictyon* must be added to this list. The text contains a large number of printing errors—fortunately the great majority can be quickly detected.

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