

WOOLHOUSE, H. W. (ed.): *ADVANCES IN BOTANICAL RESEARCH. VOLUME 7.* — Academic Press, London—New York—Toronto—Sydney—San Francisco 1979. 697 pp. US \$ 80.50.

The seventh volume of this luxuriously published books (glossy paper, many illustrations including colour ones, good Author and Subject Indexes) brings five rather long and comprehensive reviews in the field of plant physiology. They were written by seven authors from Australia, England, France, and the U.S.A.

R. Douce and J. Joyard deal with the plastid (mainly chloroplast) envelope, its origin and structure, relation to other plant cell membranes, isolation methods, chemical composition (lipids, peptides, pigments) and enzyme activities (metabolite and proton transport, lipid synthesis). The role of sodium in plant metabolism is analyzed by P. F. Brownell: the effects of low concentrations of sodium on flowering, dry matter accumulation, photosynthetic and respiratory metabolisms, chlorophyll and biliprotein contents, *etc.* The history of sodium research in plant physiology is also briefly outlined, as well as the basic conditions of experiments with sodium. The principles and modelling of aeration in higher plants, which is necessary to sustain respiratory activities throughout the plant body, are reviewed by W. Armstrong. In this paper mainly the internal movements of oxygen in wetland plants (special attention to roots) are modelled. The dynamics of fungi, their populations and communities in decaying wood are the topic of paper by A. D. M. Rayner and N. K. Todd. The last review on the physiology of orchids (J. Arditti) is the longest (235 pp.) and largest (707 references!) in the volume. It describes the morphology, anatomy and germination of seeds, contents, biosynthesis and role of phytoalexins, photosynthesis and photorespiration, flowers and their pollination, and tissue cultures of various orchids. All parts of the review contain a brief history of the respective research.

The experienced editor, Prof. H. W. Woolhouse from Leeds, ensured a homogeneous character of individual articles of this very interesting volume.

Z. ŠESTÁK (*Praha*)

HEWITT, E. J., CUTTING, C. V. (ed.): *NITROGEN ASSIMILATION OF PLANTS.* — Academic Press, London—New York—San Francisco 1979. 708 pp. US \$ 91.00.

The Long Ashton Symposia have been devoted to the selected topics in physiology, biochemistry and pathology of plants and microorganisms of direct importance in agriculture and horticultural crop production. The sixth meeting held at the Long Ashton Research Station (University of Bristol) in September 1977 has not been exceptional in this respect.

In addition to the editors' Preface, Inaugural Lecture (L. Fowden), and to the Concluding Remarks (D. Boulter), the Proceedings are divided into six Sections: (I) Utilization of Atmospheric Nitrogen, (II) Fixed Nitrogen Utilization, (III) Regulation of Nitrate Assimilation, (IV) Ammonium to Protein, (V) Relationship to Carbon Metabolism, and (VI) Efficiency of Nitrogen Usage. Each of the Sections includes several more or less comprehensive reviews by the most experienced scientists, discussion and a few short specialized contributions.

Section I is given predominantly to the work of the "Sussex" group (ARC Nitrogen Fixation Unit, Brighton) ranging from the chemistry of abiological dinitrogen complexes (J. Chatt) through nitrogenase biochemistry (R. N. F. Thorneley *et al.*) to the regulation and genetics of nitrogen fixation (C. Kennedy, R. R. Eady). Other genetic aspects of the specificity in the *Rhizobium*-legume symbiosis are summarized by A. W. B. Johnston and J. E. Beringer, and N_2 -fixation in associations of procaryotes with lower and higher plants is discussed by W. D. P. Stewart *et al.*

In contrast to the N_2 -fixation, there is less comprehensive information available in Section II. Nevertheless, mainly the survey of the practical aspect of, and plant breeders' attitude to nitrogen usage and assimilation by P. B. H. Tinker and P. J. Goodman, respectively, are very interesting.

A series of papers in Section III gives an insight into the purification procedures, structure, mechanism of action and regulation of nitrate reductase and nitrite reductase from lower and higher plants. Despite great differences between organisms, considerable progress has been made in all these fields (L. P. Solomonson, A. Oaks, E. J. Hewitt *et al.*) as well as in the molecular genetics of both the enzymes, which is discussed here with emphasis on *Aspergillus nidulans* by D. J. Cove. Several other aspects of nitrate metabolism in the relationship to photosynthesis, light wavelengths and phytohormones (S. H. Lips, R. W. Jones and R. W. Sheard, J. S. Knypf and others) are given in Section V.

The chain of reactions from the primary steps of NH_3 assimilation (GS/GOGAT, GDH), biosynthesis of amino acids and amides to protein synthesis and deposition in the harvested

plant parts is covered by several papers in Sections IV and V. There is, however, little or no information on nitrogen uptake phenomena.

Section VI logically summarizes current knowledge of nitrogen assimilation in terms of economy, efficiency, energy, yield formation, losses, and so on.

Let us agree with the editors that the Proceedings will provide ample reference material for specialists in all the above mentioned subjects, and also for others engaged in related aspects of biochemistry, plant nutrition, and the wider problems of fertilizer use.

V. NAŠINEC, V. ŠKRDLETA (*Praha*)

THIMANN, K. V.: *HORMONE ACTION IN THE WHOLE LIFE OF PLANTS*. — The University of Massachusetts Press, Amherst 1977. 448 pp., cloth US \$ 35.00.

Fourteen chapters of this volume deal with the problem of how phytohormones initiate and control the growth and development of plants. The whole sequence of events in the individual life of plant is followed, starting with the hormonal control of germination and closing with senescence and abscission of fruits and leaves. Polarity and the transport of auxin, geotropism and phototropism are treated in detail. The book ends with the critical evaluation of concepts of the mechanism of hormonal action at cellular level, based mostly on examples taken from auxin studies. A chapter on chemical aspects is intercalated. It deals with the occurrence of natural hormones and with the relationship between structure and activity. The author stresses on many occasions that perhaps all growth and developmental phenomena are the result of interaction and balance between several hormones, and an attempt is made to demonstrate the multitudinous ways in which hormones act. Special attention is paid to elucidating how a given growth reaction established with a plant segment and/or at the tissue level will be performed within the whole plant.

There are some special reasons which distinguish this book from many other written on plant hormones during the last decade. Professor Thimann himself has been actively engaged in phytohormone research since 1930 and has made many outstanding discoveries in this special field. Thus, he uses personal experiences and experiences of his students when dealing with most of the topics and is certainly entitled to draw a generalizing picture of hormonal action in complex phenomena. Professor Thimann also aptly evokes professional contacts with his colleagues and the atmosphere of some discoveries, which makes the book an especially interesting reading. This, together with his sense of humour (for example he tells us the story of Daphne and Apollo when tackling the problem of rooting) and abundant usage of his own knowledge as a general botanist stresses the personal traits he gives to the writing. Many parts of the book are written as a witty disputation with all possible for and against and with technical details being kept at minimum. This is a especially valuable feature since it provokes creative thinking. As professor Thimann devoted himself mostly to studies in auxin, the book is certainly "auxinophilic", which is reflected both in proportion and number of situations auxin is dealt with. I found this no disadvantage since it only stresses the coherent character of the book.

There is a selection of literature presented at the end of each chapter and a list of titles is added for general supplementary reading. The style is clear and the illustrations are excellent. An inspiring reading for all botanists and plant physiologists with some general background of plant anatomy, morphology and physiology.

J. KREKULE (*Praha*)

SCOTT, T. K. (ed.): *PLANT REGULATION AND WORLD AGRICULTURE*. — Plenum Press, New York—London 1979. 575 pp. US \$ 47.50.

This volume summarizes an attempt of those working in plant biological sciences, both basic and applied, to review how efficiently is photosynthesis used as a means of production at present, and what strategies may be suggested for meeting the demand for more food, forage, fiber and energy at the end of our millenium. It might well be the first book where the present knowledge of plant regulation, based mostly on phytohormone research, is used to tackle problems related to increasing yields.

The volume deals with a wide range of complex processes: photosynthesis, seed germination, flowering and fruit setting, source-sink relationship, plant nutrition *etc.*, which are believed to limit crop productivity. P. F. Wareing, K. V. Thimann, Y. Vardar and some other equally prominent physiologists are among the authors. Besides, the subjects of genetic manipulation, of modern methods to investigate phytohormones and of the use of growth retardants are also outlined. Some of the 28 contributions treat crop production as a complex issue within the scope of ecological and sociological aspects.

In some of the contributions (*e.g.* dealing with root-shoot relationship, flowering mechanism, *etc.*) the necessity to consider the plant as a whole is claimed as a prerequisite for understanding and manipulating developmental processes. Pertinent to this problem of an integrating mechanism in plants, especially the question what kind of chemical and physical messages are used by the communicating organs and tissues. This is a genuine problem in plant physiology and possibly one of the hindrances to further progress. There seems to exist a general recognition that high yields involve not only the output but also the rising input. High costs in terms of energy are certainly becoming a barrier to exploiting new technologies.

The contributions are written in a very personal way, preserving both the style and approach of individual authors. Thus on one hand the reader will encounter wise, sometimes a bit talkative speculations, and on the other hand recommendations for practical activity (*e.g.* the survey of plant retardants). Some sociological aspects of agriculture, such as land tenure, or the optimum size of a farm are also touched on. The treatment of such topics is slightly naive and does not even take into account the diversity of experience the contemporary world may provide in this respect, displaying as it does feudal estates along with state farms. However, this is primarily a book on plants, not on people.

The volume is provided with an author index and indexes of subject and plant names. The last chapter summarizes arguments and philosophies emerging from the discussion and is an excellent recapitulation of the whole book.

The book supplies the reader with useful data characterizing contemporary plant production and its planning for the next 20 years. It is equally important in summarizing new ideas and exposing present and future shortcomings of plant production, formulating problems for basic research and correcting them with the limits of available technology. It is a strictly interdisciplinary book, essential for all botanists.

J. KREKULE (*Praha*)

GORMAN, M. L.: *ISLAND ECOLOGY*. Outline Studies in Ecology. — Chapman et Hall, London 1979. £ 1.95.

With the publication of the monograph of MacArthur et Wilson "The Theory of Island Biogeography" in 1967 island biology has registered a major step toward quantification, generalization and possibility of prediction. The book under review is the first attempt at summarizing this concept in a concise introduction aimed at deducing the entire island ecology from the quantification of the fundamental processes by which insularity affects the populations of different organisms. The form the authors have chosen for this attempt is the most successful. The first three chapters (Reaching and colonizing islands, How many species and Islands as experiments in competition) deal with those particular ecological processes which determine the ecology of island communities. In these chapters, just as in the whole monograph, the authors stress clarity not admitting of ambiguity rather than going into details, even though occasionally a more thorough treatment of the matter would be desirable. The next three chapters (The very remote islands, Some dangers of the living on an island and Continental habitat islands) are rather descriptive, while dealing in greater detail with some specific aspects of island biogeography. The last chapter is an attempt to summarize different approaches to the selection and design of natural preserves along the lines of proposed concepts.

The monograph is well arranged and documented by carefully chosen tables and figures without unduly relying on mathematical formulas. Each chapter is complemented by references introducing the interested reader to sources pertaining to its subject matter. Despite its small size, the book presents many facts and findings in a concise form, but sometimes tends to avoid rather than call attention to controversial questions. Consequently it may evoke the impression that the equilibrium theory of MacArthur and Wilson is the only acceptable and satisfactory method of island description. This may also explain why the authors see no obstacles to the application of their design of nature preserves. Would it not be worthwhile to reconsider the importance of the qualitative differences of individual islands despite the reverse trend now prevailing in ecology?

T. HERBEN (*Praha*)