

ERASMUS, D. A. (ed.): *ELECTRON PROBE MICROANALYSIS IN BIOLOGY*. — Chapman and Hall London, A Halsted Press Book John Wiley and Sons, New York 1978, 248 pp., £ 15.00.

Scanning electron microscopy, X-ray microanalysers called generally microprobes have become very popular both in technical and inorganic sciences and recently also in biology and have been utilized extensively. As compared with other analysers, these microprobes enable one to analyse in a non-destructive way very small parts of surface of the studied material providing their relatively accurate topographic localization.

The book *Electron Probe Microanalysis in Biology* summarizes the methods of X-ray microanalysis and their applications in biological sciences. The introductory chapter by D. A. Erasmus is followed by the chapter by J. C. Russ on the physical basis of electron excitation of X-rays and subsequent analysis. Properties of the older wavelength-dispersive system and the new energy-dispersive method are explained and advantages and disadvantages are compared. The author does not describe the technical construction of the systems, but this is certainly not a shortcoming of this chapter. The third extensive chapter by J. A. Chandler summarizes information concerning the application of X-ray microanalysis in transmission electron microscope to the study of ultrathin biological specimens, including data up to 1977. The author summarizes data concerning the frequency of 17 specimen preparation methods used, frequency of analyzed 17 elements in the specimens and types of analyzed animal and plant specimens and types of tissues. A very extensive bibliography concluding the chapter includes 270 references yielding information about the type of the used analyser, description of preparation of specimens, the kind of analyzed elements and type of biological objects. In the fourth chapter A. J. Morgan, T. W. Davies and D. A. Erasmus describe and compare methods used for preparation of biological specimens for microanalysis. A table summarizes literature concerning losses of the analyzed elements (in %) in tissues when utilizing different fixation methods, washing procedures, dehydration and embedding of objects. The fifth chapter by T. C. Appleton is also very interesting. It describes methods of ultramicrotomy and its use in X-ray microanalysis of biological objects. In the sixth chapter I. D. Bowen and T. A. Ryder summarize the application of X-ray microanalysis to histochemistry and evaluate precipitation and staining techniques of microanalysis of endogenous substances, techniques of microanalysis of exogenous substances and methods for detecting enzymatically released reaction products. In the last seventh chapter the authors H. O. Garland, J. A. Brown and I. W. Henderson describe X-ray analysis as applied to the study of renal tubular fluid samples.

The book is richly illustrated by photographs demonstrating the techniques and showing results of the methods described. The book is very modern in its concept, it is useful not only to cytochemists and histochemists, but also to all biologists who are involved in the ultrastructural research and will certainly bring a number of new ideas and new exciting stimulations for the future investigations in this area.

J. LUDVÍK (*Praha*)

CZAJA, A. T.: *STÄRKE UND STÄRKESPEICHERUNG BEI GEFÄSSPFLANZEN* (Versuch einer Amylo-Taxonomie). — Fischer, Stuttgart, 1978, 264 pp. 98,— DM.

Although this book can and obviously will serve as a monograph on the given problematics, it is — judging mainly from the literature references — predominantly an original work. The intention of the author is characterized by the subtitle. While the occurrence of reserve compounds is a relevant character already applied to lower plants, it does not hold for the Tracheophyta. Professor Czaja tried to fill this gap. His book has three parts based on authors' previous publications. The methods of investigation of starch grains and their classification are briefly dealt with in the first part. The results of investigations on the occurrence of starch in the seeds and in vegetative organs (the root and the stem) in plants belonging to individual genera are presented in the second part of the book, often continuing immediately the data of Hegnauer's Chemotaxonomy. In the third part, the author discusses his results in connection with the systematics of vascular plants in general and with regard to the occurrence of starch in particular taxons.

The book is a result of an enormous working endeavour. However, next publications in this field must respect especially the following two points of view: (a) biochemical and analytical-chemical (chemical identification of starch, confrontation of morphological and chemical properties of the starch grain, etc.); (b) anatomical and physiological (type of tissue containing starch — endosperm vs. cotyledon mesophyll, dynamics of starch occurrence in dependence on physiological factors, etc.). It is necessary to state, however, that the question of the origin of starch grains remains open both from the metabolical and ultrastructural point of view. Even though most of the contemporary works deal with this problem, the book under review is in its place.

K. BENEŠ (*Praha*)

FAEGRI, K., PIJL, L. VAN DER: *THE PRINCIPLES OF POLLINATION ECOLOGY*. — Third Revised Edition. Pergamon Press, Oxford—New York—Toronto—Sydney—Paris—Frankfurt 1979. 244 pp.

The book is focused on basic problems and general principles of pollination ecology and in comparison with the preceding edition which appeared in 1971 it is considerably revised. The introductory chapters briefly survey the history and technical aspects of pollination research, draw comparison with spore dispersal in lower plants and outline the main ecological features of pollination in gymnosperms. The greater part of the book is devoted to various aspects of pollen transfer in angiosperms. This part begins with a description of the structure and function of angiosperm flower and with examination of some aspects of reproductive barriers operating against hybridization. This is followed by the discussion of problems of pollen transfer by abiotic vectors. The fairly large matter of complicated interactions of plants with biotic vectors is divided into 5 chapters entitled Principles, Primary attractants, Secondary attractants, Structural blossom classes and Animals as pollinators. The next five chapters examine some evolutionary, taxonomical and applied aspects of pollination ecology such as the developments to abiotic vectors, autogamy, apomixis and to vegetative propagation, development of flowers in relation to the mode of pollination, relation of pollination ecology to speciation and to biocenoses, etc. To illustrate the general principles of pollination ecology some case histories are described in detail. Examples are drawn from all geographical areas where pollination has been studied.

The book represents an excellent comprehensive survey of the field it covers and can be especially recommended to research workers interested in ecology, biological evolution and taxonomy and as a basic textbook for university teachers and students.

J. TUPÝ (Praha)

RICHARDS, A. J. (ed.): *THE POLLINATION OF FLOWERS BY INSECTS*. — Academic Press, London—New York 1978. 213 pp. US \$ 26.—

This book is based on a Symposium held in 1977 at the University of Newcastle upon Tyne and organised jointly by the Botanical Society of the British Isles and the Linnean Society of London. It appeared as No. 16 in a series of Botanical Society of the British Isles Conference Reports. Nineteen papers of leading research workers in the field bring together new findings and up-to-date reviews with valuable suggestions and stimulating ideas.

A number of contributions deal with various topics of interactions between plants and pollinating insects, such as insect sensory responses to flower, development of symbiosis, pollination of introduced species, dependence on environmental factors and relationships between entomophily and anemophily. Another major theme of the Symposium was the role of insect pollination in population biology and ecological genetics. The interest was paid especially to insect pollination syndromes from the aspect of angiosperm evolution and interactions in ecosystems, to the implication of pollination behaviour in the breeding structures of plant populations and gene flow, and to genetic floral polymorphism in relation to flower-insect interactions and conditions of pollination.

The book is in many aspects multidisciplinary and will certainly prove of great interest especially to research workers in floral biology, ecology, population genetics, angiosperm evolution and entomology.

J. TUPÝ (Praha)

SHERBET, G. V.: *THE BIOPHYSICAL CHARACTERISATION OF THE CELL SURFACE*. — Academic Press, London—New York—San Francisco 1978. 298 pages, 36 figures, 63 tables. £ 12.80.

The cell surface plays a very important role in different cellular phenomena, such as division, growth, differentiation, morphogenesis, recognition and antigenicity.

There is a great number of disease processes which may cause changes in the cell surface. These surface changes can be demonstrated by a number of bioelectric and electrokinetic techniques, such as electrometric titration of cells, measurement of bioelectric potentials across the cell membrane (estimation of the surface charge by Donnan dilution potential and measurement of the membrane potential), cell electrophoresis, isoelectric equilibrium studies of cell surfaces and partition of cells in aqueous two phase systems. All these methods of various degrees of novelty and technical simplicity are discussed from an up-to-date point of view.

Each chapter consists of a well-founded theoretical explanation of the basic principles and a number of clinical applications. These applications are presented together with detailed

instructions, which are illustrated by numerous examples on bacterial, blood, tumour and sperm cells.

The reviewed book is written clearly and concisely and may be recommended to anyone interested in the applications of these useful and promising techniques.

J. SLAVÍK (*Praha*)

HUNT, R.: PLANT GROWTH ANALYSIS. Studies in Biology no. 96. — E. Arnold (Publishers) Ltd., London 1978. 67 pp. £ 1.70.

This booklet gives a brief but still sufficiently exhaustive survey of methods which have represented for more than sixty years the "classical" analytical approach to the quantitative evaluation of growth processes as they are commonly expressed by changes in the dry weight and the dimensions of surface area of plants and their organs. The author introduces single growth characteristics (such as the relative growth rate, crop growth rate, leaf area index, leaf area duration, leaf area ratio, specific leaf area, unit leaf area, etc.) deriving them mathematically and interpreting their biological relevance. He respects the fact that plant growth analysis have continuously progressed owing to the increasing precision and more complex analytical procedures adopted. New stimuli have been brought about especially in the elaboration of indirect methods for estimating the primary values on which the growth analysis is based and in the mathematical techniques employing full-scale computing devices.

The book offers the reader directions how to treat the experimental data which make it possible to determine quantitatively the growth of plants during their ontogeny and in dependence on environmental factors, and to estimate differences between species. Divided into five comprehensive chapters, it deals with the concept of growth in plant growth analysis, with the collection of basic data and harvesting technics, analytical approaches to growth processes in individual plants, plant populations and communities, with the use of computers and finally, the aspects of development of plant growth analysis. Attention is paid to the statistical variability of data, time changes, analyses in segments, curve fitting, the use of second order polynomials and third order regressions. Some possibilities for the extension of the analytical concepts to other fields are also considered. Synopsis of symbols and formulae given in the Appendix facilitates a good orientation.

The book is clearly written and intelligible enough to be an excellent textbook and methodical manual, which is highly recommended not only to students but also to the specialists in various branches of botany.

DANUŠE HODÁŇOVÁ (*Praha*)

WALKER, E. A., CASTEGNARO, M., GRICUTE, L., LYLE, R. E. (ed.): ENVIRONMENTAL ASPECTS OF N-NITROSO COMPOUNDS. Proceedings of a Working Conference held at New England Center for Continuing Education, University of New Hampshire, Durham, USA, 22–24 August 1977. — International Agency for Research on Cancer, Lyon 1978. 556 pp. Sw. Fr. 100.—.

Much effort has been made to retrieve information on the mutagenic and carcinogenic hazards of environmental compounds to which humans are exposed ever since the first indications that chemicals can induce genetic damage in man. The N-nitroso compounds are an important class of mutagens and carcinogens that have been implicated as hazardous substances in the environment.

The Proceedings form the fourth volume of the IARC publications on nitroso compounds (the 1st volume: N-nitroso compounds-analysis and formation was published 1972, the 2nd volume: N-nitroso compounds in the environment in 1974 and the 3rd volume: Environmental N-nitroso compounds-analysis and Formation in 1976).

The 48 papers are divided under 5 headings 1) Analysis, 2) Chemistry and Formation, 3) Occurrence and Precursors, 4) Biology, 5) Safety. The introductory papers deal with the detection and analysis of volatile and non-volatile N-nitroso compounds by high pressure liquid chromatography, by thermal energy analyzers, thin-layer chromatography and by methods of nuclear magnetic resonance. The second part of the book contains papers on chemical properties of N-nitroso compounds, on their reaction with other compounds and their formation in the environment, e.g. by singlet oxygen conversion of drugs containing hydrazone function, nitrosation of amines etc. Very interesting, but at the same time warning are the results of papers included in the section on the occurrence of N-nitroso compounds in foodstuffs (cured meat, fried bacon and out fried fat), in tobacco smoke as well as in smoke-polluted indoor environment, in various cosmetics etc. The papers on the biological effects of N-nitroso compounds focus their interest

on the detection of these compounds in human urine and the possibility of nitrosation in the course of human digestion. All three papers on safety provide evidence that rubber gloves do not give adequate protection from the contamination of the hands with nitrosoamines. This demonstrates the need to develop suitable protective clothing and devices for all working with N-nitroso compounds.

The Proceedings include reports and recommendations of 5 subcommittees (Chemistry, Formation, Analysis, Occurrence, Safety). The publication will be of great value to all interested in the carcinogenic and mutagenic risks of N-nitroso compounds.

T. GICHNER (*Praha*)

INTERNATIONAL VIROLOGY IV. ABSTRACTS OF THE FOURTH INTERNATIONAL CONGRESS FOR VIROLOGY HELD AT HAGUE, THE NETHERLANDS, AUGUST 30 TO SEPTEMBER 6, 1978. — Centre for Agricultural Publishing and Documentation, Wageningen 1978. 664 pp. Dfl. 85.00.

The book includes synopses of invited symposium papers, abstracts of workshop papers and abstracts of contributions to poster sessions. The six symposia concern (1) the taming of the viruses, (2) molecular mechanisms in viral oncogenesis, (3) the ecology of viruses: the struggle of the genes, (4) structure and assembly of viral particles, (5) pathogenesis of viral infections, and (6) organization of viral genomes in relation to their replication and expression. Workshops (papers and posters) are included within 51 chapters compiled from the general, ecological and/or taxonomic points of view. Each page summarizes two papers.

The results dealing with plant viruses are presented in about 146 contributions and many of them are joined into special chapters named *e.g.* Viruses of fungi and mycoplasmas (concerns *e.g.* *Saccharomyces*, *Ustilago*, *Helminthosporium*, *Aspergillus* and algal hosts), Multiplication of plant viruses in protoplasts (18 papers on TMV, TNV, TRV, TYMV, cowpea mosaic, brome mosaic, raspberry ringspot, turnip rosette and cauliflower mosaic, clover yellow mosaic and alfalfa mosaic viruses, and a viroid), Symptomatology and pathogenesis in virus infected plants, Vertebrate and plant viruses in their arthropod vectors, Ecology of vector-borne viruses (plant and vertebrate) and epidemiology of the diseases they cause, Organization of seed and serum banks and their application to virus identification and research, Viroids (11 papers), and Potyviruses (9 papers).

Phytovirological papers placed in other chapters demonstrate new findings concerning viral and host nucleic acids, structure and genomes of viruses, multicomponent viruses, satellite viruses, evolution of viruses and viroids, assembly of viruses, their stability, pathosystems, inhibition of virus synthesis, spread and survival of viruses in plant communities. There are many new methodical approaches implied in abstracts and used *e.g.* in labeling viruses, improving serological methods, storing *etc.*

The minority of contributions to plant virology in this book does not reflect, however, a less importance of plant viruses; on the contrary, many papers on phytoviruses represent the highest level of the general virological research and are indispensable parts of virology. Everyone working at or interested in any branch of virus research must go through this book in order to get a quick information of the recent virological progress.

J. BRČÁK (*Praha*)

HOLLAENDER, A., DE SERRES, F. J. (ed.): CHEMICAL MUTAGENS. PRINCIPLES AND METHODS FOR THEIR DETECTION. Volume 5. — Plenum Press, New York—London 1978. 348 pp. \$ 27.50.

More than 500 new chemical compounds are introduced each year. Of these a crude estimate indicates one or two dozen might be mutagenic. In order to identify them it is necessary to develop simple and effective screening methods. The 5th volume in the Plenum Press series on chemical mutagens presents the following methods for detecting mutagenicity: 1) Analysis of body fluids including alkylation of macromolecules (Legator *et al.*); 2) Use of yeasts as an assay system for industrial mutagens (Loprieno); 3) Heritable translocation test in mice (Generoso *et al.*); 4) Detection of mutational damage in fern populations (Klekowski); 5) Analysis of chromosome aberrations in mammalian germ cells (Brewen, Preston); 6) Mammalian spot test in mice (Fahrig); 7) Chick embryos for detecting environmental mutagens (Bloom); 8) Specific locus mutations in mice (Ehling) and 9) Induction of sperm shape abnormalities in mice and humans (Wyrobek, Bruce). All chapters contain procedures for mutational analysis, testing protocols, strain and races recommended for testing and advantages and disadvantages of the individual methods. The volume is appendix by the U.S. Toxic Substances Control Act of 1976. The aim of this law is "to regulate commerce and protect human health and the environment by requiring testing and necessary use restrictions on certain chemical substances". The

broad interest in the already published volumes is demonstrated by the second printing of the first three volumes. All 5 volumes were sponsored by the Environmental Mutagen Society and edited by prof. Hollaender; beginning with volume 5 prof. de Serres becomes coeditor. Readership: All persons, companies and research institutes concerned with mutagenesis, carcinogenesis and teratogenesis.

T. GICHNER (*Praha*)

BOYER, H. W., NICOSIA, S. (ed.): *GENETIC ENGINEERING*. — Elsevier/North-Holland Biomedical Press, Amsterdam—New York—Oxford, 1978. 300 pp.

The second volume of the Symposium Series of the Giovanni Lorenzini Foundation contains the Proceedings of the International Symposium held in Milan in 1978 and sponsored by this Foundation and the WHO.

The Proceedings concern three major areas in research of the recombinant DNA molecules — Scientific Developments and Practical Applications, The View of Industry, International Cooperation. The first part including 23 contributions, deals thoroughly with experimental results obtained in the leading world laboratories studying the process of genetic engineering at the most important levels (structural and functional characterizations of different vectors and their recombinant derivatives, their replication and expression in hosts of prokaryotic or eukaryotic origin, improvement of *E. coli* transformation method, cloning of specific fragments of eukaryotic genomes), and with individual projects presently carried out and using this approach (structure and molecular organization of individual genes — ovalbumin, immunoglobulin, ribosomal RNA, nitrogen fixation *etc.*), which illustrate where basic research in this area stood in 1978 and what are the potential practical applications to the benefit of man and his life.

The second part, with four comprehensive surveys, covers the present state of the possible uses of the recombined DNA molecules in the production of different biopreparations, thus documenting the unprecedented interest of various industries both in research results themselves and in industry participation in research activities (production of enzymes important for the industrial section, polypeptide hormones, antibiotics *etc.*).

International cooperation discussed in the third part is evaluated from the point of view of the potential hazards and benefits, uses and applications of the new technology, necessity and adequacy of establishing a central control and restriction of the recombinant experiments, level and strictness of the working rules on the one hand and the forms of information, training and education of the workers concerned at all stages on the other. This part also summarizes experience of the international organizations (WHO, EMBO, ICSU) with establishing a safe international cooperation in the development of genetic engineering.

From all informative and stimulating contributions emerges the current trend toward considerable broadening of the range of the experimental bases and practical applications of recombination of the molecules without unnecessarily strict rules slowing down research work, while keeping up the control of the potential hazards. The Proceedings should find a highly merited and prominent place on the laboratory benches as well as in the libraries of the organizations concerned with training and education in biochemistry, molecular biology and genetics.

S. ZADRAŽIL (*Praha*)

O'CONNOR, M.: *EDITING SCIENTIFIC BOOKS AND JOURNALS*. ELSE-Ciba Foundation Guide for Editors. — Pitman Medical Publ. Co., Kent 1978. 218 pp.

The still increasing amount of information published in scientific periodicals and books calls for a professionally perfect editorial work. The purpose of the reviewed book is to tell the beginner as much as possible about the many facets of editing scientific works, to remind experienced editors of the wider aspects of editing, and to explore the responsibilities of editors toward authors, readers and science itself. The book deals mainly with all stages of editorial work on papers in journals, on scientific books and conference proceedings, from refereeing procedures to printing and reading proofs. The final chapter surveys innovations in scientific publishing, including micrographics, miniprint, electronic journal *etc.*, and discusses the future of education in editorial work. Very useful are numerous examples from editorial practice, a comprehensive subject index and appendixes dealing with administration duties of editors, *e.g.* contracts, guidelines for authors and referees, review forms, problems of copyright, abbreviations *etc.*, and other recommendations of specialists in editing.

The book will surely be useful to editors in all fields of science, but also authors of scientific papers should study this book with care in order to save the editors and mainly themselves unnecessary work in the revision of manuscripts.

J. ČATSKÝ (*Praha*)

RICHTER, G.: *PLANT METABOLISM. PHYSIOLOGY AND BIOCHEMISTRY OF PRIMARY METABOLISM.* — Georg Thieme Publishers, Stuttgart 1978. 475 pp. 101 ill. DM 26.80.

The popular Richter's book on physiology and biochemistry of plant metabolism has finally appeared in English in the series Thieme Flexibooks. The book has been published in paperback in three German editions and in Spanish (1972) and Polish (1975) editions, which is sufficient evidence of its usefulness for a wide circle of readers. As the book has already been reviewed in *Biologia Plantarum* (14 : 175, 1972) let us only recall that almost a half of the text deals with photosynthesis and related processes, but the other aspects of plant metabolism (Biological oxidation and energy production, Water and ions in metabolism, Metabolism of the cellular components, etc.) are also discussed in detail. For the English edition, the author thoroughly revised each chapter and used new illustrations wherever necessary. The English paperback edition will surely be so successful as the editions in other languages.

J. ČATSKÝ (*Praha*)

ETHERINGTON, J. R.: *PLANT PHYSIOLOGICAL ECOLOGY.* Studies in Biology No. 98. — Edward Arnold, London 1978. 68 pp. Paperback £ 1.80, hard cover £ 3.70.

Another concise textbook in plant science has been added to the welcome series edited by the Institute of Biology, London. The author was rather successful in keeping himself at the edge between plant physiology and ecology, since although the physiological approach is fundamental in plant ecology, it is still difficult enough to reach an appropriate proportion in information taken from so many branches of sciences which are to be considered in environmental problems.

The selection of topics for different chapters is in general up to date, paying attention e.g. to the physiological background of ecosystem approach, to competition mechanisms, and explaining the niche conception. Nevertheless, the textbook deals in some cases more with the problem of ecology itself (e.g. the chapter on atmosphere and soil) than with the physiological basis of the interaction between plants and environment. Still, the booklet yields an authoritative insight into the present knowledge on a very "sensitive" borderline between environmental science and plant physiology, which undoubtedly forms the utmost background of ecology. The endeavour of the authors and the editor is to be highly appreciated.

B. SLAVÍK (*Praha*)

DE SANTO, R. S.: *CONCEPTS OF APPLIED ECOLOGY.* Heidelberg Science Library. — Springer-Verlag, New York—Heidelberg—Berlin. 1978. 310 pp.

This is a very comprehensive textbook, simply, authoritatively and clearly defining the field of ecology, yielding (1) the principles of terrestrial, freshwater and marine animal and plant ecology, (2) bringing a stimulating review of methods used in applied ecological analyses, and (3) a wise chapter on the problems of different kinds of ecological stress and (4) discussing basic ideas of selected ecological cycles and pathways of matter. In addition, an extensive appendix with conversion factors of units encountered in ecological research (26 pp.) and a really authoritative glossary of terms frequently used in ecology (89 pp.) are included. I like the book very much. It is clear, excellently written, especially from the didactic point of view. The applied approach seems to be very positive even (or especially) for those interested in more theoretical problems of ecology. Being intentionally restricted to the selected problems, facts, ideas and research tools, de Santo's textbook fulfills excellently its task.

J.ŘINA SLAVÍKOVÁ (*Praha*)