

GUERN, J., PÉAUD-LINOËL, C. (ed.): *METABOLISM AND MOLECULAR ACTIVITIES OF CYTOKININS*. — Springer-Verlag, Berlin—Heidelberg—New York 1981. 352 pp., 170 figs; cloth DM 98,— ; approx. US \$ 44.60.

Cytokinins represent a unique group among plant hormones. They are the only hormones which are the integral constituents of the proteosynthetic apparatus (some tRNA species contain cytokinin moieties) and exhibit regulation effects in some animal systems. These peculiarities attracted attention of both plant physiologists and molecular biologists. This two-side approach to the research of cytokinins has resulted in fast progress in this field, which is also evident from the present book. It contains lectures which were presented on the International Colloquium organized by C.N.R.S. and held at Gif-sur-Yvette, France, in September 1980. The subject is divided into following sections: (1) Cytokinin Biosynthesis, (2) Cytokinin Metabolism and Physiological Responses in Plant or Bacterial Systems, (3) Cytokinin Hormone Receptors: Methods and Results, (4) Cytokinin in Protein Synthesis and RNA Metabolism, (5) Cytokinins and Chloroplast Development, and (6) Animal Systems Responding to Cytokinin or Cytokinin Analogues.

The first section contains papers on cytokinin biosynthesis in plants and pathogenic bacteria inducing formation of tumors. In addition to the synthesis of cytokinin from adenine and mevalonate, the significance of cytokinin release during the tRNA degradation is also discussed. Papers in the second section present interesting data on regulation of cytokinin activity in plant cell by formation of their conjugates, and methodical possibilities of the use of cytokinin antagonists in studies of biological functions of these hormones. Papers dealing with cytokinin receptors contain new information about compounds suitable for photoaffinity labeling, relative low affinity of *trans*-zeatin to wheat germ receptors and the possible "one way" action of some receptor proteins. As expected, in spite of the detailed studies of regulatory effects of cytokinins on RNA and protein synthesis, which is also presented here, their mode of action is still far from to be understood. Similarly, the mechanism of their significant effect on development of plastids in plant cell is not known in detail. Data presented in the book demonstrate their effect not only on the accumulation of proteins in plastids in general but also on the formation of specific proteins which are localized in these organelles. According to some information, plastids are also involved in regulation of hormone action in plant cells. The so far known effects of cytokinins on some animal systems are of inhibitory character. An interesting *in vitro* cultured *Drosophila melanogaster* cell line is described, which requires a cytokinin analog for sustaining cell division.

As is usual in the Proceedings of the Life Science series the book is carefully edited. It contains clear and descriptive illustrations and a detailed subject index. It can be recommended as a source of ideas and experimental data to scientists and advanced students of plant physiology, biochemistry and molecular biology.

M. KAMÍNEK (*Praha*)

HAHN, F. E., KERSTEN, H., KERSTEN, W., SZYBALSKI, W. (ed.): *PROGRESS IN MOLECULAR AND SUBCELLULAR BIOLOGY*, VOL. 7. — Springer Verlag, Berlin—Heidelberg—New York 1980. 256 pp., 31 figs., cloth DM 86,— ; approx. US \$ 50.80.

Volume 7 of the well established series (managing editor F. E. Hahn) presents a collection of five up-to-date reviews written by internationally recognized experts. The opening review has the title: "The photochemistry of 5-bromouracil and 5-iodouracil in DNA" (F. Hutchinson, W. Köhnlein). The most interesting of the synthetic bases which may be incorporated in DNA are these thymine analogs. The article summarizes the biological effects of UV light on cells, viruses and DNA containing these bases, presents structural and spectroscopic information, data on halouracils photoproducts, effects on development, mutagenesis and on the clinical use. The second review: "Non-intercalative binding to DNA" (A. K. Krey) discusses biologically active compounds, which for structural reasons cannot intercalate in DNA but bind only to its periphery. The article covers the following group of compounds: poly-L-lysine, distamycin A, netropsin, methyl green, berenil, Hoechst 33258 and antramycin. The subsequent review by H. Faulstich: "Amatoxins" presents data on biochemistry of one of the most potent plant poison, contained

preferentially in the green death cup *Amanita phalloides* but also in *A. virosa* and *A. verna* and, in considerably smaller amounts, in *Galerina marginata*. The article is focused on the occurrence, structure, toxicity and inhibition of RNA polymerases by amatoxins as well as on their biological applications in virus, hormonal, developmental and behavioral studies. The fourth article: "Specialized genetic recombination systems in bacteria: their involvement in gene expression and evolution" is by D. J. Kopeccko. Though the review is aimed at describing the recombination mediated by viruses and transposable elements in bacteria, data are also presented on the significance of transposable elements in genetic reorganization and regulation in higher organisms. The article contains a tabular list of specialized recombination events involving lambda and Mu phages and insertion sequence elements in bacteria. The concluding article "Viroids" by T. O. Diener provides a comprehensive study of nucleic acid species of relatively low molecular weight (about 10^5 daltons) that are present in certain plants, afflicted with specific maladies. So far, viroids are definitely known only in higher plants but it has been suggested that the subacute spongiform encephalopathies may be caused by nucleic acid molecules similar to those of the plant viroides.

This book can be recommended for all biological and chemical libraries.

T. GICHNER (*Praha*)

GUT, I., CIKRT, M., PLAA, G. L. (ed.): *INDUSTRIAL AND ENVIRONMENTAL XENOBIOTICS*. — Springer-Verlag, Berlin—Heidelberg—New York 1981. 409 pp., 168 figs., cloth DM 98,—; approx. US \$ 45.70.

Today, some 45 000 commercial chemicals are being marketed. Most of these are produced and treated on a world scale. It is a simple fact that we know very little of a wide spectrum of possible effects of most of these chemicals on the environment and upon man. Most of the industrial and environmental chemicals are foreign to the organisms. Some of these chemicals are persistent or they are metabolized to various products. The latter substances are called xenobiotic. This book contains selected papers which have been presented at the International Conference on Industrial and Environmental Xenobiotics, held in Prague, 27–30 May, 1980. The first part of the Proceedings deals with the toxicology and biochemistry of metals. Papers are focused on the fate of mercury in mice, rats, monkeys and chicks, biliary excretion of various metals in rats, on the factors modifying the absorption of metals and on the effects of metals in biotransformation enzyme activities. The other part of the Proceedings contains contributions on organic xenobiotics. It is well known that various forms of cytochrome P-450 are the key enzymes for the biotransformation of xenobiotics in the mammalian organisms. Depending on the chemical nature of the xenobiotic, either a detoxification or an activation is effected by this enzyme. The contributed papers discuss the molecular mechanism of cytochrome P-450-mediated biotransformation, the metabolic activation of carbon tetrachloride, halogenated ethylenes, polycyclic hydrocarbons, acrylonitrile, ortho-xylene *etc.*, the induction of cytochrome P-450 in rat liver by aromatic organic solvents and the effects of ethanol and other compounds on the metabolic activation of vinyl chloride. Several papers deal with the mutagenic effects of xenobiotics using the bacterial Ames' test and the cytogenetic analysis of peripheral lymphocytes, and with the toxicology of various pesticides, including paraquat, dichlorvos, lindane *etc.* The book is concluded by a review: "Regulatory perspectives on chemical compounds used in animal drugs or feed additives", written by N. E. Weber. The data presented in the Proceedings demonstrate the usefulness of a combined biochemical, pharmacokinetic and genotoxic approach to the study of important xenobiotics.

Readership: all those interested in toxic, mutagenic and carcinogenic effects of environmental and industrial chemicals.

J. VELEMÍNSKÝ (*Praha*)

SMITH, W. H.: AIR POLLUTION AND FORESTS. Interactions between Air Contaminants and Forest Ecosystems. (Springer Series on Environmental Management.) — Springer-Verlag, New York — Heidelberg — Berlin 1981. 373 pp., 60 figs., 104 tabl., cloth DM 64,—; approx. US \$ 30.50.

Forests are important not only for supplying commercial products, but also because of their aesthetic and amenity functions, regulation and maintenance of associated ecosystems, and general climatic and terrestrial stability. However, they are endangered by air pollution.

This book provides a compendium of the most significant relationships between forests (considered on individual-tree and total ecosystem levels) and widespread air contaminants including carbon, sulfur and nitrogen oxides, ozone, peroxyacetylnitrates, fluoride, and several trace metals (lead, zinc, cadmium, copper, nickel, manganese, chromium), and localized air contaminants including acid rains, ammonia, chlorine, hydrocarbons and hydrogen sulfide. The interactions between air pollution and forest systems are described as falling into one of three Classes, according to which the chapters of the book are arranged into three Sections. Class I interactions comprise cases when under conditions of low doses of air pollution forests are not damaged and they function as a main sink for air contaminants. Their capability to improve air quality (particularly significant in urban and suburban areas) is dependent on the nature of pollutant and its concentration, meteorological parameters, and dimensions and quality of vegetation and soil surface. In this Section also forests as source of air contaminants (CO₂, hydrocarbons, pollen, etc.) are taken into account. Section II deals with Class II interactions: Intermediate doses of air pollutants may affect forest ecosystems by decreasing photosynthesis, increasing respiration, reducing essential element availability, influencing reproductive processes and consequently decreasing biomass production. As a result of species variation in tolerance to air pollution the species composition of forests is altered. Decreased resistance of trees to diseases or insect outbreaks contributes to the adverse effect of air contaminants. Excessive doses of air pollutants (in a zone of a few kilometers immediately surrounding the plant and to a distance of several kilometers in the downwind direction) may cause severe damage of trees. This response is designated as Class III interactions and the ability of air pollution to destroy forests is documented in Section III.

A good understanding of these relationships is essential for the protection of our forests and it is hoped that this book will help to solve this serious environmental problem.

JANA POSPÍŠILOVÁ (*Praha*)

LURIA, S. E., GOULD, S. J., SINGER, S.: A VIEW OF LIFE. — The Benjamin/Cummings Publishing Company, Inc. Menlo Park, California 1981. 806 pp.

The microbiologist S. E. Luria (Nobel Prize in physiology for pioneering work in viral and bacterial genetics), the paleontologist S. J. Gould and the physician S. Singer have joined forces to write this textbook on modern biology. Modern textbooks of biology have tended to comprise more and more material and illustrations so that the readers have lost the main facts and ideas to form their own "view of life". According to the authors, facts are only used to illustrate the thread of unity through all diverse subjects of biology from molecules to ecosystems, and to stress the central role of the genetic program at all levels of biological organization. In spite of this, the authors kept in mind the student who "knew all about nucleic acid but did not know what an acid was". The introductory Part A: Basic life processes, includes chapters on organisms and cells, chemistry of life, metabolism and enzymes and on cell structure and function. Part B: Genetics, deals with the rules of heredity, genes in action, gene structure and regulation, and with human genetics. Part C: Developmental Biology, contains data on embryology of animals and plants and on morphogenesis and differentiation, and Part D: Functioning of organisms, data on nutrition and gas exchange, blood and immunity, hormones, nervous system, biological movement etc. The concluding Part E: Evolution biology, presents a classification of living organisms in addition to the data on micro- and macroevolution. Each chapter includes a code, summary, study questions, problems and further reading.

As well as being a useful guide to undergraduate biologists, this book will be welcomed by teachers who need a lucid introduction to up-to-date findings in modern biology. Intended for teachers is also a special: Instructor's guide to A View of Life written by M. H. Cantor and published by the same Publishing House (1981). In each chapter of the textbook, the answers to each of the study questions and problems, suggested films and two 15-question multiple choice tests are given.

T. GICHNER (*Praha*)

CHALEFF, R. S.: GENETICS OF HIGHER PLANTS. Application of Cell Culture. — NEWTH, D. R., TORREY, J. G. (ed.): Developmental and Cell Biology Series. Cambridge University Press, Cambridge—London—New York—New Rochelle—Melbourne—Sydney 1981. 184 pp., hard cover £ 16.0.

Representing the first comprehensive account of this topic, the book deals with the application of cell and tissue culture techniques in the field of plant genetic research. It summarizes and critically evaluates the achievements to date, examines the potentiality of cell culture and the problems still to be overcome, and provides new ideas and prospects for further work.

After an introductory outline of general difficulties of cell cultures related to cell density and aggregation and to cell reproduction and plant regeneration, the attention is drawn to the problem of distinction between epigenic (gene expression-based) and genetic (mutational) modifications of phenotypic expression in cultured cells, and to problems arising from differences in gene expression between undifferentiated cells and the adult plant. The frequently occurring karyotypic and physiological instabilities of cells in culture are discussed from the aspect of their origin and consequences for genetic applications. The high variability of cultured cells led to the isolation of many variant cell lines but only a small number of them have been shown to be mutants. The selection of variants and mutants so far isolated was based on different criteria such as pigments and secondary metabolites, habituation to hormones, resistance to antibiotics, purine and pyrimidine metabolism, disease resistance, nitrate assimilation, sulfate assimilation, amino acid metabolism, carbon metabolism, increased tolerance for herbicides and fungicides and tolerance of environmental stress. The research concerned with this selection is described in detail.

The recently developed techniques of protoplasts isolation introduced new experimental opportunities for accomplishing genetic modifications. The discussion of achievements and problems encountered in this field is focused on somatic hybridization and organelle uptake. Isolated cell and protoplast cultures further greatly stimulated the efforts to introduce foreign genetic information in the form of purified DNA. A critical survey of present state of the problem shows that the exploration of this approach is only just beginning.

The book is the 9th volume of the Developmental and Cell Biology Series appearing under the editorship of D. R. Newth and J. G. Torrey. This unique text and reference source will prove an invaluable aid especially to research workers concerned with plant cell culture, in general, and with its application in somatic cell genetics, in particular.

J. TUPÝ (*Praha*)

WEBERLING, F.: MORPHOLOGIE DER BLÜTEN UND DER BLÜTENSTÄNDE. — Verlag Eugen Ulmer, Stuttgart 1981, 391 pp., DM 108,—.

This volume represents a long awaited central source of information on morphology and anatomy of flowers and of flower organs. It brings together both historical and modern work on the topic in one clear authoritative and comprehensive survey enabling a rapid orientation in various areas of floral morphology. More than half of the book is devoted to comparative-morphological considerations and a detailed description of flowers and flower organs in their multiple forms, metamorphoses and functions, also from the aspect of their genesis and anatomical structure. The second section deals with comparative morphology of inflorescences, with special emphasis on the works of W. Troll and some of his disciples on inflorescence typology, which is summarized including hitherto unpublished results. The relations of flower morphology to flower biology and ecology are outlined in the third section, which briefly describes various systems for self- and cross-fertilization and mutual relations between flowers and pollinators, together with fruit systematics and the aspects of dissemination biology.

The book is richly illustrated (193 drawings and photographs) and contains a comprehensive reference list. As a basic botanical handbook it will undoubtedly be appreciated by university teachers and students and by specialists within the fields of botany.

J. TUPÝ (*Praha*)

ROBINSON, T.: THE BIOCHEMISTRY OF ALKALOIDS. Second Edition. — Springer-Verlag, Berlin—Heidelberg—New York 1981. 225 pp., cloth DM 88,— ; approx. US \$ 41.00.

The chemical nature of alkaloids has only been recognized in the last decades even though these compounds have been used by mankind for centuries. Till now the alkaloids have been studied mainly from the point of view of organic chemistry and pharmacology; their biochemistry

is much less developed. It is true that there is not exact borderline between organic chemistry and biochemistry, but arbitrarily one may say that the biochemistry of a group of compounds means studying their pathways of biosynthesis, function or activity, and pathways of degradation. For the alkaloids, much has been learned about routes of biosynthesis, but information on other aspects is very scanty. It is these problems of alkaloid biochemistry that the reviewed book is devoted to. Since the first edition appeared in 1968, a lot of new information has emerged in this field, especially as regards the various details of alkaloid biosynthesis. T. Robinson collected fresh data and supplemented the text with them. After the introductory chapter, mainly dealing with alkaloid classification and their biological importance, the general theories of alkaloid biosynthesis are summarized. Chapters 3 through 13 are devoted to the biosyntheses of different groups of alkaloids: simple amino acid derivatives and protoalkaloids; pyrrolidine, piperidine, and pyridine alkaloids; tropane alkaloids; lupine alkaloids; isoquinoline alkaloids; aporphine and morphinan alkaloids; amaryllidaceae alkaloids and colchicine; indole alkaloids; quinolines and other alkaloids related to anthranilic acid; some miscellaneous alkaloids; terpenoid and steroid alkaloids. In these chapters alkaloid biosynthesis is explained. Metabolism of exogenous alkaloids is the name of the next chapter. It deals with the biological degradation of alkaloids by microorganisms, animals and higher plants. The function and biochemical effects of alkaloids are discussed in the last chapter. The reviewed book is an excellent survey of the contemporary knowledge of alkaloid biochemistry. It will be appreciated very much not only by biochemists but also by organic chemists and pharmacologists working in the field of alkaloids.

J. ŠATAVA (*Praha*)

BERNIER, G., KINET, J.-M., SACHS, R. M.: *THE PHYSIOLOGY OF FLOWERING*. Vols. 1 and 2. — CRC Press, Boca Raton, Florida 1981. Vol. 1—149 pp., US \$ 49.95, foreign \$ 57.95; Vol. 2 — 231 pp., US \$ 74.95, foreign \$ 84.95.

The two-volume monograph covering different aspects of the physiology of flowering has appeared after a twelve-year gap. In the mean-time, specialized reviews on particular topics were published pointing to the importance as well as to the high complexity of the problems. Now an attempt has been made to gather all this information and to provide a critical evaluation of the classical concepts and of the recent findings and to write a balanced book containing an up-to-date presentation of the whole subject of flowering. In the first volume the classical aspects of floral induction and specificity of the flowering process may be found. This volume includes discussions on the role of nutrition and temperature in the control of flowering. Traditionally, the problems of photoperiodic induction, light perception and time measurement are reviewed extensively. The problems of juvenility and sensitivity to floral induction are dealt with. There is a critical discussion on the methods used for determination of the floral state. The second volume is devoted to the initiation of flower buds and the preceding events at the shoot apex. It is the first time that so much attention is paid to the control and inception of floral morphogenesis. The volume opens with a chapter covering the correlative influences coming from different plant organs and tissues and controlling the growth pattern at the apex. Phenomena related to floral transition are described on the basis of the three-dimensional "macroscopic" observations of the shoot apices, microscopic observations of changing apical structure and ultrastructural studies. Cell proliferation as well as the histochemical changes which may be associated with energy metabolism and gene expression are discussed in detail. The cellular and molecular events are correlated with the growth changes representing the onset of floral morphogenesis. The role of exogenous and endogenous growth hormones in flowering is discussed separately. Special attention is given to the role of energetics, assimilate supply and diversion. The central theme of the second volume is the nature of floral evocation (the events which commit the meristem to form flower primordia). An attempt was made to select those phenomena which generally occur at floral transition and may thus be considered to be essential for flowering. The specificity of floral evocation is thought to reside primarily in the way the many changes involved are timed and integrated. A model of multisequential evocation is presented.

The two-volume publication is of special interest for its unconventional handling of the matter, for highly elaborated personal suggestions and the authors' personal experience found particularly in the second volume. The books may be of great importance for crop physiologists, since many problems of crop production are associated with floral morphogenesis. It may serve as an up-to-date source of information for the university teachers and post-graduate students and it presents a reference source for workers engaged in plant development and related fields.

FRIDETA SEIDLOVÁ (*Praha*)