

HEYWOOD, V. H., HARBORNE, J. B., TURNER, B. L. (ed.): **The Biology and Chemistry of the Compositae, Vols. I and II.** — Acad. Press, London - New York - San Francisco, 1977. Pp. 1189, £ 55; \$ 107.5.

This monograph represents a biological and chemical review of one of the largest families of flowering plants. It is based on a series of papers presented at the Symposium "The Biology and Chemistry of the *Compositae*", held at the University of Reading, England, in July 1975. A total of 42 contributors participate by their communications adjusted for print in the form of 42 chapters of an extensive monograph, divided into two parts for technical reasons only. The series of the first 14 chapters is of general character and deals with a number of aspects which should contribute to a better understanding of the relationship in this "natural" family. The introductory chapter points out the problems of classification and represents a general introduction to the problem of the *Compositae*. Its specificities are then studied separately in subsequent chapters. The chapter on paleobotanical findings and on the geographical distribution of the *Compositae* is remarkable because it indicates the ancient origin of this still very "modern" family. The next five chapters are devoted to the capitulum, typical of the *Compositae*. They discuss the differentiation of this capitulum by evolution, their development with respect to pollination, the general developmental and comparative anatomy, and further on, the form of corolla. Here also belongs the chapter on the microcharacters of epidermises of the ligules. A further chapter on pollen morphology is very extensive and richly documented, discussing the relationships not only within the family, but also in morphologically related families. Then there is a chapter on chromosomal cytology and evolution in the family. The next four of the general chapters are devoted fully to phytochemical data of the *Compositae*. The first one represents a general review of the nature of the substances isolated from the plants of this family, the other three are specialized reviews of groups of compounds that today represent the most important secondary metabolites of the *Compositae*, and which are utilizable for classification purposes and the study of developmental relationships. Here belong sesquiterpene lactones, flavonoid type compounds, and also polyacetylene compounds. This series of chapters is concluded by an article on pharmaceutical and economic uses of the *Compositae*.

The subsequent 26 chapters are devoted to systematic separate surveys based on the present most often acknowledged tribes of this family. In principle these tribes do not differ considerably from those established in the classification by Bentham more than a century ago (1873). The following are discussed in turn: *Eupatorieae*, *Vernonieae*, *Astereae*, *Inuleae*, *Heliantheae*, *Helenieae*, *Tageteae*, *Senecioneae*, *Liabeae*, *Anthemideae*, *Arctoteae*, *Calenduleae*, *Cynareae*, *Mutisieae*, and *Lactuceae*. In the case of *Helenieae* the facts on why it seems useful to dismember this unnatural or polyphyletic assemblage are presented. For each tribe one or two authors were invited to prepare a description of the tribe, a list of valid or accepted genera, and the approximate number of the species they contain. A discussion of the data on floral biology, karyology, cytogenetics, palynology, embryology, anatomy and morphology is included. In corresponding chemical chapters a review of phytochemical characters was prepared by other specialists. These cover such topics as the chemical pattern of the tribe, low molecular weight constituents such as terpenoids, flavonoids, and alkaloids, macromolecular constituents, the relevance of chemistry for the systematics of the tribe, and economic and pharmaceutical uses. Only the tribes *Liabeae* and *Mutisieae* have no chapter, having been not yet studied chemically integrately enough. At the end of the second volume an appendix containing an alphabetical list of the genera of the *Compositae* (with an indication of the tribe to which they are supposed to belong) is added, together with indexes of subjects, organisms, and chemical compounds.

This monograph registers an increase in the number of species in the *Compositae*. Today (i.e. 1977) this family is represented by approximately 1302 genera and nearly 22 000 species. There still exists considerable controversy as to the phyletic interrelationships between the tribes and different phylogenetic schemes given by different authors. As a result, the present *Compositae* cannot be regarded as descendent from or closely related to any other modern family. A series of relocations of different taxa within tribes is considered. The major change concerns the 60 genera of the *Helenieae* tribe (*sensu* Bentham). They are relegated to the tribes *Vernonieae*, *Eupatorieae*, *Astereae*, *Heliantheae*, *Tageteae*, and *Senecioneae* (the bulk of genera). *Coreopsidaceae* are judged to deserve a tribal status [Turner and Powel, based upon *Coreopsidineae* Lessing, *Linnaea* 5, 153 (1830)]. The author of this review is quite satisfied that the genus *Arnica* is now classified into *Heliantheae* (and not *Senecioneae*); this also corresponds with the chemical data. Similarly, it is interesting that among the chemical characters used today for classification purposes in this very complex family, the presence of sesquiterpene lactones is mostly taken as the most important one.

Summarizing it may be said that this monograph brings a vast and unrivalled wealth of information and ideas on the *Compositae* family, and it is likely to serve as a major reference

work for several decades. Like any work of this type — *i.e.* composed of edited and previously reviewed contributions by a wide group of authors — it also has some disadvantages. The fact that the book represents a discussion and interchange of individual opinions is not one of them. It is, however, unavoidable that a number of facts and data are repeated more times than necessary (*e.g.* the mentioned sesquiterpenic lactones are repeatedly mentioned in a number of chapters). Like the majority of books published by the Academic Press, this one is printed very clearly, even though no uniformity could be obtained owing to the large number of contributors. Several systems of presentation of references are used, the formulae presented are of widely different qualities, *etc.*

On the whole, the book is a unique and a very useful work which the editors expect to be a very much sought-after source of knowledge in the field. It can be used not only by scientists studying the problems of this very complex family directly, but also by those who are willing to use not only biological but chemical data as well for the purposes of systematics, phylogenesis, and the general evolution of living organisms.

V. HEROUT (*Praha*)

LIKENS, G. E., BORMANN, F. H., PIERCE, R. S., EATON, J. S., JOHNSON, N. M.:

**Biogeochemistry of a Forested Ecosystem.** — Springer-Verlag, New York — Heidelberg — Berlin 1977. Pp. 146.

This is the first volume reporting on the results of the famous Hubbard Brook Ecosystem Study started about 15 years ago. It presents details of the biogeochemistry of an undisturbed (but nevertheless second-growth) northern hardwood deciduous forest. The Hubbard Brook Project has been a pioneer work in many respects, beginning with methodological problems such as sampling and ending with the procedure of evaluating the data. Hubbard Brook Experimental Forest, New Hampshire, covers more than three thousand hectares of the Hubbard Brook Valley with nine experimental watersheds (12 to 43 ha), some of them untreated, serving as reference, some cleared with products removed or not. Hydrological data (precipitation, streamflow, deep seepage and evapotranspiration), chemistry of precipitation and stream-water chemistry, input-output budgets (annual, seasonal and monthly variations), chemical weathering (sources of  $H^+$ , weathering rates and modes), and cycles of mineral nutrients (Ca, Mg, K, N, S, P, Cl) in terms of stocks and annual fluxes are presented in well balanced chapters.

It is a wise report. It does not contain overwhelming thousands of data but critically weighed figures based on the many thousands of original analyses and determinations during almost 15 years of hard work. The models are as complete as possible, the results are only as complicated as unconditionally necessary. A successful attempt has been made to compare the biogeochemistry data from the Hubbard Brook Experimental Forest with those from other terrestrial ecosystems of the world. Discussion and Conclusions contain twenty six concisely formulated points, including experiences in methodological respect (such as selection of experimental ecosystems and necessity of long-term-records), very conclusive data on meteorological inputs (especially nitrogen and sulphur) in spite of the ecosystem being located more than 100 km from major pollution sources, on the influence of evapotranspiration, on water chemistry, on high microbial nitrogen fixation including strong fixation in dead wood, on solution and particulate matter losses and on differential weathering. The last point deals with the main questions capable of being solved by this small watershed technique, mainly the change with time, the influence of disturbances, and the relationship between weathering and biological fixation.

The relatively thin book contains relevant results of an exemplary study of an ecosystem, critically treated and wisely discussed, which undoubtedly will soon become classical.

B. SLAVÍK (*Praha*)

BOSTOCK, C., SUMMER, A. T.: **The Eukaryotic Chromosome.** — North-Holland Publishing Company, Amsterdam - New York - Oxford, 1978. 525 pp., US \$ 84.95; D fl 195.00.

Although DNA is present also in chloroplasts, mitochondria *etc.* the main bearer of the hereditary material is the chromosome. This book is an attempt to present an up-to-date account of our knowledge of the organisation of chromosomes in eukaryotic organisms with the aim to show the central role that chromosomes play in growth, development, heredity and evolution. The early chapters deal with the fundamentals of the constituents of chromosomes: 1) DNA (incl. sequence analysis, satellite DNA, repeated, unique, inverted sequences *etc.*); 2) RNA (sequence, reassociation techniques, RNA-DNA hybridisation, different RNA species); 3) proteins (histones, non-histones, DNA-binding proteins). These chapters are followed by a section on the molecular interaction of chromosomal constituents leading to the formation of chromatin.

The chapter on the interphase nucleus provides data on heterochromatin and euchromatin, nucleolus, on replication of DNA and on the nuclear membrane. The next four sections concern various types of chromosomes: polytene, mitotic, meiotic and lampbrush. These chapters clearly demonstrate that we know the structure and chemical composition of chromosomes in broad outlines, but nothing about the facts which determine their shape and size. The new banding techniques which are described in chapter 11 can be of great importance for practical cytogenetics (identification of chromosomes and their individual parts). The concluding sections on chromosome damage and repair and on the models of chromosome structure give ample evidence that the continuity of chromosomes resides in its DNA and that the aberrations of chromosomes are connected with DNA lesions. An appendix provides pictures of human karyotype, unbanded and Q, G, R and C-banded.

This book is probably the first comprehensive contemporary work on eukaryotic chromosomes. It will be of value to all interested in clinical studies of possible effects of chromosome abnormalities, in the effects of mutagens and carcinogens and in fundamental studies of the chromosome structure and function.

T. GICHNER (*Praha*)

LITTLE, M., PAWELETZ, N., PETZELT, C., PONSTINGL, H., SCHROETER, D., ZIMMERMANN, H.-P. (ed.): **Mitosis, Facts and Questions**. Proceedings of a Workshop held at the Deutsches Krebsforschungszentrum, Heidelberg, Germany, April 25–29, 1977. — Springer-Verlag, Berlin - Heidelberg - New York 1977. Pp. 253, 55 figures, DM 43.

The aim of the organizers of this Workshop was to bring together investigators in the field of mitosis and “try to separate the hard facts of mitosis, which are accepted by most people from the soft ones which are still open for discussion”. However, only few “hard” facts have been identified as indisputable. The Workshop was divided into nine sessions: 1) The timing of cell cycle events, 2) Surface signals and cellular regulation, 3) Ultrastructure of mitotic cells, 4) Microtubule-organizing centers of the mitotic spindle, 5) Nontubulin molecules in the spindle, 6) Mitosis in differentiation, morphogenesis and cancer, 7) Chromosome-movement, 8) Mitosis *in vitro*, 9) Future research on mitosis. Each session was opened up by an introductory lecture, well supported by recent references. All other papers were presented by posters. The most important part of the Proceedings are the extensive panel discussions, printed in full, which followed the main lecture. The discussion dealt with methods, facts and questions as well. The paper of J. R. McIntosh presents a glossary of terms concerning the mitotic apparatus. The concluding lecture by prof. D. Mazia summarizes our present knowledge on mitosis and cell cycle and propounds questions and problems for future investigations. The Proceedings are accompanied by 48 abstracts of papers presented at the meeting by posters.

The Proceedings are aimed at post-graduates and established scientists who wish to discover more about mitosis or are contemplating research in this field.

T. GICHNER (*Praha*)

LANDSBERG, J. J., CUTTING, C. V. (ed.): **Environmental Effects on Crop Physiology**. — Academic Press, London—New York—San Francisco 1977. XVII + 388 pp. £ 14.50, \$ 28.35.

The book contains nineteen papers presented at the Fifth Long Ashton Symposium, held from 13th to 16th April 1975 at the Long Ashton Research Station of the University of Bristol. Among the 158 participants there were representatives of eighteen countries of four continents, e.g. from England, Australia, Canada, the USA, India, France, Denmark, Sweden, Italy, The Netherlands, Nigeria, Kenya etc. The aim of the symposium was to enable interdisciplinary exchanges of experience between scientists, focussed on the influence of environmental factors on the growth of crops. In Section I of the book called “Weather and Crop Productivity” contributions concerning the quantifying weather — crop relations (statistical studies, experimental approaches, the Ecotron), about micrometeorological studies of crops, grasslands and forests, and about the relationship weather — growth, dry matter production, yield are presented. Sections II and III are devoted to physiological processes of plants, e.g. the influence of light and carbon dioxide on net assimilation of C<sub>3</sub> and C<sub>4</sub> plants, to field studies of photosynthesis by means of <sup>14</sup>CO<sub>2</sub>, to studies of stomatal conductance and plant-water relations, of respiration, substrate utilization during seed germination, functioning of plant roots, carbohydrate distribution within the plant, etc. Effects of environmental factors on critical stages in plant development are treated in Section IV; Section V contains two papers on modelling in plant physiological research, treated as a tool or with the aim to predict crop yields. The book opens with the inaugural lecture of prof. J. P. Hudson (Plants and the Weather) and is closed by the concluding remarks of prof.

C. T. de Wit. The book is equipped with author and subject indices, a list of participants, a short preface of the editors and the contents. The individual papers are well illustrated and presented in the usual form, ending with a list of references. At the end of every Section the symposial discussion to each paper is shortly summarized.

In this volume much information is collected concerning quantification and interaction of the effects of different environmental factors at various stages of physiological development of crop plants, as seen by the specialists in various fields. The book should be recommended to all those interested in crop physiology.

INGRID TICHÁ (*Praha*)

LEWIS, W. H.: **Medicinal Botany — Plants Affecting Man's Health.** — John Wiley & Sons, New York—London—Sydney—Toronto 1977. 515 pp., US \$ 31.65.

"Medical Botany is designed to bring into perspective the massive knowledge acquired by man to retain his health by using the plants around him." This first clause of the preface to the monograph reviewed defines the sphere of problems to be treated. The author has divided his book into three separate parts, namely, 1. "Injurious" Plants, 2. "Remedial" Plants, and 3. "Psychoactive" Plants. This classification is rather out of the common, but it does correspond with the character and tendency of the book. The first and third parts are less voluminous than the second, whose contents approach most closely the universal notions of medicinal plants and their significance.

Into the category of "injurious" plants the author includes poisonous plants and draws attention above all to their toxicological aspects. A separate chapter is dedicated to plants causing allergies of various characters, including pollen allergy and allergic dermatitis, and to the therapy of the allergic ailments. Finally, the first part includes plants whose active substances, or their metabolites, exert mutagenic or teratogenic effects. A valuable detailed table of mutagens and teratogens of vegetable origin is presented.

In the second, amplest, part the medicinal plants are classed not in accordance with the phylogenic system, as is usual in the preponderant majority of monographies, but with respect to the presently "actual" groups of diseases. Accordingly, the first chapter is entitled "Cancer"; as a treatise on carcinogenesis and therapy of cancerous diseases with natural substances it is outstanding. In the next chapter on the exploitation of medicinal plants in the treatment of nervous system disturbances the author distinguishes the central, peripheral, somatic, and autonomic nervous systems, and discusses vegetable anaesthetics, hypnotics, sedatives, neuroleptics, analgetics, and antidepressants. Subsequent chapters: Heart and Circulation, Metabolism, Special Sensory Organs — Eye and Ear, Oral Hygiene, Gastrointestinal Tract, Respiratory System, Urogenital System, Skin, and other have similar characters. The information gathered in the chapters is not quite new, but rather "presented in a new manner", differing from a classical description, in which the pharmacological approach has been exclusively applied. This approach constitutes a novelty in botanical, although popularizing, literature.

The last part of the book is dedicated to "psychoactive" natural substances of vegetable origin, classified by the author as stimulants, hallucinogens, and depressants. This chapter is a good example of how historical facts can be presented in a modern manner, in context with the highly actual contemporary use and abuse of psychotropic agents.

Each chapter is accompanied by references to the literature, preponderantly domestic, that is, American. An appendix to the book contains a Bibliography of Herbal Medicine, which is valuable but neither exhaustive nor overly critical with respect to the selection. In view of the character of the monography, belonging to higher-level popular-scientific literature, a concise dictionary of scientific terms, mainly pharmacological ones, is adjoined.

The monograph is a well readable handbook, which may be of interest to both dilettantes and professionals — biologists, pharmacists, botanists and physicians.

F. STARÝ (*Praha*)

WAGNER, H., WOLFF, P. (ed.): **New Natural Products and Plant Drugs with Pharmacological, Biological or Therapeutical Activity.** Proceedings of the First International Congress on Medicinal Plant Research, Sect. A, held at the University of Munich, Germany, September 6—10, 1976. — Springer Verlag, Berlin—Heidelberg—New York 1977. 286 pp. US \$ 29.50.

Of approximately 600 000 plant species growing on Earth only about five per cent had been examined so far with respect to their contents of therapeutically active substances and the potential medical application of the latter. This fact explains why the Congress on Medicinal Plant Research was convened: in the vegetable kingdom new sources of medicines can be expected

to be found out, and the pathways of future research have been outlined by prominent world specialists in several reviews. A survey of the problems involved is given in the contribution "Problems and prospects of discovering new drugs from plants..." by the American scientists Farnworth and Bingen, in which the authors demonstrate the high requirements posed upon pharmacological screening, as well as the difficulty of interpreting its results, with a lucidity equalling that of the next contribution by their compatriot Malone. Of purely pharmacological character is the paper entitled "Natural substances with effects on the liver" (Vogel), with a special regard to flavonoids, above all to silybin and silydianin. Of greatest general interest is Cordell's paper on antitumor and cytotoxic agents from plants, because cancer therapy is a major medical problem at present. Not only higher plants, but also fungi and algae are producers of pharmacodynamically active substances, above all of antibiotics, lectured on by Professor Tamm (Switzerland). Subsequent lectures were dedicated to specified chemical groups of substances, as follows: alkaloids (Achenbach), mono-, di-, and sesquiterpenoids (Sticher), saponins (Shibata), diuretic natural compounds (Schwartz), and neolignans (Gottlieb). An example of a systematic floristic investigation concerning a specified territory is the chemical and biological investigation of Indian medicinal plants (Govindachari). Finally Thiess' paper on the modification of natural substances in the modern drug synthesis demonstrates that natural substances may serve as models in partial-synthetic studies and search for new active drugs.

All of the papers included into the collection are top-level treatises and present ample references to world literature, which have been abstracted with exceptionally objective critical approach. The contributions contain not only scientific information gathered within recent years, but also prognostic speculations and suggestions for potential directions of future research. Medicinal plants have been recently attracting growing interest on the part of chemists and pharmacologists; voices have been heard demanding world-wide investigations of folkmedicine on the basis of joint efforts of specialists, including botanists. The discoveries made in recent years, presented in detail in the collection reviewed, indicate new outlooks in the exploitation of natural substances for both human and veterinary therapy. The commercial value of these natural sources is not negligible, either.

The collection instigates plant physiologists to pay more attention to so-called secondary metabolites, to the conditions of their formation, to their localization in the plant, and to genetic factors, which mostly determine the metabolism and its products in both qualitative and quantitative respects.

F. STARÝ (Přaha)

BERZ, W., REINHARD, E., ZENK, M. H. (ed): **Proceedings in Life Sciences. Plant Tissue Culture and its Bio-technological Application.** — (Proc. First International Congress on Medical Plant Research, Section, B University of Munich, Germany, 1976). Springer Verlag, Berlin—Heidelberg—New York 1977. 196 figs., 60 tables, XV + 419 pp.; cloth DM 88.—, US \$ 38.80.

Ideas of the utilization of plant explant cultures — mainly cell suspension cultures — for industrial production of economically significant secondary metabolites are not new. With advancing knowledge of their metabolic and morphogenic abilities, and of similarity or diversity of their *in vivo* and *in vitro* behaviour, the opinions on the effectiveness of such a production changed to a considerable extent ranging from over-optimism to a profound skepticism. Both the organizing of a specialized international symposium and the content of 35 papers read in the "Plant Tissue Culture Section" illustrate not only the growing interest in this problematic but also the qualitative improvement in the methodology of such investigations and a turn from originally empirical procedures to a systematic biochemical, physiological and genetic study of tissue and cell cultures.

The content of the book can be divided in two thematic units. The first four chapters ("Cell Cultures and Secondary Products; Biochemistry, Physiology and Regulatory Aspects; Bio-transformation; Catabolism") summarize the proper "pharmaceutical" problematic — data on the biosynthesis of various compounds under *in vitro* conditions, on the effect of nutrition, hormonal or ecological factors on the production quality and quantity, on relations between the structure and the biosynthetic potential of plant cell, tissue and organ; on biotransformations and on the catabolism of different substrates. The fifth chapter — "General and Analytical Techniques" — containing contributions of methodological nature, e.g. on plating, freeze-preservation, cultivation of plant tissue and cell cultures in chemostat or bioreactor conditions will be of interest to anyone working in the area of theoretical investigations or in the field of the industrial application of plant explant cultures.

The second thematic unit is dealt with in the papers arranged into the two last chapters — "Somatic Hybridization, Fusion, and Haploids" and "Regeneration and Organogenesis". They represent, with respect both to content and form — an excellent syllabus of essentially the whole problematic of explant cultures discussed by prominent specialists.

A standard high quality of print as well as excellent photographs and extensive bibliography — all that complements the intelligent text of this publication and emphasizes its scientific value.

Z. OPATRŇÝ (*Praha*)

WALTHER, K.: **Die Vegetation des Elbtales.** Die Flussniederung von Elbe und Seege bei Gartow (Kr. Lüchow-Dannenberg). — Abhandl. und Verhandl. des Naturwissenschaftl. Vereins in Hamburg (NF). Vol. 20 (Suppl.). Verlag Paul Parey, Hamburg und Berlin 1977. 123 pp. DM 48.—.

The publication is devoted to the study of the vegetation of the flat alluvium in the lower part of the middle course of the river Elbe in the Federal Republic of Germany. It is a region where the alluvial planes and their vegetation are formed and maintained by the yearly floods. The aim of the work was to record the richness of the vegetational units and at the same time to warn against the lowering of the ground water table, which will inevitably result in the retreat of this natural plant cover and ultimately doom these natural communities to destruction, many of which are very remarkable and already extremely rare. This is the last call for their protection. Using the classical method by Braun-Blanquet forty-one plant communities (associations and subassociations) are described with tabellar evaluation and ecological characteristics. Besides this, also the flora of the region has been studied: a number of eurasiatic-continental elements that are very rare in the F.R.G. have been found. Three detailed coloured maps 1 : 5000 depict all syntaxons according to the situation in 1974.

JIŘINA SLAVÍKOVÁ (*Praha*)

BAKER, D. A.: **Transport Phenomena in Plants.** Outline Studies in Biology. — Chapman and Hall, London 1978. 80 pp. £ 1.75.

This is an excellent paperback textbook, which on eighty pages, including references, gives ample information on how solvent (water) and solutes are being transferred in both short and long distance transport in plant cells and body. It deals with the biophysical principles of solute transport (driving forces, membranes, carriers), with the biochemistry of the transfer (active transport, pumps, energy sources) and with the structure and arrangement of the pathways as well. The intracellular, intercellular, xylem and phloem transports are discussed with sufficient details and many illustrative schemes, figures and examples. The treatment is clear, authoritative and does correspond to up-to-date ideas. The book can be recommended to all-level students and researchers.

B. SLAVÍK (*Praha*)

*Annual Index will appear in the next issue (Biol. Plant. 21 (1), 1979).*