

BOOK REVIEWS AND ANNOUNCEMENTS

B. M. JOHRI (Editor): *Experimental Embryology of Vascular Plants*. Springer-Verlag, Berlin, Heidelberg, New York, 1982. xvii + 273 p., 81 figs. Cloth. DM 98.–, c. US. \$ 43.60.

Some years after the first announcement we eventually saw the appearance of this book. It has been published nicely by Springer, although the lay-out closely resembles that of *Plant Cell, Tissue and Organ Culture* by Reinert and Bajaj, which was also published by Springer (1977). Because of this resemblance, one sometimes gets the impression to sojourn in the last-called book. Unfortunately, this not only holds for the lay-out. Also the various chapters, paying much attention to the culture of generative plant parts, frequently summarize information which already has been reviewed elsewhere, often by the same authors and sometimes using the same figures.

The reader, slightly disappointed, therefore hopes that the promising "experimental" in the book's title will provide some new view points. On closer inspection, however, one notes that this adjective mainly relates to the testing and improvement of numerous culture conditions. Descriptions of research, using other experimental methods such as histochemistry, autoradiography, microsurgery, electron microscopy and biochemistry, are not or scarcely present. With respect to this, the nearly identical title of the book published by Raghavan in 1976 (*Experimental Embryogenesis in Vascular Plants*, Academic Press) much better covers the load. A pity; in my opinion a missed change to cover as up to date as possible the fastly-grown stream of new data from these research areas.

Apart from this reasons for criticism, the book contains much valuable information which is particularly suited for those starting research on generative plant tissues. And – according to the preface – for them the book is essentially meant. It gives a very complete view of this extensive field of botanical science. For that reason, also more experienced research workers surely will consult it regularly.

J. H. N. SCHEL

A. HOLLAENDER, R. RABSON, P. ROGERS, A. SAN PIETRO, R. VALENTINE and R. WOLFE (eds.): *Trends in the Biology of Fermentations for Fuels and Chemicals* – Basic Life Science Vol. 18. Plenum Publ. Corp., New York, 1981. 604 Pages, numerous illustrations and tables, U.S. \$ 65.00 (U.S. \$ 78.00 outside U.S. and Canada).

In this volume, the proceedings of a symposium, there are contributions on the properties and mode of action of enzymes attacking plant polymeric substances, e.g. cellulases (three papers), xylanases, amylases and the ligninolytic system. A number of papers deal with specific microbial conversions and fermentations: hydrogen formation by biophotolysis, production of hydrocarbons, anaerobic fermentation of cellulose to methane, production of ethanol, and butanol and acrylate fermentations. Other papers focus on more general aspects of fermentation, growth and production: on regulatory controls in enzyme production, on regulation of carbohydrate metabolism, on growth in nutrient-limited (thermostat) environment, on microbial adaptation to stress, on end-product (ethanol) tolerance, on thermophily and on thermophilic ethanol fermentations.

An important series of papers deals with molecular genetics and perspectives of genetic engineering for fermentation purposes: yeast genetics, genetics of glycolysis in microbes, genetic engineering of hydrocarbon oxidising bacteria, and studies on hydrogenase genes from various bacteria. It should be mentioned, however, that Vol. 19 in this series is entirely devoted to genetic engineering of microorganisms for chemicals.

Lengthy lists of references, and also comments and discussions are included with each of the thirty papers. In a Roundtable discussion (16 pp.) some of the future needs and priorities in the

area of fermentation science are discussed.

Most of the contributions are from well-known scientists from universities and private corporations in the United States mainly, but also from Europe.

Although the book is a photoprint from typescript, it is highly consistent in the format used for the various contributions, and contains relatively few typing errors. This book is only one of the many volumes on the subject that have appeared recently, but it is of outstanding quality and merits recommendation.

F. M. ROMBOUTS

A. C. ZEVEN and J. M. J. DE WET: *Dictionary of cultivated plants and their regions of diversity*, excluding most ornamentals, forest trees and lower plants, 2nd. ed. (1st. ed. by A. C. Zeven & P. M. Zhukovskij, 1975.). Pudoc, Wageningen 1982. 264 p., 130 maps. Cloth, Df90, —. ISBN 90-220-0785-5.

The first edition of this dictionary was an enlarged version of an original paper by Prof. Zhukovskij, entitled: "New centres of origin and new gene centres of cultivated plants including specifically endemic microcentres of species closely allied to cultivated species", which appeared in Bot. Zhurn. Moskva, 1968. A review of this first edition was given by van Steenis (*Acta Botanica Neerlandica* 25: 125–126, 1976) to which the reader is referred. After the death of Prof. Zhukovskij in 1975 a second revised edition was prepared by Dr. Zeven together with Dr. de Wet, the wellknown (cyto) taxonomist of cultivated plants from Illinois.

The framework of the book remains the same. The first part of the dictionary consist of an introduction and general remarks on the origin of agriculture, plant domestication, the origin and evolution of weeds and the evolutionary dynamics of cultivated plants. The collaboration of Prof. de Wet has led to an improvement both of the first and the second parts of the book, the latter being devoted to the treatment of 2489 species of cultivated plants (2297 in the first edition) arranged in 12 megagene centres according to Zhukovskij's system. Chromosome numbers have been provided from most species, however, a cursory inspection of the literature reveals that many known chromosome numbers have been omitted. To mention a few examples: *Nasturtium indicum* ($2n = 12, 14, 16, 24$); *Lens orientalis* ($2n = 14$); *Valerianella locusta* (erroneously assigned to the genus *Valeriana*, $2n = 16$); *Annona diversifolia* ($2n = 14$). In some species the chromosome numbers appear to be cited uncritically: e.g. *Strychnos nux vomica*: $2n = 24$ is incorrect, $2n = 44$ is correct; *Symphytum asperum* Lepech. has $2n = 32$ instead of $2n = 40$ and it has been proved that this species is one of the parental species of *S. × uplandicum*, the other being *S. officinale* ($2n = 40, 48$). Therefore, two types of hybrids are know: *S. × uplandicum* ($2n = 36$ and $2n × 40$).

Printing errors are comparatively few. Some plant species are placed in families which are usually known under another name: Cleomaceae (Capparidaceae); Pistaciaceae (Anacardiaceae); Strychnaceae (Loganiaceae).

Much attention is paid to the treatment of important crop plants such as *Brassica*, *Solanum*, *Secale* and *Triticum*, but to my suprise, I also came across the species *Wolffia arrhiza*, the smallest known Angiosperm, which has a very high protein content and is cultivated as a vegetable in Burma and Laos. Even the Cranberry (*Vaccinium macrocarpum*) from the Dutch Wadden Island Terschelling is included in the dictionary.

The reference list contains twice as many references as the first edition, including such important books as: SIMMONDS (1976): *Evolution of crop plants* and HAWKES, LESTER and SKELDING (1979): *The biology and taxonomy of Solanaceae*. Unfortunately Heinz BRÜCHER's masterly treatment of tropical plants (*Tropische Nutzpflanzen, Ursprung, Evolution und Domestication*, Berlin, 1977) has been omitted. Notwithstanding these minor objections, in the reviewer's opinion this dictionary is a useful work of reference for students of plant systematics and plant geography, plant improvement, agriculture and plant evolution.

TH. W. J. GADELLA

K. WELLS and E. K. WELLS (Ed.): *Basidium and basidiocarp, Evolution, cytology, function and development*. Springer series in microbiology. Springer-Verlag, Berlin, Heidelberg, New York 1982. xi + 187 pp., 117 figs. Cloth DM 89.-; approx. US \$ 39.60.

The editors have noted, that the increasing specialisation within mycology corresponds to a decreasing communication between the specialists in the various disciplines. This tendency becomes stronger when the investigative techniques become more numerous and more complicated, while the isolation of investigators is often fostered by the policies of journals and societies. This book aims to form a counterweight by giving reviews on a selected topic by specialists of several disciplines, using various techniques. The contributions can be subdivided into two groups, one on the basidium and one on basidiocarp development.

The first paper on basidia, a contribution by Oberwinkler, includes a review of the various basidial types on which the taxonomy of the basidiomycetes is based. He discusses parallel developments in and transitions between the main taxonomic groups and draws interesting conclusions. However, I do not understand Oberwinkler's hesitation to accept a relationship between the Cryptococcales and *Filobasidiella*, because *Filobasidiella neoformans* is the teleomorph of *Cryptococcus neoformans*, the type species of *Cryptococcus*. The suggested relationship between *Sistotrema* and *Multiclavula*, on the basis of basidium morphology, is incorrect as the basidia of *Sistotrema* have a distinct basal swelling, while those of *Multiclavula* gradually taper towards the base. In fact the *Multiclavula* basidium is much more reminiscent of that of *Hyphoderma*. Bifurcate sterigmata which Oberwinkler suggests as a hypothetical link between *Uthatabasidium* and *Botryobasidium* occasionally do occur in nature, but I have seen them only in species which normally have more than 4 sterigmata, e.g. *Sistotrema brinkmanii*. *Galzinia geminispora* may be similar aberration. McLaughlin presents a detailed survey of the literature on mainly ultrastructural studies of basidial and basidiospore development. New data are given on the changes in basidium development by changing environmental factors. Application of an electric field on isolated gills of *Coprinus cinereus* resulted in single-spored basidia, and exposure for 24 h. to a temperature of 0°C in abnormal sterigmal patterns (1-3). MacLaughlin's statement that monokaryotic fruit bodies form two-spored sterigmata, has no general value. Thielke discusses meiotic divisions in the basidium, with emphasis on the spindle apparatus and the nuclear envelope, and compares the corresponding stages in the ascomycetes.

Lu describes the meiosis of basidia of *Coprinus cinereus* at the molecular level, with emphasis on recombination. He states that there are two opposing processes: nicking and repairing. Recombination is only possible when nicks are open. The sooner they are repaired, the less chance there is of recombination. Recombination is favoured by holding two chromosomes together for a longer time and by reducing repair activities. Lu's theory is that recombination through crossing over is too important to be left to chance alone and he suggests the existence of a nicking program (endonuclease active between late s-phase and late pachytene), a repair program (active after karyogamy to late diplotene) and a division program (starting in diplotene). Combined with the thesis of independent nuclear and cytoplasmic cycles, his theory explains the results obtained in "arrest-release" cultures. The contributions on basidiocarp development start with a study of Uno and Ishikawa, who demonstrate the positive influence of adenosine 3'5'-cyclic monophosphate on basidiocarp formation of *Coprinus macrorhizus* f. *microsporus* (= *C. cinereus*). Gruen proves that stipe growth is dependent on the pileus in species of *Agraricus*, *Flammulina* and *Coprinus*. The growth controlling agent originates from the lamellae, whose presence is required until about 55% of the final length has been reached. The influence of the somatic mycelium and various nutrients on stipe growth is also discussed. Finally Gooday analyzes the major chemical components before and after elongation in *C. cinereus*.

The book is well produced and the many illustrations are functional and of good quality (fig. 1.18 is upside down). It is highly recommended to students of basidiomycetes, but also to those who wish to form a more general impression of this group of fungi.

J. A. STALPERS

H. JANETSCHKE (Ed.): *Ökologische Feldmethoden*. Ulmer Verlag, Stuttgart 1982. 175 p. 92 figs. 19 tables, DM 68, —.

The book summarizes and discusses a wealth of ecological field methods, the application of which is increasingly needed, according to the authors of the "Innsbrucker Oekologenschule". They themselves studied alpine ecosystems, experienced their complexity and tried to clarify the impact of human activities and to measure the tolerance limits of the system (MAB research program).

The book has chapters on (micro)meteorology; soil science; biomass assessment of fungi, algae, higher plants and mosses; CO₂-exchange and waterbalance; vegetation and syntaxonomy; typology and sampling of animal communities and secondary production. No data treatment procedures or modeling, nor interpretation problems; just the production of empirical data. And thus indeed a list is presented of simple towards more advanced field methods and related laboratory methods. This catalogue is not complete, how could it be in view of our real world complexity and the specific aims in different studies. However the few gaps, for example the estimation of water qualities, the detection and measurements of biomass by IR reflection, the estimation of mineralization c.q. biodegradation, do not seriously harm the objective: to present a survey of current field methods, of which the appropriate ones can easily be selected.

The description of a method most often covers a discussion of technical and ecological feasibility, with reference to specific and general literature. This partly compensates for the need of background knowledge one might have.

In summary, a technically well produced and rather complete catalogue of ecological field methods, useful in the orientation and the set up of plant-animal-and system-ecological projects, especially of the applied category.

W. JOENJE

L. BOS: *Introduction to plant virology*. Pudoc, Wageningen 1983. 160 p. 63 ill., 22 colour phot. Soft cover. Dfl 35. — (excl. VAT). ISBN 90-220-0793-6.

Virus infections of plants are interesting, both from biological and agricultural points of view. There are a few outstanding textbooks dealing with plant viruses but these are far too expensive for students and non-virologists.

It was high time that the fundamentals of plant viruses and of their control were presented in a payable single volume and we have to thank the author for his efforts to produce the present book at low price. Three chapters deal with the biology of plant viruses in which the historical development of virology is used as a frame. It is made clear why plant viruses are unique pathogens requiring special techniques derived from molecular biology. Plant viruses are important disease incitants. Their behaviour as contagious agents and how they are transmitted from plant to plant is of interest for anyone concerned with crop protection.

Four chapters inform on the viruses themselves as physico-chemical particles, how they can be handled and studied. Virus characterization can serve as a basis for reliable disease diagnosis.

Two chapters are devoted to the rôle of plant viruses in nature and agriculture, a topic in which the author is highly interested. It is worthwhile when scientific information can be translated in terms of practical relevance.

At the end of the book the information on plant viruses and human involvement is placed in a philosophical perspective.

It is unavoidable that some aspects are neglected, but I regret that local and systemic acquired resistance are not even mentioned. The book is well printed and the colour photographs are excellent. I doubt whether the soft cover is resistant against the intensive reading of this invaluable textbook by anyone with an interest in plant virology. Highly recommended!

D. H. WIERINGA-BRANTS

V. VARESCHI: *Vegetations-Ökologie der Tropen*. Verlag Eugen Ulmer, Stuttgart 1980. 293 p., 161 figs. and 13 colour photographs. DM 96.—.

In the present book the author deals with results of his investigations on tropical vegetations in the past 30 years. He makes use of the phenomenological ecology in which "the plant cover is put on the foreground and from this conclusions are drawn with regard to the environment".

In the first part of the book a number of "Elementary characteristics" and "Complex characteristics" of the plant cover are discussed. "Elementary characteristics" include "the plant" (trees, lianas, stranglers, epiphytes, plants of the undergrowth), "tropical life forms" (terrestrial plants only), comprising 15 main- and 48 subgroups ("categories"), and "plant-organs" (bark, roots, flowers, means of dispersal, buds and leaves). The leaves are classified in 19 categories.

"Complex characteristics" (or "Vegetations characteristics") include classification of the vegetation based on physiognomic "Formations" (sensu Ellenberg), which is, on good grounds, preferred to the floristic classification method. Additional information is given by introducing the "species number-area curve" from which the minimum area of the community (indicated as "minimal-areal" by the author) can be determined. Each formation mentioned is named and characterized, its distribution is given as well as information on climatic and edaphic conditions. A visual presentation is given by a "Bisekt" (semi-schematic vegetation profile), drawings of leaf-forms, and a number of colour-photographs.

Multiplication of the number of species in a community by the number of leaf-categories found in the community leads to the "Diversity-coefficient" (C_d). The C_d -value ranges from 1 (in mono-specific communities with only one category) to over 20,000 (in tropical optimal communities rich in species and leaf-forms).

In the second part of the book the tropical formations are presented in order of the C_d -values from high to low. Curiously the starting point is the Cloud-forest ("Wolkenwald") instead of the expected Tropical rain-forest: $C_d = 20,769$ (Cloud-forest Rancho Grande, Venezuela) resp. 1,470 (Mt. Silam, Borneo), 1,100 (Sarapiquí, Costa Rica), 900 (near Atherton, N.E. Australia).

The book is concluded by a chapter on "Diversity" (2 pages), "Productivity of the tropical vegetation" (2 pages), "References", and "Register".

The book is written in a pleasant style and gives a good survey of the vegetation of Venezuela. Although brief notes on the mangrove and a forest-type from Borneo, a forest-type from Australia and an African savanna are also provided, the title of the book suggests too much for what it offers. Many important comprehensive studies on the vegetation of the Tropics, even on the vegetation of Venezuela, are not mentioned or discussed e.g. K. Hueck, *Die Wälder Südamerikas* (1966), *Die Wälder Venezuelas* (1961), Hueck & Seibert, *Vegetationskarten Südamerikas* (1972), R. Knapp (1973), *Die vegetation from Africa*, etc.

Misprints such as e.g. "Sacrifragaceae" instead of "Saxifragaceae", "Ravenala" for *Ravenalia*", "Cerios" for "Ceriops", "Sporobulus" for "Sporobolus", "Coccolobium uviferum" for "Coccoloba uvifera" are numerous. "Podocarpus draco" (p. 207) is "Pterocarpus draco". The non-existing taxon *Echium alopecuribides* is (probably) *Echium bourgaeum*. It is also confusing that a taxon sometimes is given under different names as e.g. *Bignonia unguis-cati* and *Macfadyena unguis-cati* (and not *Macfadyenia unguis-cati*), *Libidibia* and *Caesalpinia*, to mention a few of the various discrepancies encountered.

The book presents a (partly) new approach to the study of vegetations in the tropics. However, a critical revision of the book is necessary in case a second edition should be wanted.

A. L. STOFFERS

G. WAGENITZ: *Index collectorum principalium herbarii gottingensis*. Published by the Systematisch-Geobotanische Institut der Georg-August-Universität, Göttingen 1982.

A list of some 730 collectors who contributed at least 4 items to the herbarium of the institute, with a sample of the handwriting of 60 of them.

J. M. LYONS, R. C. VALENTINE, D. A. PHILLIPS, D. W. RAINS and R. C. HUFFAKER (Eds.): *Genetic engineering of symbiotic nitrogen fixation and conservation of fixed nitrogen*. Basic Life Science Vol. 17. Plenum Press, New York and London 1981. 698 p. USA and Canada: \$ 69.50; other countries US \$ 83.40. ISBN 0-306-40730-2.

This book has developed from a symposium "Enhancing Biological Production of Ammonia from Atmospheric Nitrogen and Soil Nitrate" held at Lake Tahoe, California, June 1980. After three introductory chapters (Hollaender, Huang and Hess) the following chapters are each written by one or several investigators.

In the genetic sections special attention is paid to new developments such as molecular cloning of nitrogen fixation (Nif) genes. Here methods are described for cloning e.g. *Rhizobium japonicum* DNA in *E. coli* and how in such a way an identification can be obtained of Nif genes (Henneke & Mielenz). Ditta et al. describe methods for the development of a two-plasmid, binary vehicle system for cloning DNA from Gram-negative bacteria. In an interesting chapter Ausubel et al. showed that cloned *R. meliloti* contained DNA sequences homologous to *Klebsiella pneumoniae* Nif-D and that mutations on cloned DNA fragments can rather rapidly be constructed. In a more general paper Beringer discusses the identification, location and nitrogen fixation genes in *Rhizobium*. The role of *Rhizobium* plasmids in host specificity of legumes is presented by Brewin et al.

Hydrogen uptake and energetics receive due attention. Schlegel et al. described the effect of O₂- and H₂-oxidizing bacteria including nitrogen fixation by nitrogen fixing hydrogen bacteria as *Xanthobacter autotrophicus* and *Alcaligenes latus*. Hydrogen uptake (Hup) plasmids are discussed by Tait et al. and methods are described to obtain mutants for the study of the regulation and expression of hydrogenase. The chemolithotrophy of *Rhizobium* which has to do with hydrogenase and hydrogen cycling is discussed by Evans et al. The H₂-uptake system in whole plants and detached root nodules is also treated (Lim et al.).

In the physiological section factors are discussed which affect nitrogen fixation capacity. Methods for evaluating potentially superior *Rhizobium* strains are outlined for soybean (Eilliams et al.) and for peas (De Jong et al.). Breeding methods for superior plants are discussed in relation to the evaluation of elite alfalfa (*Medicago sativa*) lines (Heichel et al.) and extensive photosynthesis work in relation to nitrogen fixation and its enzymology is treated by a number of investigators (Andersen, Buchanan, Bahr & Steffens, Miller, Huffaker, and Friedrich).

In more general articles the nitrogen fixation by non-legumes, including cyanobacteria (Wolk and Spiller et al.), *Azolla* (Peters et al., Talley et al.) is presented, in this section also little known nitrogen-fixing woody plants are mentioned by Delwiche et al. and Munns et al.

Finally there is a large section dealing with the conservation of fixed nitrogen, discussing denitrification, nitrate metabolism and its enzymology (Payne, Carlson, Thayer, Satch, and others). In this section also attention is paid to the whole plant; some studies deal with nitrate transport processes in plants and compartmentation of nitrate in root systems (Jackson and Volk), the reduction of NO₃ in leaves, and the influences of light and CO₂ on nitrate reduction (Allam, Huffaker, Delwiche and others).

In the concluding section more general aspects are presented, such as the integration of nitrate and ammonium assimilation in higher plants (Novoa et al.), some plant genetics (Van Keulen), analyses of reductive and dissipative costs in nitrogen assimilation (McDermitt & Loomis), and last but not least "Strategies for achieving self sufficiency in nitrogen on a mixed farm in E. Canada based on use of *Faba* bean" (Patriquin et al.).

The book contains more than fifty papers, written by about eighty contributors. Its genetic sections show the explosive developments in prokaryotic genetics in the last few years. It is evident that bacterial genetics related to nitrogen fixation has outgrown its initial stage of work, attention being more particularly focused on *Rhizobium* with molecular cloning of its nitrogen-fixing (Nif) genes, to improve nitrogen fixation. Because it contains much new information the book will be well received by students and research workers in this field. It gives a concise, readable and up-to-date account of the state of affairs in this also economically very interesting field. For use in libraries its purchase can be strongly recommended.

HEINRICH WALTER, *Bekennniss eines Okologen (Erlebtes in acht Jahrzehnten und auf Forschungsreisen in allen Erdteilen.)* Gustav Fischer Verlag, Stuttgart, New York, XII, 334 pages, 12 photographs and 1 plate out of the text. DM 19. — . ISBN 3-437-30321-X.

This most recent book of the ecologist Heinrich Walter is the autobiography of a botanist who played a prominent part in ecological research not only in Europe but also in many parts of the tropics during the last 50 years. In ten chapters he describes the course of his life in an enchaining way.

Walter was born in Odessa on 21 October 1898 as the third child of the oculist Otto Walter and Clara Stromberg, descendants from Germans who emigrated to Estland in Napoleonic times. They had the Russian nationality. The first years of Walter's life passed off quietly and in his young days he developed already a predilection for botany. In February 1917 he was incorporated in the field artillery of the Russian army. In 1918 he entered the University of Dorpat, in 1919 he switched to Jena where he took his doctor's degree. After a short period in Halle a.d. Saale he became assistant in Heidelberg. From there he moved for a short time to Marburg but returned to Heidelberg after a year. In 1929 he went "as a Rockefeller Fellow" to the U.S.A. for ecological studies in the Sonora Desert, studies on grasslands, and in the area of Pikes Peak, Colorado. In 1932 he was appointed director of the Botanical Institute and the Garden of the Technische Hochschule in Stuttgart. In 1934 Walter went to Africa to perform a.o. the famous investigations on mangroves (together with Dr. Steiner) and rainforests, sailed around Cape of Good Hope, visited Namib Desert and returned in 1935 in Stuttgart. In 1937/38 he visited South- and Southwestern Africa again.

After the outbreak of World War II Walter was called up for military service (now in the German army) at first as interpreter of Russian, afterwards for civil affairs (as e.g. director of the Botanical Institute in Posen, where he met Ellenberg for the first time. At the end of April 1945 he became a prisoner of war and during this period he was appointed Rector of the "Lageruniversität" in St. Avold. In November 1945 he returned to Stuttgart and in 1952 travelling started again: S.W. Africa (1952/53), visiting professor in Ankara, travels to Mesopotamia, Syria, Palestina and Lebanon (1955), a world-tour via Australa and New Zealand and through the Panama Canal back to Europe. In 1965/66 Brasil, Argentine and Chile, in 1968 to Venezuela and a last trip to Southwest Africa.

Most of Walter's publications (21 books and more than 160 publications in scientific periodicals) are the result of these travels or show a relation to them.

The "Bekennnisse" are interwoven with anecdotes. He depicts situations and experiences in a bright way. We get insight in the course of his career as well as his view of life, inspired by a deep religiosity which is so characteristic for the Russian Orthodox Church.

We are thankful to professor Walter that he has published his memoirs

A. L. STOFFERS

G. JAHN (ed.): *Application of vegetation science to forestry*. Handbook of vegetation science vol. 12. Dr. W. Junk bv, Publishers, 's-Gravenhage 1982 xi + 405 pp., 51 figs, 23 tables & maps. df 185. — , US \$ 79.50.

In her Introduction the editor gives a clear and comprehensive outline of the history of vegetation science and of forestry, mentions the main system for describing and analysing vegetation as applied in forestry (methods of Cajander and Braun-Blanquet), and indicates in what questions vegetation science can be of help the forester. She also wrote the final chapter of Conclusions, in which the requirements for application and the many fields in which it can be used, are summarized. Contributions from 14 countries form the lion's share of the book. A common line is followed by the various authors. Generally chapters are devoted to the forest conditions in the country in question including sometimes rather detailed descriptions of forest communities, to the history of the application

of vegetation science in forestry, to a description of the main fields of application itself, and to evaluations of past practice and future prospects. Three contributions lack a summary in English, whereas two contributions display the wealth of a summary in German as well as in English. The selection of the countries has clearly been determined by the availability of specialists. The North-, West- and Central-European countries are well represented, from the Mediterranean region Italy and Yugoslavia are included, whereas countries from Eastern Europe are missing, and the only contributions from other continents concern Canada, Japan and Australia. The editor's observation that the knowledge of vegetation science in the East-European countries and the U.S.A. "is being practised in forestry in a similar way as expressed in this volume" does not take away a certain dissatisfaction about the lack of balance in representation. I also think it is a pity that no tropical country could be included. It is apparent that vegetation science does not play that pioneer role in forestry it does in most temperate countries. On the other hand some examples exist, or at least elements for the application in forestry have been promoted e.g. in Indonesia, Suriname and Venezuela. The extension of present knowledge could contribute to better management of tropical forests in the future. In spite of these critical notes the editor should be congratulated with the completion of this work, in which much of the actual knowledge and experience in question has been accumulated and made more accessible to scientist and practising forester.

J. H. A. BOERBOOM

HOWARD S. GENTRY: *Agaves of continental North America*. The University of Arizona Press, Tucson, 1982. XIV + 670 pp., numerous figs. and photos, distr. maps and tables. US \$ 49,50. ISBN 0-8165-0775-9.

One of the most interesting genera of the plant kingdom is the genus *Agave*. These succulent plants have since thousands of years played a major role in the life of the inhabitants of those countries where the many species are found growing. The first chapters of this splendid monograph by Howard Scott Gentry on the Agaves of continental North America are devoted to the many uses made of Agaves that enabled old civilizations to survive in sometimes inimical surroundings. Agaves provided them with food, beverages, fibers for clothing and medicines.

The taxonomic history of the genus reveals that a greater part of the species was described in early days from cultivated specimens imported to Europe as seeds or young plants from which inflorescences were often lacking. In this way and because of the inappropriate surroundings where the described plants had to grow the older taxa usually unaccompanied by illustrations are almost unrecognizable. Many more species were insufficiently described by later investigators based on a single specimen. No wonder nomenclature became a mess in this genus where above all the preparing of herbarium material asks for special skills.

Agaves should be studied in their natural surroundings and Gentry had for many years the opportunity to do so or to grow plants near at hand under climatic conditions that could well be compared with those of their original localities. Still identification of Agaves is not so easy. Keys to the twenty groups and their species, fortunately emphasising vegetative characters, as well as a geographic guide (including keys) to the species of specific areas are provided. The main part of this book, lavishly illustrated with photos, drawings and distribution maps, is devoted to extensive descriptions of all 136 species with subspecies and varieties totalling 197 entities recognized by the author for the area studied. In these descriptions all information known as for instance relations to other species, distribution and habitat, economic use, chemistry and horticultural notes, is given. For the greater part of the species flower ideographs are also included, showing the variability within the species under consideration.

A small chapter on the culture of Agaves, a bibliography and a glossary of special terms used concludes the book of which the author remarks: "I leave the next agave taxonomist a good opportunity for improvement". I doubt if such a taxonomist will soon be born.

E. A. MENNEGA

P. F. WAREING (Ed.): *Plant Growth Substances*. Academic Press, London and New York 1982, xviii + 684 pp., £23.40 (U.K. only); \$45.—. ISBN 0-12-735380-1.

The book contains the proceedings of the 11th Conference of the International Plant Growth Substances Association, held at the University College of Wales at Aberystwyth, July 1982. The prompt publication of the mostly invited papers offers an up-to-date survey of the state of the art in the area of plant hormones.

Biosynthesis, metabolism, transport and the cellular basis of physiological effects are dealt with for auxins, gibberellins, cytokinins, ethylene and abscisic acid. Attention is especially paid to their binding to receptor proteins. It is to be regretted that the consequences of amount and accessibility to binding sites for the sensitivity of a tissue to hormones, as elucidated by Trewavas, is not printed in the proceedings.

A session was included to discuss whether polyamines are to be considered as growth regulators in plants. A variety of stimuli can induce and repress the synthesis of these substances, the contents of which vary considerably at changing growth rates and upon senescence. The translocation of polyamines and specific cellular receptors for them have not yet been demonstrated. This may indicate that they reflect rather than regulate developmental processes or that they directly act as intracellular messengers, interfering with nuclear acid metabolisms and/or membrane functions.

Other sessions as well as some workshops were devoted to such physiological phenomena as gravitropism, senescence, seed dormancy, flowering, assimilate partition, and stress physiology. The apparently arbitrary choice of topics was based on new developments in these areas. The main contributions, collected in the book, properly discuss these developments.

The editor and his colleagues are to be congratulated with this compilation of often new information. The book is an indispensable and valuable link in the chain of proceedings that keep us abreast, every three years, with the developments in the field of plant hormones.

J. BRUINSMA

W. H. CARMICHAEL (Ed.): *The water environment: Toxins and health*. Environmental Science Research Vol. 20. Plenum Press, New York and London 1981. xii + 491 pp., ill., tables. U.S.A. and Canada: \$ 59.50; other countries: \$ 71.40. ISBN 0-306-40756-6.

The book contains the proceedings of the international conference on toxic algae, held June 29–July 2, 1980, at Wright State University, Dayton, Ohio. There are two excellent reviews on toxic marine dinoflagellates and toxic marine algae, and a review of older work on a marine chrysophyte by the Israeli workers who solved the problems this alga caused in fish ponds. One paper deals with the mode of action of a crudely characterized toxin from the green alga *Pandorina*. The majority of the papers (29), however, is on planktonic cyanobacteria. Apart from the two well-known producers of exo-toxins *Microcystis* and *Anabaena flos-aquae* the toxicity is mentioned of another Nostocacea, *Aphanizomenon*, but only for one locality.

The subject of the toxic cyanobacteria is covered with great diversity: microbiology and ecology of the species, isolation procedures and chemical characterization of the poisons, case histories of effects on humans, dose-response relations and biochemical and ultrastructural details of the effects on mice.

A description is given of a useful fluorometric technique for the measurement of the neurotoxins, both of cyanobacteria and marine dinoflagellates responsible for shellfish poisoning.

EDITORS

H. LIETH (ed.): Tasks for vegetation science, Vols. 1, 5, 7. W. Junk Publishers, The Hague. Volume 1: E. O. BOX: *Macroclimate and plant forms*, 1981, xiv + 272 p., Dfl. 165.—, approx. US\$ 69.50. Volume 5: M. J. MÜLLER: *Selected climatic data for a global set of standard stations*, 1982, xxviii + 306 p., Dfl. 95.—, approx. US\$ 41.50. Volume 7: L. STEUBING and H. J. JÄGER (eds.): *Monitoring of air pollutants by plants*, 1982, x + 164 p., Dfl. 80.—, approx. US\$ 32.—.

Junk Publishers are continuing their publishing activity in the field of biogeography and ecology with the new series "Tasks for Vegetation Science", edited by H. Lieth from the University of Osnabrück (a parallel series "Geobotany" has been launched under the editorship of M. Werger, Utrecht). The main goal of this new series seems to be the exploration of methods and applications in the field of vegetation science with emphasis on standardization and predictive modelling by the aid of computer. The books are in hard cover and the text is set in an attractive, 2 column lay-out. Examples of volumes exploring application of computer software are those by Box and Müller. Box presents, in what is essentially his doctor's thesis, an attempt to predict world occurrence of plant life forms and vegetation types in relation to macroclimate, by using the general screening program ECOSIEVE, the SYMAP program for mapping and some auxiliary software. Sample maps show predicted world distributions of various climatic parameters, plant life forms (trees in particular) and plant formations. Box' approach stands out by its emphasis on the life forms rather than on the formations.

Müller gives a standardized description of macroclimatic parameters for use by vegetations scientists and other specialists in the field of environmental sciences, and as a means for tracing Walthers-Lieth climate diagrams with computer. The bulk of the book consists of a tabular listing of climate data for over 1000 weather stations selected from the main regions of the globe. A Fortran IV programme for tracing the climate diagrams (KLIMAPLOT) and sample diagrams are also provided.

The volume on air pollution monitoring by Steubing and Jäger is of a different nature and is essentially a compilation of lectures presented at the Man and Biosphere workshop in Osnabrück, September 1981. The contributions, mainly by western and eastern European workers, focus on the various methods of field monitoring, use of indicator species and vegetation types as well as plant organs, analysis of plant damage and interpretation of results. It appears that much more methodological sophistication is needed than applied so far to arrive at scientifically sound conclusions. Thus, emphasis is put on the need of simultaneous use of different indicator species and long term monitoring by means of permanent plots and mapping. Appropriate species or plant groups suitable for monitoring individual pollutants are provided in an appendix. This volume provides some insight in what effort is being made to achieve standardization in pollution ecology methodology.

S. R. GRADSTEIN