

BOOK REVIEWS

G. HAUG & H. HOFFMANN (Eds.): *Chemistry of plant protection, Vol. 1. Sterol biosynthesis, inhibitors and antifeeding compounds*. Springer Verlag, Berlin, Heidelberg, New York, Tokyo, 1986. IX + 151 pp., 30 figs. Hard cover DM 98.– ISBN 3-540-13487-5

This volume is the first one of a series on 'Chemistry of Plant Protection', which appears under the editorship of Dr. Haug and Prof. Hoffmann, both from the Monheim Plant Protection Centre of Bayer, Leverkusen. The series is meant to cover new developments in crop protection, biological and biochemical discoveries as well as advances in synthetic chemistry. It will continue the handbook 'Chemie der Pflanzenschutz und Schädlingsbekämpfung', edited by R. Wegler, which appeared from 1970–1982 in eight volumes, but the old arrangement of the material on the basis of insecticide-, fungicide-, herbicide- etc. research has been abandoned. The volumes will, according to the editors, contain invited, critical review papers. Although each of them will be more or less topic oriented, contributions from diverse areas of plant protection will occasionally be united in one volume, in view of rapid publication.

The first volume contains four review articles, three of which cover various aspects of fungicides, which inhibit sterol biosynthesis (s.b.i.'s). T. Kato discusses sterol biosynthesis in fungi as a target for fungicides (thus mechanism of action of s.b.i.'s), D. W. Krämer the chemistry of s.b.i.'s, and K. H. Kuck and H. Scheinpflug the biology of s.b.i.'s. All three papers provide up to date reviews on these topics by highly qualified specialists. The fourth review by D. M. Norris, which falls outside the competence of the reviewer, deals with various aspects of antifeeding compounds in plants, animals and humans. It is not related to the topic of the first three reviews, although the comma after the words 'Sterol Biosynthesis' in the title of this volume in fact, does suggest a relation at first glance. This could have been avoided by omitting the comma.

The trend towards further internationalization, which was already present in the subsequent volumes of Wegner's handbook, is reflected in the editorial board (members not only from FRG, but also from DDR, USA and Japan), the English title of the series and the exclusive use of English, even in the two papers by German authors.

Although not many, there are some printing errors (e.g. in the table of contents: mutilation of the word biosynthesis in the title of the first review, a dash between the initials of Kuck; on page 1 inhibit instead of inhibit; in the list of references: Casonova instead of Casanova). There is not always consistency in the use of fungicide names: in the first review the name fenpropemorph is used, in the third review fenpropimorph. The leading words in the title of the volume and the titles of the first three reviews are written in three different ways: Sterol Biosynthesis, Sterol-Biosynthesis, and Sterol biosynthesis. These, however, are only minor remarks, which do not detract from the excellent quality of this first volume, which warrants high expectations with respect to future volumes. The series may prove to be very valuable for researchers and all others who want to keep abreast of the recent developments in the field of chemical plant protection.

J. DEKKER

K. ESSER: *Kryptogamen. Cyanobakterien, Algen, Pilze, Flechten. Praktikum und Lehrbuch*. 2nd, revised edition. Springer Verlag, Berlin, Heidelberg, New York, Tokyo, 1985. XXII + 566 pp., 310 figs. DM 98.–. ISBN 3-540-15572-4.

This is an excellent book written by an author obviously intimately acquainted with teaching and organising courses on lower plants. Its purpose is twofold: on one hand it is a guide for the teacher in collecting, rearing and preservation of the various organisms, on the other hand it contains direc-

tions for the students, concise but very clear, richly illustrated with photographs and drawings. Moreover – and that is exceptional – in every instance the life cycle is represented as a drawing and diagrammatically as well under clear indication of its haploid and diploid parts.

So this is a very useful book for everyone teaching in this field. Its utility is augmented by appendices containing addresslists of culture collections and biological supply companies and a survey of appropriate films. It is therefore regrettable that the title is somewhat misleading (although the subtitle mends this) as mosses, ferns and the like are not treated. The coverage of the work seems accidental, dictated by the authors teaching schedule. So it may be also a matter of argument that only the Cyanobacteria are treated and the other bacteria are not or as one may like to dispute that they are treated at all. The author states in the preface that for didactical reasons he deliberately maintains a simple so conservative classification; this is an other point with which not everyone will agree. It is true that the schemes representing the descent look rather oldfashioned but I am afraid that better ones are not available yet.

Of course there are some minor points still, for instance that sexual reproduction is said not to be known in the Chrysoomonadales (p. 85), that the section on diatom locomotion is not up to date (p. 94) and that the diagram representing the cell division in *Oedogonium* (p. 149) is incomplete and has lost in comprehensibility by the omission of the nuclei, the recommendations to clean diatom frustules by glowing instead of by oxidation by chemicals and to collect desmids by squeezing a handfull of *Sphagnum*, while submersed mosses and phanerogams from localities with a higher pH would yield far richer samples.

But these are details that may be due to the fact that the author is originally a mycologist. As for the students, the book is very instructive as I know from ample experience with the first edition, but regrettably mainly by the illustrations, not only because the time students have available in a practical course is too short for extensive reading in textbooks but mainly because their poor knowledge of the German language. An other barrier will be the price; by reduction of some illustrations and the use of an other type – which has greatly improved its legibility indeed – is achieved that this second edition although it is revised contains less pages than the first, but the rate has nearly doubled.

A. C. ELLIS-ADAM

K.-H. NEUMANN, W. BARZ and E. REINHARD (Eds.): *Primary and secondary metabolism of plant cell cultures*. Springer Verlag, Berlin, Heidelberg, New York, Tokyo, 1985. Cloth DM 188.– ISBN 3-540-15797-2.

This book contains the proceedings of a symposium on plant cell technology, held in Giessen, Germany in 1984.

In twenty papers different approaches to the understanding and manipulation of the biogenetic pathways of secondary metabolites in plant cells have been worked out. They vary from studies of the activities of the enzymes involved, knowledge of the role of intermediates and degradation of metabolites to application of protoplasts fusion and multiple shoot cultures. Two papers deal with the use of bioreactors for the production of rosmarinic acid and cardiac glycosides. In the latter case specific emphasis has been laid on the validity of bioconversion. Furthermore, techniques and potentials for immobilisation and cryopreservation of plant cells of biotechnological value have been reviewed in this section.

In a separate section three papers describe ways of inducing herbicide resistance as well as the biochemical explanation of this phenomenon.

An important asset of this book is that the subjects are not restricted to secondary metabolism alone. Six contributions deal with primary metabolism. It is all to the good that the linkage of the primary and secondary metabolism is now receiving more attention. Understanding the influence and alteration of photosynthesis, assimilation and nitrogen flow on the growth and biogenetic properties of the plant cells may provide the basis for directed manipulation of the cell in order to trigger biogenetic pathways involved in secondary metabolism.

After reading the book, it is not difficult to understand the enthusiasm expressed by the participants in the symposium in 1984. It is therefore that apart from the introduction of the book and the pages devoted to the future prospects of plant cell technology, I strongly recommend this book to anyone who is interested and/or concerned in this field of research.

H. J. HUIZING

J. D. BEWLEY and M. BLACK: *Seeds. Physiology of Development and Germination.* Plenum Press, New York and London, 1985. XIII + 367 pp., ill. Cloth. US \$ 54.00; in US and Canada \$ 45.00. ISBN 0-306-41687-5.

The scientific literature on seed biology is large and continues to expand rapidly. Both authors of this book are well-known for their two volume monograph 'The physiology and biochemistry of seeds and their germination' (Springer, 1982). In contrast to that comprehensive account and standard work on seeds, this book was merely intended to be a generalized consideration of the essential aspects of seed physiology and biochemistry. It turned out to be an excellent introduction and synopsis in seed biology.

The first five chapters are dealing with seed structure and composition, development and maturation, storage and germination, the cellular events during germination, the dormancy and the control of germination. Some ecophysiological aspects are discussed in chapter 6, mobilisation of stored reserves and its control are outlined in chapter 7 and 8.

The text is well-illustrated with simple diagrams and fine line-drawings, but the quality of the EM and lightmicrographs is poor (probably due to the used printingtechnique). Every chapter is concluded with a selected choice of references for an adequate introduction to early and recent literature on seed biology. Some familiarity with the basics of plant physiology is a prerequisite, but those who did not catch up with modern developments in biochemistry will benefit from the included details of biochemical fundamentals.

This book may be regarded as an excellent textbook and will undoubtedly become the first resort for students and teachers coming new to the subject. Price and content are well-balanced. No library should miss its copy.

H. W. GROENEVELD

B. E. S. GUNNING and M. W. STEER: *Bildatlas zur Biologie der Pflanzenzelle.* 3. Auflage. Gustav Fischer Verlag, Stuttgart, New York, 1986. 103 pp., 49 plates. Paperback. DM 34.- ISBN 3-437-20368-1.

This book is a translation of 'Plant Cell Biology: an ultrastructural approach, 1975', which contains the light and electron micrographs with their description of a more extensive work: 'Ultrastructure and Biology of Plant Cells' by the same authors, published by Edward Arnold in 1975. More than 200 micrographs illustrating the diversity of structure in plant cells are described and interpreted. The selected material is of interest to university students of plant cell biology and the comprehensible presentation has already proven its merits. Differences from the earlier editions are only marginal, the micrographs in all are the same. A new edition should include coated pits and coated vesicles and their possible roles in plant cells.

A. M. C. EMONS

H. CROASDALE and E. A. FLINT: *Flora of New Zealand. Freshwater algae, Chlorophyta, Desmids. With ecological comments on their habitats*. Vol. I. V.R. Ward, Government Printer, Wellington, New Zealand, 1986. XII + 132 pp., 27 plates. Cloth \$ 49.95 ISBN 0-477-01353-8.

This is the first part of a New Zealand desmid flora, planned as a three-volume work. It deals with the families Mesotaeniaceae, Gonatozygaceae, Peniaceae and Closteriaceae and the relatively small genera *Pleurotaenium*, *Triploceras*, *Tetmemorus*, *Euastrum* and *Micrasterias* of the fam. Desmidiaceae s.s. The first author is well-known as one of the main co-operators of the Synopsis of North American Desmids, so it will be no accident that both publications resemble each other in intention and design. The flora of New Zealand Desmids too is rather a synopsis, a compilation of published data than a critical flora. The preface, as far as dealing with general morphological and systematic features, is very concise and focussed on the terminology necessary for identification. On the other hand much attention is paid to the topography, environmental description and bibliographical documentation regarding the collection sites, even eight colour photographs of sampling stations are included. Welcome is the presentation of a simple method for measuring the curvature of *Closterium* cells, as previously introduced by J. Heimans. Among the numerous illustrations of desmid taxa – for the most part copied from world literature – are some doubtful ones, e.g. of *Closterium moniliferum* (cf. *C. littorale* var. *crassum*), *C. cornu* (cf. *C. limneticum*) and *Penium polymorphum* (cf. *Actinotaenium silvae nigrae*). An other objection is the varying scale of magnification even within the individual plates. Moreover the magnification is only mentioned in the legends, not figured by means of scale bars. The identification key to the genera contains severe imperfections and inaccuracies (e.g. the genus *Staurastrum* can only be found by choosing for the alternative of more than one spine per lateral angle; the characteristics differentiating *Penium* from *Actinotaenium* are incorrectly formulated).

Unfortunately the applicability of this flora will hardly extend beyond New Zealand. Probably owing to the geographical isolation of these islands their desmid flora is rather modest in species richness. The occurrence of some propable endemics such as *Euastrum mammatum*, *E. rotundum* and *E. haplos* is balanced by the apparent absence of many almost cosmopolitan species (as *E. verrucosum*, *E. oblongum*, *E. humerosum*). This limits the use of this flora as a practical help for identification to phycologists and limnologists in New Zealand. However, as a synopsis of all possible documentation about the desmids of this isolated region it will be valuable for anybody who is interested in geographic distribution patterns of microorganisms, a topic that has suffered from the many gaps in the world-wide inventory of these organisms. The book is pleasantly produced and its price is reasonable.

P. F. M. COESEL

M. H. V. VAN REGENMORTEL and H. FRAENKEL-CONRAT (Eds.): *The plant viruses*. Vol. 2. *The rod-shaped plant viruses*. Plenum Press, New York and London, 1986. XVIII + 424 pp., ill. Cloth US \$ 65.00. ISBN 0-306-42258-1.

The second volume compiled by 22 distinguished authors contains information about the molecular biology of viruses with rod-shaped particles belonging to the following four groups: Tobamovirus, Tobravirus, Hordeivirus and Furovirus (Fungus-transmitted rod-shaped).

About one third of the volume is devoted to Tobacco Mosaic Virus (TMV), reflecting the importance of this plant virus for virologists. The structure, self-assembly, infectivity, replication, epidemiology and control are discussed, besides cytopathological effects and classification. The last three sections of the book concern the remaining groups covering the same and some other relevant topics. In their preface the editors state: 'the reader will discover that the boundaries of our knowledge concerning TMV are still being extended and the end is not yet in sight'. That is true indeed.

It is intriguing to learn that homology with sequences encoding the '30 K' protein of TMV has

been found in the circular RNA of Hepatitis Delta Virus. The importance of these data remains to be discovered.

The Tobravirusess have several features not found in other plant virus groups like the ability of RNA 1 to infect plants and induce symptoms on its own. For identification, nucleic acid hybridization using probes for RNA 1 is the most reliable test now available.

The Hordeivirus group contains three rather unusual, genetically unstable viruses: Barley Stripe Mosaic Virus, Poa Semilatifolius Virus and Lychnis Ringspot Virus: all with a tripartite genome. The information concerning the structural organization is still scanty.

Although the formation of a new group 'Furovirus' seems necessary, the taxonomic status of the 12 labile rod-shaped viruses involved is still uncertain. The group contains viruses infecting major crops like Beet Necrotic Yellow Vein and Soilborne Wheat Mosaic Virus.

The second volume of the Plant Viruses is a reflection of the enormous increase of knowledge of the four virus groups involved. For those working in this field the book is highly recommended.

The series should be at hand in libraries of institutes working with plant viruses.

D. H. WIERINGA-BRANTS

L. A. STAEHELIN and C. J. ARNTZEN (Eds.): *Photosynthesis III. Photosynthetic Membranes and Light Harvesting Systems*.

(Encyclopedia of Plant Physiology, New Series, Vol. 19). Springer Verlag, Berlin, Heidelberg, New York, Tokyo, 1986. XXVIII + 802 pp., 163 figs. Hard cover DM 498.-. ISBN 3-540-16140-6.

The preface to the present volume shows that the editors did not only choose matter complementing the volume I of 1977, but also wanted to provide an update of areas covered in that volume, thus increasing the literature covered from 1974 to 1984, with occasional references dated 1985. It seems to have been a wise policy. The well-produced book pays special attention to the trend 'toward increased integration of biochemical and biophysical approaches to study photosynthetic membranes and light harvesting systems and a renewed appreciation of the structural parameters of membrane organisation.' The editors have brought excellent cohesion in 49 papers by 67 authors (7 only from volume I) by starting with 5 authoritative, single-author reviews (250 pages) followed by 6 subdivided chapters with more specialized papers that provide insight in the state of the art. There is ample cross-referencing between the initial reviews and the specialists' contributions. The editors merit much praise for the increased readability thus achieved.

This reviewer, not being a biophysicist, will restrict his comment on the concerned papers to the observation that, whereas in volume I, of 53 authors, 4 were dutch, there is only one (biophysical) paper here by a dutch author. Is it possible that photosynthesis is loosing its traditional strong place in biological research in our country?

I was very impressed by the opening review by Staehelin, which contains, among many other matters, a full treatment of the thylakoid structure of the many and various phyla of algae that are usually quite inconspicuous to land-dwellers. Also I was particularly charmed and fascinated by Dutton's review which demonstrates again the scientific importance of bacterial photosynthesis very readably, and especially by his prudently-worded but unmistakable treatment of comprehensive insights which make the metabolism of photosynthetic bacteria, chloroplasts and mitochondria comparable (p. 198-200). I was also impressed by casual remarks (p. 204-205) on the 'remarkable similarities between elements of photosystem II to those of purple bacteria', followed by a remark that 'the reaction center of photosystem I (P700) appears generally to be similar to that of the green sulfur bacteria', and to 'fascinating' new developments which may in the future open a way 'to come to an understanding of the emergence of the oxygen-evolving system of chloroplasts.' (p. 231). The importance of such potential contributions of photosynthesis research to general biology and evolutionary theory will need no further comment.

The price of such important books puts them out of range for most individual scientists. Hence, scientific institutions, e.g. universities, would be ill-advised if they followed suggestions to cut deeply in their library budgets in order to save as many of their staff as possible. An up-to-date library is an absolute requirement for up-to-date research.

J. F. G. M. WINTERMANS

S. M. WALTERS, A. BRADY, C. D. BRICKELL, J. CULLEN, P. S. GREEN, J. LEWIS, V. A. MATTHEWS, D. A. WEBB, P. F. YEO and J. C. M. ALEXANDER (Eds.): *The European Garden Flora. Vol. I. Pteridophyta, Gymnospermae, Angiospermae – Monocotyledons (Part I) Alismataceae to Iridaceae*. Cambridge University Press, Cambridge, 1986. XV + 430 pp., 44 figs. Hard cover £ 55.00 (US \$ 99.00) ISBN 0-521-24859-0.

In a total of six volumes, the European Garden Flora describes ornamental plants of all types and from all phytogeographical areas, and supplies keys for their identification. 'European' means that cultural directions are added for the different parts of Europe. The taxa are arranged according to the classification system of Engler & Prantl.

The Editors are staff members of several botanical gardens and institutes in the United Kingdom, which also holds for most contributors, up until now.

Volume I discusses the ferns, gymnosperms and the greater part of the monocotyledonous Angiosperms, i.e. most of the bulbous and tuberous families. On an average c. 30% of the species per genus is included, with the understanding that somewhat more attention is paid to groups from temperate regions. The botanical language is kept fairly simple and a number of black and white figures illustrate the text. Relevant literature is cited with each genus, and the useful references to illustrations which are given for nearly all species and subspecific taxa should be particularly mentioned.

The following drawbacks can be established, some of which are due to the fact that many different authors are involved. A number of fernfound silhouettes are not as well printed as might have been. Some figures are furnished with a scale or magnification rate, others are not. Both the broad and the narrow species concept are used; for instance, only one species is recognized in the *Gloriosa superba* group while no less than six are recognized in the *Narcissus tazetta* complex. It is a pity that the information on cultivation, somewhat unequally and usually scantily supplied, is mainly focused on temperature while other important climatological and edaphic factors are barely considered.

As a garden *flora*, however, this first volume shows the same high standard which is also found in other modern floras produced in the United Kingdom. It is a very useful and even an indispensable book for amateur and professional horticulturists, as well as for all other botanists concerned with cultivated plants. It may be expected that the other volumes in the series will be as useful as well.

J. H. IETSWAART

E. HULTÉN (†) and M. FRIES: *Atlas of North European Vascular Plants (North of the Tropic of Cancer)*. Koeltz Scientific books, Königstein 1986. xvi + 1172 pp. in 3 vols., 1936 maps. Cloth. DM 540,-. ISBN 3-87429-263-0 (Vols. 1-3).

The present work can be considered as a critically revised combination of Hultén's three plantgeographical works: that on the distribution of Nordic plants (1971), the one on the Amphi-atlantic plants (1973), and that on the Circumpolar plants (1962; 1971). In its present form, it comprises maps of nearly 2000 species together with plantgeographical information on another 2500 related taxa. The maps are like those of the Amphi-atlantic and Circumpolar plants: in a projection with the north Pole in the centre and radiating towards the Tropic of Cancer, and with five altitudinal zones in four shades of green, the plant occurrences in oxblood colour. Species are again presented in systematical order according to the system adopted in *Flora Europaea* (with the monocots, however, directly after the gymnosperms). The first and second volumes comprise maps only, the third volume contains the text. The text for each map is brief, giving a summary of the area, taxonomic notes with references, and references to Hultén's earlier works and to that of Meusel c.s. It is regrettable for the botanical world that Hultén himself did not live to finish it. Fries, however, did perform an excellent piece of editing so that it could be published as a whole only five years after Hultén's

decease. As a very minor remark it can be mentioned that the maps are not very accurate for The Netherlands, which is, however only a minute part of the Northern Hemisphere. Printing and presentation of the work by Koeltz is excellent, in full accordance with the intrinsic value of Hultén's *magnum opus*.

R. VAN DER MEIJDEN

S. SPRUNGER (Ed.): *Orchids from Curtis's Botanical Magazine*. Cambridge University Press, Cambridge, 1986. 525 pp., figs. of almost 1200 species in colour. Hard cover. £ 85.00, US \$ 150.00. ISBN 0-521-32595-1

This book contains reproductions of all hand-coloured orchid plates, 1176 in number, that appeared in Curtis's Botanical Magazine from its foundation, in 1787, to 1948. The illustrations, made by leading botanical artists of the period under the close supervision of eminent scientists, generally are of a very high standard. Many plates also include analytical drawings, which enhances their value even more.

To bring together the whole collection, Sprunger could draw upon the resources of the libraries at the Botanical Institute of the University of Basle, where an almost complete set is present, and the Institute of Systematic Botany of the University of Zürich for a few plates missing (or damaged) in the Basle set. The plates are arranged alphabetically by genus and (in large majority) by species. Large plates in the original edition (foldouts) are reproduced full-size, whereas the smaller plates have been slightly reduced to make them fit 4 on a page. The nomenclature has been brought up to date, including synonyms and bibliography. There are also notes on geographical distribution and cultural requirements. The descriptions originally accompanying the plates were left out for obvious reasons: part of this information is outdated now, and inclusion would have enlarged the whole to unacceptable proportions. There are two catalogues, one listing taxa found in the present volume, and one listing taxa illustrated during the period 1948–1983.

The introduction is written by Dr. Phillip Cribb, curator of the Orchid Herbarium at Kew Gardens. This contains a brief history of Botanical Magazine and biographical notes on authors and artists who made substantial contributions, as well as a chronological listing of all artists involved. Also, many data of bibliographical interest are to be found in the introduction.

There are some minor points of criticism. In the bibliography some explanatory remarks are in German, others in English. The reason for this is not clear. Some recent papers by L. A. Garay which are not without impact on orchid systematics should have been included in the list. It may suffice to mention the following: On the systematics of monopodial orchids. I. (*Bot. Mus. Leafsl.* 23: 149 et seq. 1972); Systematics of the Physurinae in the New World. (*Bradea* 2: 191 et seq. 1977); Orchidaceae. I. (in Harling & Sparre: *Flora of Ecuador* 9. 1978); A generic revision of the Spiranthinae. (*Bot. Mus. Leafsl.* 28: 277 et seq. 1980). Contributions on orchids which appeared in *Die Natürlichen Pflanzenfamilien* and in *Das Pflanzenreich*, though partly of disputed value (Kränzlin), should not have been omitted. The gender of the name *Mormodes* should be treated as feminine, following Lindley who founded the genus. *Porroglossum echidnum* should read *P. echidna*, since Reichenbach f., in having printed *Masdevallia Echidna* (note capital E), clearly appears to refer to the Australian spiny anteater. *Phaius tankervilleae* should be read *P. tancarvilleae*.

One could probably add some more details to the above. As already indicated, however, these are of minor significance. What really matters is that Sprunger, a Swiss horticulturist with a special interest in orchids, has packed a wealth of information now in a single book.

This superbly executed volume is a must for anyone dealing with orchids, whether professional botanist, amateur, or grower.

L. Y. TH. WESTRA

M. KEDVES: *Introduction to the palynology of pre-Quaternary deposits*. Part I. 164 pp., 24 figs. 20 plates. ISBN 963-05-4190-4; Part II. 144 pp., 48 figs. ISBN 963-05-4191-2. (*Studia Biologica Hungarica*, Vols. 19 and 20). Akadémiai Kiadó, Budapest, 1986. Paper, US \$ 26.00

There is an ever increasing need for books introducing the fundamentals of palynology. Miklós Kedves, an experienced lecturer at the University of Szeged who taught palynology at various educational levels, has attempted to supply this long-felt want. In two issues of the *Studia Biologica Hungarica* he has drawn on his teaching experience to develop an introduction to pre-Quaternary palynology, designed for students or non-specialists having an interest in the potential of palynology in biological and geological research.

Part I concentrates on various aspects of the methodologies applied in the study and interpretation of spores and pollen grains. Part II provides general accounts of achievements in Precambrian, Palaeozoic, Mesozoic and Tertiary palynology.

The format of Kedves' approach is that of an annotated guide to what he calls 'fundamental literature'. In short chapters he briefly summarizes what the reader can expect to learn from specialized research papers on the various topics treated. Such an approach encourages reader participation to a great extent. While that may be ideal in the educational environment of a training institute where palynological literature is readily available, the home-reader may soon become frustrated by not knowing where to trace copies of the hundreds of papers, which are needed to become familiar with the current possibilities and limitations of palynological research. Thus, in practice, the actual coverage of most areas often seems too brief and incomplete to be of much help in the early learning process of a beginner who cannot rely on adequate library facilities of assistance or a tutor.

Although failing as a self-teaching course, a good and original point remains that Kedves has based his introduction on an exemplary knowledge of palynological literature published all over the world. However, any publisher should realize that palynology is still in a very dynamic state of development, so that a literature guide completed in 1980 cannot serve as an up-to-date introduction when released in 1986.

H. VISSCHER

M. KEDVES: *Paleogene fossil sporomorphs of the Bakony Mountains* Part IV. Akadémiai Kiadó, Budapest, 1986. 121 pp., 8 figs. Paper. US \$ 11.00. ISBN 963-05-4066-5. (*Studia Biologica Hungarica*, vol. 21)

Since the early sixties Miklós Kedves has concentrated his palynological research on the study of Early Tertiary (Paleogene) spores and pollen grains. In this area he has become an internationally recognized expert. Much of his work is dealing with palynological assemblages from the Paleogene of the Bakony Mountains, Hungary. Already in 1973, 1974 and 1978 the results of his taxonomic studies on this material were published in the *Studia Botanica Hungarica*. As a sequel to these publications, Part IV of Kedves' 'Paleogene fossil sporomorphs of the Bakony Mountains' now provides a stratigraphical evaluation of the assemblages so far investigated.

After a comprehensive review of literature on Paleogene palynology not yet treated in the earlier parts, Kedves presents a wealth of information on the composition of successive spore/pollen assemblages encountered in samples from a large number of boreholes. Extensive species lists, enclosed semi-quantitative distribution charts as well as a detailed discussion provide an invaluable source of information to experienced palynologists who wish to include the Hungarian palynological record in inter-regional stratigraphical, phytogeographical or palaeo-ecological considerations. When studying Part IV, however, it is absolutely necessary to have the previous taxonomic parts permanently available for consultation.

H. VISSCHER

H. F. LINSKENS & J. F. JACKSON (EDS.): *Modern Methods of Plant Analysis. New Series. Vol. 1. Cell components*. Springer Verlag, Berlin, Heidelberg, New York, Tokyo, 1985. XX + 399 pp., 96 figs. Hard cover DM 238.- (Reduced price for subscribers to the entire series: Hard cover DM 198.-) ISBN 3-540-15822-7.

This book presents descriptions of up-to-date methods for plant analysis. It is the first volume in the new series of 'Modern Methods of Plant analysis', which is a continuation of the earlier series with the same name, edited by K. Paech, M. V. Tracey and H. F. Linskens (et al.), from which seven volumes appeared between 1956 and 1964.

This volume 'Cell Components and Organelles' deals mainly with the study of cell organelles after fractionation. The first two chapters deal with the cell wall, the structure which differentiates most plants cells from animal and bacterial cells. Studies on cell wall isolation and on general growth aspects of cell walls are reported. The second chapter describes cell wall chemistry, structure and components. The old concept that the plant cell wall is a rigid and inert structure constructed as the end-product of a plant cell has clearly been replaced by the new idea that the cell walls of a growing plant are undergoing turn-over.

A significant breakthrough in plant cell fractionation has been the production of protoplasts by enzymic breakdown of the cell wall. Protoplast formation is dealt with in the third chapter. In addition, methods are presented for protoplast lysis and isolation and purification of its components. One must, however, keep in mind that protoplasts may not be equivalent to the cells of the originating tissue.

The fourth chapter gives general practical guidance in the use of markers in plant cell fractionation. This basic approach complements the description of the use of specific 'markers' assay procedures given in other chapters of this book. In the following chapters the various cell components and organelles are treated. First the plasma membrane, which likely plays a role in resistance of cells towards pathogens, in frost hardiness, and in blue light photomorphogenesis. Though some of these events may be studied with protoplasts or cells in situ, also isolated plasma membranes are important in the unveiling of the functions of the plasma membrane. Regarding the indeed justified place given in this book to the cell wall, one regrets the omission of studies on attempts to produce cell wall microfibrils in vitro by means of isolated plasma membrane fractions.

The endomembrane system is a membrane continuum with parts that are functionally distinct: the biosynthetic compartment, endoplasmic reticulum and Golgi apparatus and the lytic compartment, the vacuoles, which contain hydrolases and serve storage, osmotic and other functions. By omitting coated pits and coated vesicles, which is a serious shortcoming, this book misses the opportunity to show the possible relation between biosynthetic and lytic compartment. It is not at all clear why the Golgi apparatus with dictyosomes and Golgi vesicles, important organelles in the formation of the cell wall, are not treated.

Chloroplasts and non-green plastids are extensively treated in as much as 145 pages: isolation of the chloroplast as a whole, purification of inner and outer chloroplast envelope membranes, isolation, subfractionation and purification of the supramolecular complexes of the chloroplast thylakoid membrane and isolation and characterization of nongreen plastids. The chapter on ribulose-biphosphate carboxylase, the major protein of chloroplast stroma is by C. Peach, the son of the founder of the earlier series of 'Modern Methods of Plant analysis'. The chapters on mitochondria and on the nucleus are by J. F. Jackson, one of the editors of the new series. The book furthermore includes chapters on protein bodies, lipid bodies and polyribosomes. With respect to the cytoskeleton only the microtubules are treated.

To study biochemical functions through cell fractionation is no easy task, and should be performed with as much rigor as is technically possible. The major problems which occur during cell fractionation and the potential erroneous conclusions drawn from experiments without appropriate controls are discussed in this book.

The first volume of the new series of 'Modern Methods of Plant analysis' is a handbook on the

sophisticated methods of cell fractionation and will surely find its way to those working in plant sciences and related fields.

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T. L. WANG (Ed.): *Immunology in plant science*. Cambridge University Press, Cambridge, 1986. 228 pp., ill. Hard covers (ISBN 0-521-30746-5) £ 27.50; paperback (ISBN 0-521-31480-1) £ 9.95.

This book contains the invited papers presented at the Leeds meeting of the Society for Experimental Biology in January 1985. It describes the advances that have been made in the study of plant cells through the application of antibody technology. The initial chapter gives an overall introduction to immunology. This minimal knowledge of fundamental immunology is a must for all researchers using immunological techniques. All other chapters contain a Protocols section, in which the relevant practical aspects of using antibodies to the topic in question are clearly described. The book shows that immunological techniques are in use in a wide range of areas of plant cell biology.

A promising technique for solving complex problems in the study of plant hormones is the combination of immunoassays and HPLC. Enzyme immunocytochemistry represents an important improvement for the localization of enzymes at tissue, cellular, and subcellular levels, because it visualizes enzymes at their normal sites within cells. The technique is suitable even if isozymes are present. Antibodies are now being used in studies of the plant cell surface: the identification of oligosaccharide moieties involved in cell-signalling and recognition, the mapping of structural domains within cell wall glycoproteins and the cloning of genes that code for hydroxyproline rich structural glycoproteins and incompatibility glycoproteins. An advantage of immunofluorescence studies over electron microscopy is that the cytoskeleton of whole cells can be viewed. In the past the cell wall presented a barrier to the entry of antibodies. Fixation and permeabilization strategies have overcome this problem. From immunological techniques microtubules appear to play an important role in morphogenesis. An intermediate filament-like system seems to be present in plant cells, and the distribution of actin filaments observed with rhodamine-phalloidin has been confirmed with monospecific antibodies from antisera against actin. Studies on cytoskeletal associated proteins will become possible with the availability of antisera raised specifically against plant proteins. In molecular biology antibodies are used in immunoprecipitation of translation products, of polypeptides and of polysomes. Antibodies have also been used in the study of phytochrome. Monoclonal antibodies to nodule-specific antigens have been used in the study of *Rhizobium* symbiotic mutants. In plant pathology, immunoassays are used for identification of pathogens, diagnosis of plant viruses, and quantitative measurement of particle or organism numbers and distribution of pathogens in plant tissues.

The importance of immunological techniques in plant science is underlined by Weiler et al. (p. 50): 'Immunoassay is such a flexible technique that there seems little limitation other than the imagination of the researcher, for the improvement of existing assays and the development and use of new ones'. The application of immunological techniques in electron microscopy is only scarcely mentioned in this book, but is already giving a strong impulse to cell biology of animal cells, and will prove its importance to plant cell biology in the near future.

In conclusion, this book is highly recommended to all plant cell biologists and its moderate price should enable a wide distribution.

A. M. C. EMONS