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Book Reviews

The Impact of Biotechnology on Agriculture

R.S. Sangwan and B.S. Sangwan-Norreel
Kluwer Academic Publishers, Dordrecht. 1990.
485 pp. Illustrated, hard cover. US$142.00,
UK£89.00, Dfl.240.00. ISBN 0-792-30741-0.

The Impact of Biotechnology on Agriculture comprises the proceedings of The International Conference: 'The Meeting Point between Fundamental and Applied in-vitro Culture Research', held at Amiens (France) on 10–12 July 1989. The book under discussion is volume 8 of the series *Current Plant Science and Biotechnology in Agriculture*. It contains 53 contributions, presented at the conference, 28 as selected extended papers and 25 as abstracts. The book starts with a special essay on the history of tissue culture by S.C. Maheshwari, followed by five sections. Section 1 on plant regeneration includes clonal multiplication, organogenesis, somatic embryogenesis and haploidy. Section 2 on plant genetic engineering includes non-sexual gene transfer, somatic hybridization, *Agrobacterium*-mediated and direct gene transfer, somaclonal variations and isolation of mutants resistant to herbicides, insects, plant pathogens, etc. Two papers, one on the cytoskeleton and the other on glyphosate tolerance, constitute section 3, named 'special topics'. Cryopreservation of plant cells is the subject of one paper in section 4. Section 5 contains abstracts. The editors have tried to touch upon a range of disciplines across the entire spectrum of plant biotechnology ranging from in-vitro plant multiplication to the use of recombinant DNA. This book therefore gives a good survey of the current developments in plant biotechnology. The editors requested that contributing authors write a paper on their respective subject of no more than 20 pages. The authors had great freedom concerning the contents of the paper. The consequence is that both the quality and the extent of the treatment of the subject differs strongly between the different papers. Depending on one's subject of interest this book can give valuable information. It contains a large number of references and can therefore be used as a starting point for a literature search on the treated subjects. For a very detailed survey of the current developments in plant biotechnology I would recommend a consultation of the proceedings of the VIIth International Congress on Plant Tissue and Cell Culture held in Amsterdam on 24–29 June, 1990.

A. C. J. Timmers

The Connaraceae—a Taxonomic Study with Emphasis on Africa

F.J. Breteler (ed.)
Agricultural University Wageningen Papers 89–6.
1989. 403 pp. Illustrated, paperback. Dfl.171.00.
ISBN 90-6754-158-3.

This taxonomic study of the chiefly plaeotropical family of the Connaraceae is unusual due to its multidisciplinary approach. The main part of the book is a description of the family and comprehensive revisions of ten genera by F. J. Breteler, J. Brouwer, V.E. Eimunjeze, C.C.H. Jongkind, R.H.J.M. Lemmens, and H.W. van Ziel. Lemmens and Jongkind, who both incorporated their PhD thesis into this book, are the authors of chapters on geographical distribution, general morphology, leaf anatomy, phytochemistry, and phylogeny. Other specialist chapters are by Arends (on chromosomes) and Den Outer & Veenendaal (on the large wood anatomical range in family). Multidisciplinary taxonomic monographs are usually much more than the sum of their specialized parts. This is also the case here, but the added value has not been fully exploited in the hypothetical reconstruction of the phylogeny of the family. Wood anatomical attributes have been left unemployed in this chapter, despite the fact that they would have been highly suitable for inclusion in the cladistic analysis, with interesting possibilities for putting the xylem phylogenetic dogmas to the test. Despite this minor criticism this goldmine of information on the Connaraceae must be applauded, and recommended for all libraries of systematic and comparative botany.

P. Baas

Key Works to the Fauna and Flora of the British Isles and North-western Europe, 5th edition

R.W. Sims, P. Freeman and D.L. Hawksworth (eds)
Clarendon Press, Oxford (Systematics Association Special Volumes no. 33). 1988. viii + 312 pp.
Hardback, UK£35.00. ISBN 0-19-857706-0.

This is an update of the guide to references which can be used to identify living organisms of the British Isles, north-western Europe and the shelf seas. A small selection of key works is given for most groups of organisms. For the seed plants there is also a geographical listing, with the Netherlands represented by Boom & Ruys' *Flora der Gekweekte Kruidachtige Gewassen*, the incomplete *Flora Neerlandica* (said to

be published by 'De Vereenigin') and Van der Meijden & Heukels' *Flora van Nederland.*

P. BAAS

The Structural Biology of Palms

P.B. Tomlinson
Clarendon Press, Oxford. 1990. xii + 477 pp.
Illustrated, hard cover. £60.00. ISBN 0-19-854572-X.

Almost 30 years after his first major contribution to palm anatomy (volume 2 in '*Anatomy of the Monocotyledons*', edited by C. R. Metcalfe) the author has treated us to a new book on the structural biology of palms. Classical anatomy and structural biology embodied in these two contributions are indeed worlds apart. The first provided, as it were, valuable pieces of a jigsaw puzzle; the latter adds developmental, constructional and other functional dimensions to provide a more dynamic picture of palms.

The introductory chapter alone contains a wealth of information on the history of palm studies, palm classification, distribution, ecology, pollination biology, breeding mechanisms, palm predators, and economic aspects. Chapters 2–4 address phasic development, culminating in the mature vegetative phase which is described with reference to architectural models in chapter 5. The following chapter deals with vascular anatomy and gives a comprehensive summary of the elegant work Tomlinson, Zimmermann, and others have carried out using three-dimensional analysis of serial sections and surfaces. Palm stem mechanics, age determination, hydraulic architecture, and vascular development are the subject of chapters 7 and 8. Leaves, roots, inflorescences, flowers and fruits are – as much as current knowledge allows – treated like the stem, with equal attention to development, structural diversity, and function. There is a special chapter on defences; mainly spines and various chemical deterrents (especially silica). In the final chapter on the relationships and origin of palms the author emphasises the isolated position of the group, and tells us that the structural biology of plants must be better understood in general before evolutionary scenarios can be reconstructed.

In the introduction, Tomlinson makes the point that the study of palm trees requires a certain lunacy. I have not found any trace of mental instability in this extremely well-written book (except perhaps in the rather amusing citation mistakes of that proud Dutch publication, which appears with three variants in the list of references, one of which: '*Proceedihngs Koninglens nederlandisches Akademie wetenschapens*' approaches, most closely, a yet-to-be-designed language for a united Europe). One would wish more plant groups to receive the same treatment as the author now has awarded the palm family.

P. BAAS

Useful Plants of Manang District

P. Pohle
Franz Steiner Verlag Wiesbaden GmbH, Stuttgart.
1990. vi + 65 pp. Illustrated, paperback. DM38.00.
ISBN 3-515-05743-9.

This contribution to the ethnobotany of the Nepal–Himalaya constitutes instalment 16 of the Nepal Research Centre Publications edited by A. Wezler. Following introductory chapters on the research area (a high altitude region in north-central Nepal) and transliteration and transcription of vernacular plant names, the author gives concise, annotated lists of medicinal plants, nutrative and narcotic producing plants, ritual plants, and other useful plants in three different parts of the Manang district. The short notes accompanying each vernacular and latin name contain a wealth of ethnobotanical information. Altogether 239 useful plants are recorded. In the final chapter differences in traditional plant knowledge and uses between the three different areas are analysed and discussed.

P. BAAS

Morphology, Development, and Systematic Relevance of Pollen and Spores (*Pl. Syst. Evol. Suppl. 5*)

M. Hesse and F. Ehrendorfer (eds)
Springer-Verlag, Wien. 1990. viii + 124 pp.
Illustrated, hard cover. DM138.00 (DM124.20 to subscribers of *Pl. Syst. Evol.*). ISBN 3-211-82182-1.

This book provides a selection of the papers presented at the symposium 'Spores of pteridophytes and pollen grains: development, function, comparative morphology and evolution', held during the XIV International Botanical Congress in Berlin (1987). Nine of the 18 papers presented are included, roughly representing the themes of the symposium. Three deal with spores, either partly: sporoderm homologies in pollen and spores (S. Blackmore), harmomegathy (E. Pacini), or completely: evolution and ecological differentiation in fern spores (A.F. Tryon). The one on sporoderm homologies is especially important and clearly written. Two contributions describe ultrastructural aspects: fundamental exine structure (J.R. Rowley) and role of the microtubular cytoskeleton of microspore mother cells and tapetal cells in exine formation and patterning (S.J., Owens *et al.*). M.R. Bolick thoroughly explores the question of why pollen of anemophilous plants generally has a smoother exine surface than pollen of entomophilous plants. Harmomegathy of pollen and spores is treated by E. Pacini, mainly focusing on volumetric aspects. The developmental aspect of pollen and spores is included in the papers by Blackmore and Owens *et al.* Three

contributions focus on pollen morphology and taxonomy: of the genus *Acacia*, Leguminosae (P. Guinet), of the subfamily Cordioideae, Boraginaceae (J.W. Nowicke and J.S. Miller) and of the Apocynaceae (S. Nilsson), the last author also reflects on evolution. A limited subject index is provided.

The book deals with major topics in current pollen morphology, and offers a number of interesting case studies. Most are illustrated very well (Blackmore's *Echinops* micrographs are really fascinating), but some suffer from poor visual representation of the material and results. This makes, for example, the *Acacia* paper, which is without any figure, hard to read. The paper on fundamental exine structure (a difficult subject) would gain much if the reconstruction were accompanied by a few diagrams. Technically speaking the book leaves nothing to be desired.

R.W.J.M. VAN DER HAM

The Coralline Red Algae. An Analysis of the Genera and Subfamilies of Nongeniculate Corallinaceae.

Wm.J. Woelkerling
British Museum (Natural History)/Oxford University Press. 268 pp. Illustrated, hard cover. £40.00. ISBN 0-19-859249-6.

Coralline algae occur in benthic marine communities throughout the world, where most of them form important components. For convenience they have customarily been divided into two groups, the non-articulated (non-geniculate) and the articulated species. The reviewed book only deals with the former group and provides a taxonomic and nomenclatural analysis of the genera and subfamilies of these interesting algae. Both fossil genera and holocene taxa are discussed, but emphasis has been placed on the recent ones.

Because of the different methods, including decalcification, embedding and sectioning, normally required to study the hard thalli of non-geniculate Corallinaceae, phycologists often consider them as one of the most difficult and troublesome groups of Rhodophyta. The author, however, follows van Steenis (*Flora Malesiana* ser. 1, Vol. 5) stating: 'that the majority of difficult groups are not so intended or created in nature, but that the difficulties have been created by the monographers'. According to Woelkerling this certainly applies to the non-geniculate Corallinaceae, a group with more than 1600 described taxa.

The vast amount of important and often new information of this monograph, which has mainly been selected and compiled by the author during his long-term research programme into the taxonomy of the non-geniculate Corallinaceae, summarizes the progress made towards achieving a stable taxonomic system for that group. The book contains general chapters on morphology, collecting, preservation and preparation of material, taxonomic literature and diagnostic features as well as historical analyses, identification keys, descriptions and other accounts on subfamilies and genera. The figures are often superb and always very informative. Glossaries and appendices as well as a conveniently arranged index perfect this book, a reference book of very high standard and an example to be followed in future monographs.

W.F. PRUD'HOMME VAN REINE

Stratification of Tropical Forests as seen in Leaf Structure, Part 2

B. Rollet, Ch. Högermann and I. Roth
Tasks for Vegetation Science 21. Kluwer, Dordrecht. 1990. xv + 246 pp. Illustrated, hardback. Dfl.275.00 $160.00, £99.50. ISBN 0-7923-0397-0.

Three aspects of stratification in amply sampled forest plots in Venezuelan Guyana are treated in this instalment of T: VS 21:

(a) leaf morphology (in 197 species) by B. Rollet; (b) leaf venation (in 39 species of 3 families) by C. Högermann; and (c) miscellaneous leaf surface structures thought to function in gas exchange, guttation or light capture, by I. Roth.

Earlier contributions in the series of publications on the same samples from Venezuela dealt with leaf anatomy, bark structure and fruit and seed attributes. These have received very critical reviews by ecologists and anatomists. This explains why in this book there is a very unusual defensive preface by the series editor, H. Leith, one of the authors, I. Roth, and the publisher. Their awareness of criticism might inspire hope for improved standards in the present volume. Alas, this optimism is unjustified. All three contributions are disappointing for various reasons: Rollet's chapter explores all sorts of quantitiative and semiquantitative leaf morphological attributes, presented as raw or semi-digested data in a large number of inacessible tables, often with a misleading impression of precision and with little effort at synthesis. What is to be made of this statement on p.47: 'the overall average (of form factor k) of 2/3 suggested by Cain *et al.* seems to be something of an underestimate' because Rollet found average k values to be 0.676 for simple leaves and 0.682 for leaflets of compound leaves!

Högermann's long-winded chapter, which interprets a large number of venation parameters, reads like an undergraduate thesis, and the small sample analysed does not allow meaningful conclusions about stratification in tropical forests, except perhaps the rather predictable correlation between vein density and tree height.

Roth's discussion of the functional significance of epidermal fissures, cork warts, (presumed) hydathodes, ocelli (i.e. lense-shaped epidermal cells), papillae, and surface sculpturing represents an example of the type of speculation which one can admire in Haberlandt's pioneering work around the turn of this century, but which should either be better informed or more cautious at our present stage of knowledge. With regard to guttation, Roth remarks on p. 235 that on certain nights it is so strong in tropical trees that a continuous rain of water falls from the leaves; here she describes the effects of water condensation on leaf surfaces which have nothing to do with guttation. Roth expresses astonishment 'that ecologists still object against our studies or devaluate them in a strange way'. I am sure that ecophysiologists find descriptive correlative analyses of functionally significant anatomical features interesting and important as long as they are carried out well. The latter condition is, alas, not met within the studies presented in this book. A missed opportunity for comparative anatomy and morphology.

P. BAAS

Plant Molecular Systematics—Macromolecular Approaches

D.J. Crawford
John Wiley & Sons, New York. 1990. xii + 388 pp. Illustrated hardcover. UK£39.80. ISBN 0-471-80760-5.

The development of molecular biology has had a tremendous impact on the biological sciences over the last three decades. Plant systematics is no exception to this rule. Crawford's *Plant Molecular Systematics* touches, superficially, almost anything you can think of. It provides the necessary background information on the structure of proteins and nucleic acids, the separation techniques of these macromolecules, and analyses of the data, including phylogenetic reconstruction. Advantages and disadvantages of the various types of macromolecular approaches are discussed to stress the author's point that particular types of macromolecular data provide best answers to particular systematic questions.

The book covers electrophoresis of seed proteins and Rubisco as well as the popular technique of enzyme electrophoresis. Coverage continues with analyses of infraspecific variation, interspecific relationships, modes of primary and hybrid speciation, and polyploidy. Furthermore, the use of isozyme number and amino acid sequencing in phylogenetic studies is detailed and serological techniques are discussed. Basic methodology of nuclear, ribosomal and chloroplast DNA analyses as well as their use in systematic studies is outlined in the last one-third of the book. It deals with DNA amounts, DNA-DNA hybridization, RFLPs, and sequencing. Finally, some case studies in molecular systematics (wheat, *Brassica*, and *Clarkia*) are presented.

There is one part in which I have some reservation, however, in this otherwise very useful book. Breeding systems are only mentioned in relation to adequate sampling of populations of outcrossing versus selfing species. One would think asexuality does not occur in vascular plants. Although the use of allozyme and DNA analyses for understanding the origin of auto- and allopolyploid species is treated in detail, nowhere does it become clear how to deal with clonal variation and complex polyploid species such as e.g. *Taraxacum*.

The book is carefully written and edited, well illustrated, and contains a good selection of the relevant literature. It is highly recommended as an up-to-date introduction to plant molecular systematics.

S. MENKEN

Methoden zur Pflanzenökologie und Bioindikation

K.H. Kreeb
Gustav Fischer Verlag, Stuttgart. 1990. 327 pp. Illustrated, hardcover, DM48.00.
ISBN 3-437-20437-8.

This book on methods in plant ecology and bioindication is an update and thus an extended second edition of the former '*Methoden zur Pflanzenökologie*' (1977). After a short introduction and a chapter on steps to adequate data handling, the remaining 16 chapters mainly concentrate on methods of water and irradiation ecology, and on the bio–indication of air pollution. Other topics in ecology seem to be unimportant: how is it possible to publish a book on methods in plant ecology without stressing problems on random and non-random sampling , the impact of plant age and environmental heterogeneity, etc.? Soil is a topic which is treated incredibly, on just one page; aspects of competition suffer the same fate. Although a book on the methods in plant ecology and bio–indication would be highly welcomed by students familiar with the German language, this book has too many gaps to guide plant ecologists through the last decade of this century.

W.H.O. ERNST

The Tree Habit in Land Plants

V. Mosbrugger
Lecture Notes in Earth Sciences 28, Springer-Verlag, Berlin. 1990. v + 161 pp. Illustrated, paperback. DM45.00. ISBN 3-540-52374-X.

These lecture notes deal with the construction of trunks in fossil and extant arborescent land plants, a little explored subject since the introduction of biomechanics into botany by Schwenderer in 1874.

Following a general and historical introduction, the author discusses trees as living systems, and the manyfold, often antagonistic functions trunks have to carry out. Some elementary biomechanical principles follow, with attention to mechanical wood properties, limiting factors for tapering solid columns, trunks and branches as cantilevers, cracks and fracture energy, prestressing, and options for the alternative strategies of stability and flexibility. In the main chapter three structural principles are recognized: (a) support provided by a wood or sclerenchyma cylinder (with three subtypes) represented by conifers, most dicots, Calamites, Lepidodendrales, etc., (b) support by isolated strengthening elements (with four subtypes) as in tree ferns, Medullosa, palms and certain cacti; (c) support by concentric plates, as in the pseudostems of bananas.

In the final discussion chapter the different, admittedly intergrading constructional types are viewed as the result of evolutionary strategies, bound by phylogenetic constraints and frought with paralellisms.

As the series name implies, this book should not be taken as a comprehensive reference discussing all problems of tree architecture. The author admits that there is a dearth of experimental data, resulting in an overspeculative nature of many of the biomechanical interpretations. Despite these shortcomings however, or perhaps thanks to them, these lecture notes are stimulating and contain many ideas to be followed up in future botanical research.

P. BAAS

Plant, Animal and Anatomical Illustration in Art and Science. A Bibliographical Guide from the 16th Century to the Present Day

G.R. Bridson and J.J. White
St. Paul's Bibliographies, Winchester & Hunt Institute for Botanical Documentation. 1990.
xxvii + 450 pp. Illustrated hardback £75.00.
ISBN 0-906795-81-8.

This bibliography aspires to be a comprehensive listing of primary instruction or a 'how to draw' books, and non-scientific iconographic or a 'pattern' books, published for artists and designers. It contains secondary historical, bibliographical and biographical literature on natural history and human anatomical illustration. 'Nature printing' and nature photography are also covered.

From the introduction it is clear that the authors primarily wish to be of service to future historical studies of biological illustration, and that they have considerable doubts about the interest their sources may have for artists, draughtsmen and photographers. Unfortunately one must share these doubts. This is not because there are not enough references but rather because the authors in their great zeal have cast too wide a net. There are no less than 197 bibliographical entries, 299 on nature illustration in general, 474 on plant illustrations, 1360 on animal portrayal, 949 depicting the human body, and 1284 references to artist biographies. In addition there are shortlists on 12 periodicals, 17 books on colour, and 17 organizations dealing in some way with illustrations of nature. It is not very clear who will benefit from these lists of mostly very rare and inaccessible publications, partly on obsolete techniques (especially in photography).

With so many subjects covered it is not surprising that the claim of comprensiveness on the dust cover is unjustified. For example, on pp.36 and 37 many editions of Leonhard Fuchs's famous 16th century herbal are listed, but not the most important first edition; the oldest and most important Dutch publication in this field, Karel Van Mander's *Schildersboek* is not included, while the later book by Samuel van Hoogstraaten is included. On the other hand many books containing beautiful illustrations but with little to do with instruction are included. In the geographical section on collections and exhibitions of plants in art and illustration there are some odd reallocations: The Hague in Belgium and the Swiss Winterthur in Germany. Such imperfections should of course not detract from the impressive amount of accurate and painstaking work also represented in this bibliography. Let us hope it will not end up like so many books listed in its pages, which — as the authors suspect in their introduction — were generally discarded soon after their purchase.

P.W. LEENHOUTS AND P. BAAS

Farn- und Samenpflanzen in Europa, mit Bestimmungsschlüsseln bis zu den Gattungen

H.O. Martensen and W. Probst
Gustav Fischer Verlag, Stuttgart/New York. 1990.
x + 525 pp. Illustrated, hardcover. DM89.00. ISBN 3-437-3049B-4.

The main body of this book consists of 'synoptic' keys, which are very original but complicated. They consist of full-page diagrams with 6–8 columns of characters and mostly three rows of character states. Aided by numerous small drawings one progresses through the consecutive tables from Cormobionta to Spermatophyta, Angiospermophytina, Magnoliatae, Rosidae, Rosanae, Rosales, Rosaceae, Rosoideae, to reach the last step: a 'normal' key to the genera of the subfamily (or in other cases the family or a tribe). One thus covers the whole hierarchy of intermediate taxa, which has, according to the authors, a distinct educational value. I am not convinced that this is so: many of these intermediate taxa have a highly debatable scientific and therefore educational value.

To find out about a species, one is referred to regional atlases and floras.

There is a general text paragraph on characters (also chemical), taxonomy and evolution interwoven into the keys for each subclass and higher taxon. In addition for each subclass there are one or two pages of very accurate illustrations that represent, by means of one species, each European order, including a diagram of the flower and often a flower formula. The book starts with 13 pages of Grundlagen: chapters on the species, higher categories, relationships, phylogeny, methodology, nomenclature, a short but useful and to the point introduction to the science of systematics and its methods. In my opinion the book suffers from not having one clear purpose and one clear market user. Is there a need for a (large) generic key and a general survey of vascular plant taxonomy in one volume?

It is, however, very well produced, the drawings are excellent, and the keys work although they are not easy to handle in the beginning.

C. KALKMAN

Plant Molecular Biology—Manual

S.B. Gelvin, R.A. Schilperoort and D.P.S. Verma (eds). Kluwer Academic Publishers, Dordrecht. 1989. xiii + 400 unnumbered pp. Illustrated, hardback. Dfl.165.00, US$89.00, UK£52.00. ISBN 0-7923-02362.

Molecular-biological techniques are excellent aids to the elucidation of regulatory mechanisms in plants. This manual offers descriptions of selected procedures and is designed both for advanced college level laboratory courses and as a bench guide for use in the laboratory. It comprises three sections: introduction of DNA into plant cells; expression of genes in plants; and fate of introduced genes, each consisting of short chapters by established experts giving some background information, as well as typical stepwise protocols of various techniques. Each chapter ends with references, including titles, for further consultation.

The various topics adequately cover the methods currently in use, particularly with regard to gene transfer and expression, as well as dissection of gene regulatory elements. Conspicuously missing, however, are some of the more recent techniques, such as 'biolistic' transformation with microprojectiles and the polymerase chain reaction, and the β-glucuronidase (GUS) assay is mentioned only in passing. Some common techniques, such as differential screening, are not described, so that a fair background knowledge of principles and basic procedures is required. Other common methods, however, are described at length often as part of more specific techniques. Thus, the book is not intended to provide a logical sequence of procedures to be followed when starting to apply molecular techniques to plant problems, but rather to be consulted when one wishes to apply a specific technique. Almost inevitably in a multi-author text, the individual chapters vary substantially in length and extent of detail. However, they provide first-hand protocols that have been thoroughly tested but may require some adaptation when one wishes to apply them to different plant species or tissues. In view of the still rapidly changing techniques, the publisher promises to periodically publish additional chapters that can replace or be added to this first edition.

L.C. VAN LOON

Research Advances in the Compositae

T.J. Mabry and G. Wagenitz (eds). Springer-Verlag, New York. 1990. v + 124 pp. Illustrated, hardback. DM138. ISBN 3211-821174-0.

In this volume six out of eight lectures (two have been published previously) given at the half-day Compositae-symposium of the XIV International Botanical Congress in Berlin, 26 July, 1987, are brought together. The aim of the symposium was to focus on new approaches to unravel the complicated systematics of the Compositae.

Bohlmann & Jakupovic and Bohlmann give a very useful compilation of the chemical compounds found in the tribes Vernonieae and Heliantheae respectively. However, they propose a classification for the genera of these tribes based mainly on the presence or absence of chemical compounds, as if these characters were of more importance than others.

The same holds for the phytoserological investigations of seed legumin of the tribe Cardueae s.l. by Fischer & Jensen. Although the results are interesting (Cardueae s.str. are serologically more similar to the tribe Lactuceae than to the other subtribes of the Cardueae s.l.) they cannot *a priori* over-rule previous classifications based on other characters.

In this respect Keeley & Turner give a more satisfactory approach in their cladistic analysis of Vernonia, using a variety of characters. Their OTU's are the type species of sections or subsections of the genus. Because of this, the resulting cladogram is highly provisional but very useful as a starting point for future analyses of the (sub-)sections.

The remaining two contributions are not purely taxonomic. Sundberg & Stuessy, in their overview of isolating mechanisms in the Heliantheae, try to stimulate taxonomists and evolutionary biologists to examine species relationships and the origins of diversity more intensively. Finally, Barkley attempts an explanation of the distribution as well as the problematic species delimitation in Senecio in the highlands of Mexico and Central America in a geohistorical way. The rapid and comparatively recent

fluctuations in local climates, as well as the creation by mankind of habitats favoured by many Senecio spp. are probably the main influencing factors.

Although the contributions in this book are all about Compositae, their subject matter is very diverse. The individual articles, however, are of considerable importance to specialists.

H. DUISTERMAAT

The Vascular Cambium

M. Iqbal (ed.). Research Studies Press, Taunton & John Wiley, New York. 1990. xviii + 246 pp. Illustrated, hardback, US$86.95. ISBN 0-86380-095-5 (Research Studies Press) and 0-471-92647-7 (John Wiley).

This book can be viewed as an update of Philipson, Ward & Butterfield's much consulted *The Vascular Cambium—Its Development and Activity*, published in 1971. A trio of authors did not suffice this time, and the editor invited 12 authorities on cambial research to review special topics. The resulting volume is aptly dedicated to the memory of the late Professor K.A. Chowdhury, a pioneer of cambial and wood research in India with wide international acclaim.

The chapters detail conceptual aspects and organization of the cambium (Iqbal & Ghouse), origin and development of cambial cells (Soh), cambial cytology and biochemistry (Catesson), parent cell walls (Mahmood), orientation phenomena in the cambium (Hejnowicz), seasonal cambial activity (Fahn & Werker), environmental influences on cambial activity (Creber & Chaloner), anomalous cambia (Philipson) and the evolution of the cambium (Chican & Taylor). Comprehensive author and subject indices facilitate the accessibility of the book as a source of reference.

Most chapters have the charm of combining a fairly well-balanced review of the literature with comprehensive presentations of the authors' original contributions to the field. A drawback is that they were apparently written several years ago so that there are only very few citations of work published after 1986.

The book can be recommended to active researchers as well as for advanced teaching.

P. BAAS

Advances in Botanical Research Vol. 17

J.A. Callow (ed.). Academic Press, London. 1990. xi + 303 pp. Illustrated, hardback. UK£52.00, US$103.00. ISBN 0-12-005917-7.

This volume of *Advances in Botanical Research* contains four most interesting review papers—two on classical subjects, namely plant evolution and ecology during the early tertiary (M.E. Collinson) and origin and evolution of angiosperm flowers (E.M. Friis & P.K. Endress); two on underexplored themes, namely bacterial leaf nodule symbiosis (I.M. Miller) and fracture properties of plants (J.F.V. Vincent).

The paper by Collinson provides a wealth of information on recent progress in our understanding of geological events, plant evolution, and changes in climate and vegetation during the Paleocene, Eocene and Oligocene. She convincingly argues in favour of further attempts at whole plant reconstructions and the application of ecological and functional anatomical analysis for future progress. Friis and Endress bring a much welcome synthesis of the achievements of neo- and palaeo-floral biology, and conclude that although Darwin's 'abominable mystery' has not yet been solved, it is no longer in deepest darkness.

Miller describes in detail the structural and developmental aspects of obligatory bacterial leaf nodule and leaf gland symbiosis in *Ardisia* (Myrsinaceae), *Psychotria* (Rubiaceae), and *Dioscorea* (Dioscoreaceae). The long-held belief that these nodules are involved in fixing atmospheric Nitrogen is exchanged for the better documented hypothesis that they provide the host plant with essential cytokinins.

Vincent's paper gives a refreshing mechanical approach to the fracture properties of plant cells, tissues and organs including abscission phenomena. These properties are not only important for the living plant but also for herbivores and omnivores (including man) whose appreciation of fruits and vegetables has much to do with the toughness and strength of the consumed product. One could have wished for more integration of biological aspects with the purely mechanical approach presented here. For instance, in the discussion of bruising tests of apples, one misses any mention of physiological responses of living parenchyma cells in repeated loading–unloading cycles.

This volume can be warmly recommended and does full justice to the series.

P. BAAS

Leaf Venation Patterns—Vol 4. Melastomataceae

E.P. Klucking and J. Cramer, Stuttgart. 1989. 293 pp. + 118 halftone plates, Hardback, DM260.00. ISBN 3-443-50004-8.

This fourth volume in a series on leaf venation patterns deals with the Melastomataceae, a large and interesting pan(sub)tropical family of trees, shrubs, climbers and herbs, which are often recognized in the field by their striking pattern of sub-parallel major veins. The author has studied and described 485 species belonging to 79 genera of the Melastomataceae and 70 species of three genera of the split-off family Memecylaceae. Most of these species are illustrated by leaf clearings in the 118 plates at the end of the book.

Despite the considerable amount of work invested, and the potentially useful dataset presented, one cannot help being disappointed by this book. Klucking's classification of venation patterns is mainly based on how the secondary veins are inserted at the leaf base. This leads to the assignment of strikingly different patterns to the same major group (e.g. *Memecylon afzelii* with its scalloped submarginal vein to the acrodromal group with mostly prominent subparallel secondary veins). Also the speculative and simplistic developmental hypotheses of the author about the axial and lateral expansion phase at which veins differentiate, is not helpful in accounting for the diverse patterns described. What irritates most, is that the literature and much debated taxonomic problems on (sub)family and generic delimitation in the Melastomataceae sensu lato are totally ignored. For instance, *Axinandra* is included in the Memecylaceae, but its closest relatives *Crypteronia* and *Dactylocladus* are not even mentioned. The opportunity to defeat the argument that venation patterns support the recognition of Memecylaceae as separate from the Melastomataceae is missed (cf. five *Memecylon* species on plates 104 and 105 with typical melastomatoid venation), Van Vliet has already made this point in his study on the wood anatomy of the family in which an alternative classification was suggested, which apparently escaped the attention of Dr Klucking. The catalogue of omissions could go on. The conclusion is that almost 100 years after Cogniaux's classical monograph of the family, this expensive book is hardly a step forward. Its main value is constituted by the 118 plates, provided that all identifications on the herbarium sheets from which the leaves were taken are correct. However, judging from the introduction by the author, special attempts to make sure this was the case were omitted.

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Plant Anatomy, 4th Edition

A. Fahn. Pergamon Press, Oxford. 1990. xi + 588 pp. Illustrated, paperback. US$49.95. ISBN 0-08-037491-3.

This fourth edition of Fahn's well known *Plant Anatomy* is a thorough update from the third edition published as recently as 1982. Noted significant additions in the sections on the cytoskeleton, crystals, cell wall formation, bud meristems, ecological wood anatomy, secretion, inclusion of branches in stemwood, pollen/stigma interfaces, the embryosac, and germination. Many new figures are added, as well as 550 extra literature references. The result is an increase in volume by 44 pages, and a price for the paperback edition which is still very reasonable. There is also a more expensive hardback edition.

The author is to be congratulated with the success of the various editions of his classical textbook.

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