Acta Bot. Neerl. 27(5/6), December 1978, p. 439–448.

BOOK REVIEWS

J. B. HARBORNE: *Introduction to ecological biochemistry.* Academic Press, London 1977, 243 p. £ 7.00.

The topic of this book concerns the (bio)chemistry of interactions occurring between plant and plant, plant and animal, and animal and animal. Research has been summarized on the biochemistry of plant pollination, plant toxins and their effects on animals, hormonal interactions between plants and animals, feeding preferences of insects and vertebrates, including man, animal pheromones and defence substances, biochemical interactions between higher plants and the role of phytoalexines and phytotoxins in disease resistance of plants. The text of each chapter is followed by a list of recent books and review articles on the topic of the chapter enabling the interested reader access to more information on the subject. It should be mentioned that not all interactions between organisms are covered in this book, partly because the information on the subject is rather fragmentary (higher plant parasitism, mycorrhiza), partly because text books on the subjects are available (lichens, animal diseases).

Reading the text is very pleasant. In simple language and with the aid of well-prepared figures of chemical structures of the substances involved the reader is introduced to the various relationships which link (field) observations with biochemistry. Occasionally a page reads like a good quality detective story, e.g. the story on the so-called "paper factor" in juvenile hormones (p. 97). Numerous interesting details are given, e.g. reversal of bitterness to sweetness in flavonoids, evolution of feeding deterrents in higher plants, to mention two examples.

In my opinion the chapter on the plant and its biochemical adaptation to the environment is out of place. In 27 pages adaptation to climate (including freezing, flooding and drought), to soil (salinity and metal toxicity) and "detoxification mechanisms" are covered. Biochemical aspects of environmental adaptations of plants (and of animals) should be treated much more extensively and preferably in a separate text book.

P. J. C. KUIPER

W. NEWTON, J. R. POSTGATE and C. RODRIGUEZ-BARRUCCA (eds.): *Recent developments in nitrogen fixation.* Academic Press, London, 1977. 622 p. Price £ 16.00, $ 31.25.

Since the energy crisis confronted the world with the exhaustion of the fossil sources of energy many efforts are made to use energy-saving methods in technology and agriculture. This implies a renewed interest in the possibilities for biological nitrogen fixation and the search for new inorganic catalysts which can reduce nitrogen without the application of high temperatures. Both directions of research are not as different as they might appear. The new chemical catalysts bear a striking resemblance to the enzyme nitrogenase. It is therefore highly important to stimulate multi-disciplinary discussions between chemists, biochemists, biologists and agronomists. Since 1974 every two years such interdisciplinary discussions are organized. The present book is a record of the proceedings of the second international symposium on nitrogen fixation organized in Salamanca, september 1976.

A symposium of this type is organized for specialists and many papers therefore are mainly of interest for those who are already specialized in certain aspects of this rapidly expanding field. In addition, for each subject area a synthesis lecture was given in which a distinguished contributor brings together the recent advances. These surveys make the book valuable for all non-specialists who are interested in the recent developments.

Special emphasis is given to the comparison between the chemical and biochemical systems, the recently discovered nitrogen fixation by certain strains of *Rhizobium* and the comparison with free-living bacteria like *Klebsiella*, and the possible importance of rhizosphere associations.

Notwithstanding a number of excellent articles on the symbiotic systems botanists still might have

appreciated a more thorough discussion of biological aspects. Recent developments in this fields certainly will enable such discussions in the next symposium.

A. QUISPEL

V. H. HEYWOOD, J. B. HARBORNE & B. L. TURNER (eds.): *The biology and Chemistry of the Compositae.* Academic Press Inc. (London), Ltd. (American edit.: Academic Press Inc., New York), 1977. 2 Vols.: I with IX + 619 pp., and II with 570 pp., numerous figures and microphotographs (numbered per chapter). Price per volume £ 27.50 – $ 53.75 (hard cover).

The more or less "holotaxonomic" treatment of a plant family is always to be welcomed and, if up to standard, to be applauded. Several years ago the Umbelliferae were treated in this way in a symposium book which had a good press. The present publication is also a symposium report containing contributions by a large number of specialists and it is, therefore, to be expected that not all chapters are of the same quality, but on the whole the level is quite high.

The taxon of the Compositae or Asteraceae, one of the largest of all plant families, is interesting for several reasons, partly because it contains so many well-known forms with singular characteristics (such as apomixis in *Taraxacum* and *Hieracium*), and partly because there are still some very interesting and unanswered problems, such as the question whether the Liguliflorae are to be segregated from the remainder of the family (and, if so, why), and the general, moot point of the phylogenetic origin and relationships of the Asterales. For this reason one starts looking for relevant evidence regarding such topics and for critical discussions, because there is no need of a mere rehash of established notions and standing problems. Such a non-committal treatment is not sufficiently compensated by the convenience of having a comprehensive and more or less complete and up-to-date reference source unless it is extremely well written and quite exhaustive. It is by these standards that a book of this kind must be judged on its merits, so that one must begin looking for "something new", a fresh or unconventional approach, a judicial use of pre-existing and new evidence, and an appraisal of the ensuing deductions.

A superficial glance through the two volumes already confirms the opinion that the scope suggested by the title is indeed to a large extent reflected in the contents. The more interesting parts are of course those directly relating to the biochemistry and the phytochemical features, to the karyological studies, and to the possible phylogeny of the family.

The perhaps most important general conclusion is that the alleged intranscendency between the liguliflorous composites and the other groups, at one time supposed to be quite sharply indicated by, *e.g.*, the presence or absence of laticifers and of acetylene compounds, is untenable, so that the Compositae as a whole constitute a much more homogeneous taxon than was hitherto assumed, which conclusion may also render the answering of the question of the evolution of the Asterales a good bit easier than one may have thought till recently.

There are indications of a relatively early origin of the Compositae and of a relationship with Umbelliferae, which leads indirectly to taxonomic affinities, with Rutales-Sapindales and, ultimately, Polycarpiceae (not with the Rubiales!). This renders the independent origin of the Asterales in respect of most other taxa united in the "Asteridae" highly probable (and would require the final abolition of the latter, artificial assembly).

Although most aspects are well covered (the phytochemistry is extremely well and exhaustively treated), the embryological features are neglected. Chapter 9, on the chromosomal cytology and the evolution of the family (by Solbrig) not only omits the extensive (mainly "European") literature pertaining to apogamy especially in the genera *Hieracium* and *Taraxacum*, but also the incidence of triploids and pentaploids in such apogamous genera. Chapter 4, on insect-flower interactions by Leppik, is based on certain notions which are not accepted by everybody. Chapter 6 (on corolla morphology, by Jeffrey) is also highly speculative. Zygomorphy is an adaptive feature found in many groups and often of recent origin. Zygomorphy of a kind started in the corollas in the outer zone of certain umbelliferous *inflorescences* as a feature associated with a change-over from an inflorescence to a more condensed, pseudanthial, aggregate of individual flowers. The manifest phylogenetic con-

nection between Umbelliferae and Compositae suggests a similar development in Compositae – starting from an *actinomorphic* prototype.

There are some flaws and minor mistakes. On p. 16 (Ch. 1) eremanthine is said to be effective against the cercariae of *Schistosoma*, which is a worm trematode, not an insect. On p. 34 (Ch. 2) Turner refers to "VAN DER PIJL (1961)" but the reviewer does not know what publication is meant, certainly not the only one by VAN DER PIJL (1969) cited in the References. Skvarla et al. (Ch. 8) consistently cite and quote "LIENS" instead of LEINS (see e.g., p. 162, 163, 196) – in the Appendix by Thanikaimoni, p. 253-4, the name is correctly cited. A more careful vetting by the editors might have prevented such blemishes.

The number of misprints is apparently negligible, but some appear in the titles of papers in German or French ("Verwandstchaftsbeziehungen", "dévelopment" for développement, etc.). It is of course the individual authors that are mainly responsible, but several obvious mistakes could have been corrected.

The book is certainly worth its price which is quite reasonable for a publication with so many figures (mainly reproductions of photographs, and many chemical formulas). It is an absolute must for taxonomic institutes and also provides very useful reading for chemists, geneticists, pharmacognocists, and applied and general botanists. It has several indices including a complete list (up to the date of page-proof reading) of all recognised genera of the Compositae, but strangely enough there is no author index which is a strange omission.

The typography and photoreproduction are of a very high standard. In spite of the minor flaws: highly recommended!

A. D. J. MEEUSE

S. NILSSON, J. PRAGLOWSKI, L. NILSSON: *Atlas of airborne pollen grains and spores in Northern Europe.* Natur och Kultur Kunskapsforlaget. Stockholm, 1977. Numerous photomicrographs, 159 pages, hard cover. Price Swedish Crowns 170.

This beautifully executed atlas presents pollen descriptions, illustrations, distribution maps, flowering periods and an index of plant names in the four Nordic languages, English and Latin for 74 aerobiologically important Scandinavian vascular plants.

Aeropalynologists will primarily use the light micrographs, but for pollenmorphologists the transmission and scanning electron micrographs are invaluable, since they provide a wealth of descriptive detail, some of which has not been published before. For instance, in *Stellaria media* and *Rumex acetosella* a basal lamellar layer is shown, of which it is not yet clear whether it belongs to the sole or the endexine. In *Ulmus glabra* an intriguingly complex anastomosing infratectal structure is shown. Also, the peculiar nature of the microsculpture of *Fagus sylvatica* pollen will come as a surprise to stratigraphic palynologists used to LM images.

Due to careful preparation techniques, which generally included critical point drying, the scanning electron micrographs are unsurpassed in quality. Only the micrograph of *Vaccinium vitis-idaea* at 30.000 × shows a "cracquelé" pattern which is most probably a coating artefact.

Two minor omissions only were noted. The scanning electron micrograph on p. 36 lacks the magnification and the term "analept", used in the description of *Pinus* and *Picea* is not explained in the glossary.

The atlas thus forms a welcome addition to the palynological literature and will be equally useful to aerobiologists, pollen stratigraphers and morphologists and, as the authors hope, also to people admiring the sheer beauty of the intricate patterns which have evolved in such different directions by the species shown.

J. MULLER

S. J. VAN OOSTSTROOM: *Heukels–Van Ooststroom, Flora van Nederland.* Edition 19. 925 pp., 1038 figs. Wolters–Noordhoff b.v., Groningen, 1977. ISBN9001 38001 8. Dfl. 46,75.

Until the beginning of the Seventies this flora was nearly exclusively used in schools and universities, by taxonomists and a rather small group of interested laymen. From 1970 onwards, presumably as a response to the dramatical growth of human influence on nature, the number of people interested in floristics and plant protection increased strongly. This is reflected by the publication dates of the successive editions: 1956 (ed. 14), 1962 (ed. 15), 1970 (ed. 16), 1973 (ed. 17), 1975 (ed. 18), 1977 (ed. 19). The publication of a new, partly revised edition of this flora is therefore more important now than it was a decade before.

The quality of the text is as high as ever. The text on distribution and frequency of the native species has been made more up to date. The flora is now largely adjusted to the opinions put down in the "Standard List of the Dutch Flora 1975" (Arnolds and Van der Meijden, Rijksherbarium 1976), although many neophytes accepted in this list are still not indicated as such in Van Ooststroom's Flora. In comparison to edition 18, no less than 38 descriptions of taxa have been added. With the exception of 3 names in *Rubus*, and one in *Taraxacum*, the flora thus contains descriptions of all taxa mentioned in the Standard List. Because the check-list for plant inventory research ("I.V.O.N.-streeplijst") is also based on the Standard List, workers in the field can now – for the first time in history – use a "standard" flora, and they are strongly recommended to do so.

Apart from these positive comments the present reviewers feel that this new edition invites some critical notes as well. The significance of *Flora Europaea* is still ignored. Kramer pointed to this in a review of edition 16 (Acta Bot. Neerl. *20*, 1971, 451–452). For 12% of the Dutch *Compositae* taxa (excl. *Hieracium* and *Taraxacum*) Flora Europaea names can not be found in the Flora van Nederland. We must be happy that the Flora Europaea has been completed recently (vide D. A. WEBB, *Taxon* 27, 1978, 3–14), because it is the first of its kind. There can be no dispute about its importance of being the standard work for European plant systematics. *Its accepted names*, whether right or wrong, should be cited – at least in synonymy – *in each local flora*, also in the Flora van Nederland.

Edition 18 had $2^1/_2$ pages with "Addenda". In the present edition this has grown to no less than $17^1/_2$ pages. Half of them are not merely additions, but reflect new taxonomic concepts. These should all have been included in the text, of course, as has been done for *Rubus*. In our opinion (and other users of the Flora will probably all agree) the author should have insisted with the publisher on the incorporation of the addenda.

One of the serious deficiences of this edition is the very bad quality of many illustrations (and of printing in general). Many of the figures are due to be replaced since long. The publisher, *Wolters-Noordhoff*, has to realize that if he is not willing to spend some money on these innovations, the Flora stands in danger to loose its authority, not because of defiencies in the text but because of bad presentation. See for instance the index in which frequently the page number is in another column or even on another page than the name!

In spite of these critical remarks we still are of the opinion that the contents of this Flora is superior to all other works dealing with the Dutch flora. We sincerely hope that, by completely revising the form, it not only will remain the only important flora for The Netherlands, but will also retain its significance for all those who are not only scientifically interested, but who wish to use it as a practical and efficient tool for the identification of Dutch plants.

R. VAN DER MEIJDEN
J. C. ROSKAM

Brian E. S. GUNNING and Martin W. STEER: *Biologie der Pflanzenzelle. Ein Bildatlas.* Gustav Fischer Verlag. Stuttgart, New York 1977. 103 Pages, more than 200 photographs. Price DM 24,80.

The book with the above title is the German translation of "Plant Cell Biology, an ultrastructural

approach" (Edward Arnold Publishers Ltd, London, 1975) which is an abstract of the more comprehensive publication: "Ultrastructure and the Biology of Plant Cells" (from the same publishers). It contains mainly transmission electron micrographs while also some light micrographs and scanning electron micrographs are shown.

The micrographs in this book are so beautiful that it is not necessary to be a botanist, not even a biologist, to enjoy looking at them.

The aim of the authors was to merely present the pictures, so that by studying and interpreting them, students of biology could arrive at some understanding of probable functions of the shown structures. But although the authors present a very suitable collection of photographs, the given introduction is perhaps a little brief for the purpose. The introduction gives information about electron microscopical techniques and contains only a list of short definitions of the various cell components. It would have been better, when a revision of the chapters 1, 2 and 3 of the comprehensive publication had been used as an introduction. These chapters include technical aspects of electron microscopy as well as the current ideas about the structure of the protoplast and the cell wall.

The authors made an interesting selection of photographs. They illustrated the variation in the form of cell organelles (e.g., the endoplasmic reticulum and the mitochondria) in different cell types. By accentuating the variation in form the authors preclude that one is going to believe that structures always look like they usually do in books. The authors succeeded very well in showing the interconnections between cell organelles, e.g., dictyosomes, endoplasmic reticulum and nucleus. Also changes in form during development of various cell organelles. e.g., plastids, are well illustrated.

On the other hand I must also make some critical remarks. First, the most frequently occurring plant cell, the mature parenchyma cell, is not represented in this collection; in fact this cell type is seldom shown in micrograph collections. Furthermore, it would have been helpful if a list of all used abbrevations had been given; now a student has to read the whole introductional text to learn the meaning of the abbreviations used in the schematically drawn meristematic plant cell in the introduction. Short information about the used fixatives and stains with each photograph would have been useful for advanced students active in the field of ultrastructural research. It would have been more appropriate to picture sieve tubes and vessels vertically; the same orientation as in the plant. It may be confusing that photographs 1 and 2, showing the light and electron microscopical view of a meristematic plant cell are from different plant species and, therefore, cannot be compared.

The critical remarks, however, concern superable details. The book provides such a lucid illustration of the ultrastructure of the plant cell that it is of value to everyone with a general interest in the subject.

L. GOOSEN-DE ROO

Kenneth V. THIMANN: *Hormone Action in the Whole Life of Plants*. University of Massachusetts Press, Amherst, Massachusetts 01002. 448 pag. 244 figs. Price: cloth, $ 35.00.

In his "A study of History" (1972) Toynbee writes: H. G. Wells's "The Outline of History" was received with unmistakable hostility by a number of historical specialists. They criticized the errors which they discovered at the points where the writer, ..., happened to traverse their tiny allotments. They seemed not to realize that,..., Wells was achieving something which they themselves would hardly have dared to attempt...

I must confess that I had at first similar negative feelings while inspecting some chapters of Thimann's book, and I presume that other specialists will have had them as well. The following may serve to explain their origin, disappearance and reversal into very positive ones. The main cause of the present "hostility" were not the inevitable errors but was the fact that the role of hormones in plant growth and development is largely illustrated with the writer's own work and that of his students. By thus giving prominence to his own contributions in this broad field of investigation, he becomes liable to the charge of having erected an, admittedly beautiful, monument for himself.

These feelings disappear – together with the charge of selfglorification – as soon as one has read the cover of the book, the forword by Swanson, and the author's preface. The book is a revised version of a

series of lectures delivered at the University of Massachusetts in 1974. The author even attempted to convey the "spoken" character to the written form. "Truly encyclopedic coverage was the last thing at which the lectures aimed, since integration and interrelation constituted the prime targets". "The references are merely those needed to acknowledge sources of figures and tables". Only once a reference is disrespectfully vague, when the reader for the source of a table of the amounts of phenolic acids in corn leaves, is referred to "a French analysis". "The viewpoint on the material is frankly a personal one", which is indeed what his colleagues in plant physiology would have preferred if they had been asked.

The result of this courageous and adventurous enterprise is a priceless work. Thimann contributed from 1930 onwards with more than 250 excellent papers to the knowledge of practically all aspects of plant growth and development. Hence he is qualified, more than anyone else, to discuss the more recent investigations against the historical background of the subject. Time and again we realize how many really important discoveries have been done in the past with simple techniques. The history of many subjects begins earlier, and is more relevant to the present-day worker than he is inclined to believe. These distinguishing features of the book add to its historical and its scientific value. Thimann also frankly takes the opportinities to tell – often amusing – anecdotes, even on much-respected colleagues, but on the other hand, he mercifully draws a veil over an embarrassing period ("As to the auxin A and B episode, we have to forget it"). He also enjoys the liberties offered in a lecture, to give way to controversal comment and to daring speculations.

The chemical and biochemical sides of the subjects are admirably illuminated and sometimes profoundly discussed. The biosynthesis of hormones and of substances with less obvious significance (the anthocyans) is described with as much enthousiasm as the development of an organ. Specialists often seem inclined to over-estimate the importance of the things they are studying. Not so Thimann. In the chapter on flowering he carefully prepares the reader on the nearing death of the florigen hypothesis. The very good chapter on senescence not only contains much of his own work at Santa Cruz, but it includes also many things outside the domain of hormones. A highly valuable chapter is that on The Relation between Structure and Activity of Auxins, a subject to which he himself was much attracted. Much appreciation I have for the final chapter on Concepts of the Mechanism of Action of the Hormones, in which he suggests that hormones have more than one mode of action, as they act in quite unrelated phenomena. This chapter is, however, concluded with a less-convincing defence of the philosophy that a dual action is important for the "survival" of a substance or an organelle or even of an organ in the evolution of organisms.

Granting that the book is composed of selected material, I do not hesitate to recommend it as a text for students. It will not do to dissuade them to follow the lectures of Thimann on which after all this work is based.

L. ANKER

Dietger GROSSER: *Die Hölzer Mitteleuropas. Ein mikrographischer Lehratlas.* Springer Verlag, Berlin, Heidelberg, New York, 1977. VII + 208 pp., 87 plates in 344 figures, 3 separate tables. Hard cover. DM 98; US $ 43.20.

For a long time the need has been felt for a concise, well illustrated book dealing with the anatomical structure of the wood of the most important woody species, native or cultivated, in the Central European region. The present book fills this gap in an excellent way.

The work consists of two main parts. The first chapters are devoted to a clear general introduction into the structure of a woody stem, and the methods to study the anatomy with the naked eye, a hand lens, and by means of microscopical sections. The structures of Coniferous and Dicotyledonous woods are treated separately. The Conifers are represented by 9 species (7 genera). A dichotomous key is given based on macroscopical characters, and there is another one based on microscopical characters, as well as a folded table with an illustrated synoptical selection of features. In the section dealing with the so much larger group of Dicotyledonous woods (54 species, belonging to 51 genera), a tabulatory survey listing 44 selected characters is given as a folded separate table, instead of a dichotomous key. Another folded table is restricted to 22 species, representing the commonest timber species. It is based on

macroscopical and hand lens characters.

The second part contains the descriptions and photographs of all the woods treated. Each treatment consists of general remarks on the tree, the macroscopical and microscopical aspects of the wood, and some very useful additional remarks pointing out similarities and differences with respect to other related species. Fine photographs on the pages opposite those with the descriptions complete the text. Usually there are four: two of transverse sections at different magnifications, and of a radial and a tangential one. In a number of cases additional photographs are added for comparison on an extension of the page. This solution, though helpful in understanding, may result in unsatisfactory dog's-ears when the user of the book has had to fold back those pages several times.

The reviewer encountered some difficulties in using the folding table for macroscopical characters, e.g. *Acer* species proved to be hard to bring home, and in general identification within the relatively large groups of woods with very smal, diffuse vessels will need careful verification by means of the descriptions and photographs. Irrespectve of this I do not hesitate to recommend Dr. Grosser's book warmly to all those, botanists or non-botanists, who need for their work a clear guide into the structure of Gymnospermous and Dicotyledonous timbers and to whom it will serve as a means to identify material at hand. Let us hope that the price will not be prohibitive for those interested.

A.M.W. MENNEGA

F. M. MULLER: *Seedlings of the North-western European lowland. A flora of seedlings.* W. Junk B.V., The Hague, Boston, and Centre for Agricultural Publishing and Documentation (PUDOC), Wageningen. Clothbound, 654 p., including 403 pages of line-drawings. Dfl. 150.00.

The appearance of a publication on seedlings of a scope and size as the present book by Muller is a noteworthy event. Seedlings of 1211 species (957 Dicots, 254 Monocots, and 3 Gymnosperms) are described and illustrated. This covers the large majority of the flora in the area under consideration, with the main focus on the flora in the Netherlands. The aim of the book is to provide a means by which seedlings can be identified, for which purpose it is subdivided into a key, seedling descriptions, and a major part with illustrations. The artificial key, an impressive piece of work 72 pages long, is based on characters of seedlings in a stage in which besides the cotyledons also foliar leaves are present. The short seedlings descriptions, based on dried specimens, amount to 2–3 lines on an average for Monocots, and 4–5, rarely up to 8 lines for Dicots. The approximate period of germination is also indicated. 1209 seedlings are illustrated, three per page, sometimes with the addition of a detail. The size of the line-drawings facilitates in most cases easy recognition; they are of a quality which would have justified the inclusion of the names of the three artists on the title page. Cotyledons and foliar leaves are mostly illustrated in such a position that the actual shape is shown, and it is almost impossible to judge which seedlings have been drawn from dried specimens, and which from living material.

Some minor remarks may be appropriate. The work – completed in three years – is by necessity based mostly on limited collections, which means that variation between seedlings of different populations is not covered. The descriptions could have been somewhat more detailed. Where more than one species of a genus is covered, consultation would have been facilitated if only the diagnostic characters of the species were given together with a single generic description. The distinction between seedleaves (emergent cotyledons) and cotyledons (which remain at or below soil level, enclosed by fruit wall and/or testa) is not usual, these terms are in seedling morphology used as synonyms. Several species (9, 11, 13, 398, 454) have been depicted with the cotyledons exposed, whereas in nature the latter do not emerge from the fruit wall and/or testa. Indication of soil level is absent in the drawings; for many species this would have given a better idea of how the plantlets grow.

However, these remarks detract almost nothing from the value of this work for the purpose it was intended for: supplying a means for identification of seedlings. No doubt this standard work will soon be indispensable in floristic surveys, plant sociology and plant ecology, and prove its usefulness for weed control and systematic botany. In design, scope and importance it ranks amongst the best works in this field of study, viz. those by Burger (1972, Indonesia), Csapody (1968, Central Europe), Lubbock

(1892, mainly European, and some tropical seedlings), De La Mensbruge (1966, Ivory coast), and Troup (1921, India).

E. F. DE VOGEL

J. G. WESSELS BOER, W. H. A. HEKKING, J. P. SCHULZ: *Fa Joe Kan Tak' Mi No Moi, Surinaamse Wandelflora* part I, in two volumes. Editor A. M. W. MENNEGA. Natuurgids Serie B no 4, Paramaribo 1976, 293 pp., ill. paper cover. Price Dfl. 25 + Dfl 4 postage (postgiro no. 273185, Bilthoven; Bank: AMRO bank no 45.65.23.057, Utrecht, of Dr. A. M. W. Mennega).

The Surinam flora comprises over 3.000 species of flowering indigenous plants. Most of them are treated in the nearly finished series "Flora of Suriname". The "Wandelflora" contains descriptions of 232 species. All of these are from coastal areas or from opened up areas inland and have been selected for common occurrence or striking appearance. Each species is illustrated by a linedrawing and occasionally by a photograph as well. Reproduction of these is unfortunately rather poor. Families are arranged in alphabetical sequence, which is the best system especially for this kind of book. Under each family at least one species is treated. General notes on the family and occasionally biological notes (of which there should be more) are added.

There is no key. To identify a species one has to compare the specimen with the drawings and descriptions.

The book contains an introductory chapter on systematic botany, a glossary of botanical terms and an index to local and Latin plant names.

For those who want to make their first acquaintance with the Surinam flora this book certainly fills a need. Those who want to know more should in addition turn to "Nuttige planten en sierplanten in Suriname" (Ostendorf, 1962) for information on useful and ornamental plants and to "Bomenboek voor Suriname" (Lindeman & Mennega, 1963) for trees. All these books are in Dutch which hampers their use outside Surinam.

Printing errors are few. One could wonder why no translation is given of the poem at the inside of the cover.

The second part of "Wandelflora" containing a description of the vegetation will appear in the near future.

M. M. J. VAN BALGOOY

D. F. CUTLER: *Applied plant anatomy*. Longman, London and New York, 1978. ISBN O 582 44128 5. 103 pages, many illustrations. Price £ 4.95.

This book introduces plant anatomy to students at an intermediate level in their first degree course. It emphasizes the applications of anatomy in and outside botany. As such it is the personal application by the author of his own ideas on how to teach plant anatomy (D. F. CUTLER, 1978. *Acta Bot. Neerl.* **27**: 141–142).

The book starts with a section on material and methods which is well worth reading for students as well as for professional plant anatomists because it gives a fairly complete survey of the techniques developed and applied over the last decades at the Jodrell Laboratory. They are attractive because of their very simplicity and because of their results which are often superior to those obtained with more sophisticated and time-consuming techniques. A very elementary treatment of basic morphology is followed by an illustrated glossary, intended to help understanding the subsequent chapters. These are on histology of leaf, stem and root, and on meristems and secondary tissues. Chapters on adaptive features, flower and fruit structure (very limited in scope), and on the economic aspects of applied plant anatomy conclude the book.

This new approach, stressing the use of plant anatomy for physiology, ecology, horticulture, taxonomy and identification of commercially or otherwise important plant products is refreshing and

will be appreciated by student and teacher alike. The author has not hesitated to use many examples from his own specialized background in the anatomy of Juncales and Liliales and from the fascinating "routine work" that has gone on at the Jodrell Laboratory for many years now. This has resulted in a new choice of plants, which will be of great interest to teachers of plant anatomy courses from all over the world; the author has taken care to list examples from different geographical areas to ensure the availability of native species.

No textbook is perfect, and this concise manual is no exception. The ample printing space devoted to examples of applications of plant anatomical knowledge has sometimes gone to the cost of clarity of the basic anatomy which is explained in the same sections. The sequence and lay-out of the text is not always very well-chosen, and unfortunately some crucial slips and printing errors have been left uncorrected (e.g. p. 97 where the text is muddled). The illustrations, of vital importance at this level are of varying quality. Most photographic illustrations are superb, but some of the line-drawings are so crude as to almost fail in conveying the information they were intended for. This may perhaps put students with limited drawing abilities at ease during practical course hours, but a consistently high standard would have set a more inspiring example, I think.

The success of this book will depend on the reactions by students rather than by book reviewers, and all teachers of plant anatomy are warmly recommended to give this new approach a try.

P. BAAS

René BASTIN: *Biochimie du développement végétal.* Tome I – *Thèmes centraux.* 1977. Librairie Al. Blanchard, Paris. 407 pp., 118 figs. Bfr. 850,–.

The past two decades have witnessed a considerable expansion of research in the field of developmental biology. The growing interest of biochemists and molecular biologists in problems of development of animals and plants can be taken as one of the main causes of said course of events. At the same time an ever stronger tendency at unification of developmental biology is becoming apparent; certainly at the cellular and subcellular levels animal and plant development seem to have much in common.

Professor Bastin's book, dealing with the central fundamental themes of the biochemistry of higher plant development, is an excellent illustration of the above-mentioned state of affairs. Moreover, it shows very clearly – as is its purpose according to the introduction – that developmental biology is a highly interdisciplinary undertaking.

The book's seven chapters successively deal with composition, properties and origin of living matter, molecular genetics, molecular control of development, regulation of the cell cycle, regeneration phenomena and cellular totipotency, aspects of plant development (such as pollen germination, fertilization, embryogenesis, morphogenesis of the whole plant), and theories of development. They have been written in a lucid, very personal style reflecting the author's stimulating enthusiasm for his topic, "le spectacle le plus remarquable que puisse nous offrir le festival permanent de la nature".

Unavoidably, certain specialists will consider some chapters as too superficial. Also several readers will probably disagree on points of philosophy. Seen as a whole, the book certainly serves its purpose of giving an account to students of various disciplines of what plant development means in terms of biochemistry and in comparison with development in animals. It contains a large number of carefully chosen references beit that in this respect it is not really up-to-date. For a survey of central themes this is not a serious criticism, although on some occasions the author could have made a stronger point by referring to more recent experimental results. Hopefully, part two of the book, that will deal with metabolism and mode of action of hormones and with photomorphogenesis, will be based upon as much recent literature as possible, because, undeniably, progress is very rapid in developmental biology.

D. STEGWEE

V. RAGHAVAN: *Experimental embryogenesis in vascular plants*. IX + 603 pp. ISBN 0125754507. Academic Press Inc., London, 1976. Price £ 21.00/$ 45.65.

Investigations in the field of experimental plant embryogenesis have greatly increased in number in the last few decades. This development is largely due to the application of *in vitro* culture methods. In fact the greater part of Raghavans book is a compilaton of experimental results obtained by this method.

The book is divided into three sections: "From egg to embryo" (the largest part), "Adventive embryogenesis" and "From seed to seedling". Each section is divided into a number of chapters which end with comments by the author. The list or references is considerable and covers over 100 pages. An author index, an index of plant names and a subject index form a convenient key for the reader. An appendix containing the mineral salt composition of 18 culture media commonly used in embryo culture emphasizes the importance of *in vitro* culture methods in the study of embryogenesis.

Section I deals with all aspects of embryogenesis from structural, biochemical, nutritional, to applied aspects of embryo culture. Only the developments on the molecular level are excluded. Perusing the chapters the reader may get the impression of dealing with a complete bibliographic study. Notwithstanding the extensive list of references this is, however, impossible for the broad approach of the author. Even rather well-known investigations, for instance the work of De Guzman on the *in vitro* culture of excized coconut embryos, are not mentioned. On the other hand, the comments of the author give those less familiar with the subject a good impression of what is going on in embryogenesis.

The last chapter "Applied aspects of embryo culture", which is drawn upon an article by the author for another book: "Applied and fundamental aspects of plant cell, tissue and organ culture" edited by J. Reinert and Y. P. S. Bajaj, gives a good connection with the next section on "Adventive embryogenesis".

This second section, divided into a chapter devoted to diploid and a subsequent one to haploid embryoids, gives more the impression of an enumeration of research results than of a general explanation. It is evident that in spite of twenty years of research by several outstanding scientists on embryoid induction, in particular in carrot and tobacco, a generalization of embryogenic principles is not yet possible. However, and this is not enough emphasized by the author, synchronization in the mass culture of embryoids may produce the bulk of "embryogenins" needed for advanced analytical research. In his comments the author is somewhat pessimistic about the application of adventitious embryogenesis in plant production and breeding. Where he mentioned the prospects of *in vitro* culture of nucellar embryoids he forgot to mention the importance of natural polyembryony in citrus culture.

The third section: "From seed to seedling" presents a logical follow up of the preceding sections. It contains information about seed dormancy and seed germination, of course restricted to embryo dormancy and early embryo development in the seed.

Information about the growth and development of the plant embryo is indispensable for a wide range of botanists and agronomists. For them the book gives a compilation of the scattered literature on the various aspects of plant embryogenesis and a general idea of the current and future perspectives in this fascinating field of experimental research.

G. STARITSKY