Acta Bot. Neerl. 29 (4), August 1980, p. 317–336.

BOOK REVIEWS

Heinrich WALTER: *Allgemeine Geobotanik.* Uni-Taschenbücher 284. Eugen Ulmer. Stuttgart. 2. Aufl. 1979. 260 pp. DM 19.80.

Die erste Auflage dieses kleinen Lehrbuchs wurde ausführlich besprochen in dieser Zeitschrift (1974, Vol. 23(3): 358–59). Da die Änderungen nur geringfügig sind, und sich hauptsächling beschränken auf Erwähnung der wichtigsten inzwischen erschienenen Literatur (z.B. die 2. Auflage von Ellenbergs 'Vegatation Mitteleuropas) kann hier danach verwiesen werden. Die damals geäusserten kritischen Bemerkungen können zum Teil (aber nicht alle) jetzt zurückgenommen werden. Neu ist ein kleiner Schlussabschnitt, hauptsächlich über die Methoden der Ökologie und die Verarmung der Landschaft.

Dieser Text kann nach wie vor empfohlen werden als vielseitige Einführung in die Geobotanik, nicht nur für Studenten sondern für alle Biologen die sich in dieser Hinsicht orientieren möchten.

H. DOING

C. VAN DEN HOEK and H. M. JAHNS: *Algen. Einführung in die Phykologie.* Georg Thieme Verlag, Stuttgart. 1978. X + 481 pp., 136 figures, 7 tables. Price DM 26.80.

In recent years several handbooks on algology appeared, e.g. Fott 1971 and Round 1973. Also a number of works dealing with special subjects or groups were published like for instance Dodge's treatise on the fine structure of algal cells (1973) and the surveys of Dixon (1973) and Picket Heaps (1975) on the red and green algae respectively. Nevertheless it can be stated that the book written by Van den Hoek and Jahns is a valuable new contribution to the algological literature. In this work the numerous results in the field of morphology and cytology of algae obtained during the last 15 years are brought together. From the 600 titles cited in the list of literature more than 400 date from 1965 onwards.

Especially EM work has contributed in a revolutionary way to the classification of the algae. Besides much became known on life-cycles of algae, resulting in a better understanding of the lower hierarchic categories.

In the book are treated successively the divisions Cyanophyta, Rhodophyta, Heterokontophyta (with the classes Chrysophyceae, Xanthophyceae, Bacillariophyceae, Phaeophyceae and Chloromonadophyceae), Haptophyta, Eustigmatophyta, Cryptophyta, Dinophyta, Euglenophyta and of the Chlorophyta only the subdivision Chlorophytina with the classes Chlorophyceae, Prasinophyceae and Charophyceae.

For each group first a summary is given of some important characters, followed by remarks on numbers of species and a comprehensive survey on distribution and ecology. Subsequently the organization and characteristics of a number of representative species are worked out. At the end of each chapter a survey of some important genera and species is given. The taxonomic treatment of the groups has not always been carried through to the same extent. The Chlorophytina receive comparatively much attention.

Due to the strong emphasis on morphological and cytological aspects the subtitle of the book is rather misleading in my opinion. Certain aspects of algology, like for instance ecology and geography receive comparatively little attention. For these aspects and for a general treatment of algae at the genus level one has to refer to other algological works.

Still the book can be recommended strongly to all who are interested in modern developments in the field of algology.

M. VROMAN

W. BRAUNE, A. LEMAN and H. TAUBERT: *Pflanzenanatomisches Praktikum I. Einführung in die Anatomie der Vegetationsorgane der höheren Pflanzen.* Third edition, Gustav Fischer Verlag, Jena, 1979. 311 pp., numerous illustr. Price DM 33.00 Also: Gustav Fischer Verlag, Stuttgart, 1979. DM 36.00.

The third edition of this manual for practical courses in plant anatomy at university level differs in some minor aspects from the previous editions: theoretical parts and terminology have been somewhat updated, and some illustrations have been replaced.

This book remains an admirable guide for students, junior demonstrators and lecturers alike. The sections on cell structure, and stem, leaf and root anatomy are well designed and contain a wealth of information on carefully chosen subjects suitable for inclusion in course work. The combination of photographic illustrations and line-drawings is highly instructive, as are the most welcome notes on 'Fehlermöglichkeiten' at the end of each practical topic. At the beginning of the book there is a chapter on microscopy, and at the end an alphabetical catalogue of useful and simple techniques.

Going through a comprehensive manual like the present one, one cannot help wondering how many (or how few) biological curricula can still afford the luxury of such a generous treatment of plant anatomy as a fundamental branch of botany. In the Netherlands this book will probably be more appropriate for the instruction of demonstrators and lecturers than for direct use by students, who nowadyas will find it difficult to read German anyway.

Two points of criticism are perhaps appropriate here. On p. 150 the rays of angiosperm woods are erroneously said to frequently contain tracheidal elements. Also, one would wish less emphasis on the classical treatment of stomatal types according to their opening and closing mechanisms in favour of some reference to the diversity of stomatal types as defined by the arrangement of surrounding cells.

Like the previous editions this book is very handsomely produced, and consequently the price may be considered remarkably low.

P. BAAS

D. LEWIS: *Sexual incompatibility in plants.* Studies in Biology nr. 110. Edward Arnold Publishers, London, 1979. ix + 59 pages, 20 figures and 3 tables. Price £ 1.90 net. paper.

In the flowering plants many devices, both mechanical, temporal, and biochemical have been evolved to reduce self-pollination, even self-fertilisation can be prevented in certain plants. The author distinguishes five main systems (and not six as mentioned on the cover) present in self-incompatible plants to prevent self-fertilisation. These systems are classified into: heteromorphic incompatibility in which differences in flower morphology characterize the inter-compatible types and homomorphic incompatibility in which there are no such differences. Their subdivision is based on the genetical biochemical processes resulting in the prevention of self-fertilisation. These processes are dealt with in the chapters three and four, which give an adequate introduction in the field.

In chapter five an idea is given of the many contradictions and as yet unsolved questions concerning self-incompatibility; it is therefore a good starting point for future research.

In the next chapters the author shows the practical uses of the systems discovered so far, e.g. for plant improvement, and some attention is paid to plants other than flowering plants.

In future editions perhaps Linskens & Esser's method for staining pollen tubes could be mentioned, which is much easier to use than the one included in the last chapter. More references to the literature would be welcome to the reader.

The book can be recommended to both students and workers in the field as a good introduction to self-incompatibility.

M. M. A. VAN HERPEN

H. WALTER: *Vegetation of the Earth and Ecological Systems of the Geo-biosphere.* Springer-Verlag, New York, Heidelberg, Berlin 1979. 2nd edition, translated from the 3rd, revised German edition, 274 pp., 124 figs. DM 28,–. ISBN 3-540-90404-2.

The book gives a rough survey of the various zones in which the natural terrestrial vegetation of the world can be subdivided. For each zone information is given on its bio-mass productivity, its climatic factors, and in very general terms on its soil types. Only very rough descriptions are given of the physiognomy of the ecosystems, and the role of animals and lower plants is only rarely mentioned. In my opinion a more appropriate title of the book would have been: 'Bio-mass productivity and a-biotic factors of the terrestrial plantgeographic zones of the world'. Brought back to this narrower circumscription the book is informative but hard to read, not in the least because of the use of so many artificial terms. Lack of references deprives it of much of its value. A serious shortcoming is the ignorance of human influence on the ecosystems although the author has clear opinions on this subject. The lay-out is rather unattractive, and the printing quality of most of the photographs is bad. For other critical remarks on the contents of this book the reader is referred to VAN DONSELAAR's review of an earlier version in German (*Acta Bot. Neerl.* **20**(3): 379, 1971).

R. VAN DER MEIJDEN

E. BÜNNING: *Die physiologische Uhr. Circadiane Rhythmik und Biochronometrie.* 3rd. Ed. 176 pp., 135 figs., hard bound. Springer Verlag, Berlin-Heidelberg-New York 1977. Price DM 23.80.

The author is a pioneer in the investigation of biorhythms. The first German edition of this book which appeared in 1958 transformed biochronometry from a mystical phenomenon of parapsychology to the reality of internal clocks in plants and animals; since then the book has been translated into English, Russian, Chinese and Japanese. This new edition, which follows the third English one, presents again an evaluation of the nearly 1000 publications per year on this subject. The author succeeds again in presenting an overall view on biochronology. The emolument of the internal clock in evolution is quite evident.

Starting with definitions and fundamental phenomena, the cellular anatomy, the regulation and interaction in unicellular and multicellular organisms are treated. The analysis of the effects of the various factors influencing the internal clock lead to a first analysis of the oscillation kinetics including a biochemical and biophysical explanation. The relations between the circadian, tidal and lunar rhythms are discussed as well as the synchronizing factors. The use of the time measurements evoked in recent years an increasing interest within the field of entomology and even of medicine. Appropriately the author points to the disturbances of the internal rhythms caused by a lack of synchronization and phase shifts as a pathological phenomenon with far reaching consequences.

All in all again a brilliantly written monograph based on a careful evaluation of the primary and secondary literature. Everybody who wants to be informed on the recent progress in biochronology as a common property of living organisms should read this book.

H. F. LINSKENS

F. WEBERLING and H. O. SCHWANTES: *Pflanzensystematik. Einführung in die Systematische Botanik. Grundzüge des Pflanzensystems.* Dritte, neubearbeitete Auflage. Eugen Ulmer, Stuttgart. 1979. 395 pp., 116 ill. DM 26.80.

The first edition of this textbook was published in 1972. That a third edition is needed after 7 years obviously implies that the book is bought and considered useful by students.

The book covers two large fields, an introduction to plant systematics as a science, and a survey of the plant kingdom. Nevertheless it is a small book and indeed: no word is wasted, it is very concisely and compactly written with as a consequence that it is certainly no easy reading.

There is, for my taste, too little phylogeny in the survey of the plant kingdom. Evolution is not denied of course, but phylogenetical hypotheses and considerations do not pervade the statements on 'Baupläne', relationships, classification. I regret this since without phylogenetical speculations such a survey remains a rather unwieldy mass of facts, hard to memorize and digest.

My second objection is that the book gives the impression that everything is settled in the field. It is not of course: many facts are still unknown, many questions cannot yet be answered,many problems can be viewed from different angles with different results for relationships and classification.

In its kind, being a factual up-to-date presentation from a rather conventional point of view, and not given too much dispute, this is a very sensible textbook. The most difficult part of writing a textbook is what to put in and what to leave out, and to my mind the right choices are usually made. Production is fine, the price is very low, the changes made in this edition (some textual, some illustrations added) are improvements.

The first edition was reviewed by MEEUSE in *Acta Bot. Neerl.* **22** (1973) 461–462.

C. KALKMAN

Berthold HALLER, Wilfried PROBST: *Botanische Exkursionen, Band 1: Exkursionen im Winterhalbjahr*. Gustav Fischer Verlag. Stuttgart – New York. 1979. VII + 188 S, 27 Abb., 99 Tab. DM 19.80.

Obwohl Exkursionen im allgemeinen als wertvoll anerkannt werden für biologische Ausbildungen, ist damit ihr Nutzen noch keineswegs gewährleistet. Durch Zunahme der Studentenzahlen und der Spezialisierung besteht die Gefahr, dass Erfahrungen mit lebendigen Pflanzen in ihrer Umgebung immer seltener werden. Die Dozenten sollten sich deshalb besonders bemühen, Exkursionen einen mehr dauerhaften Wert zu verleihen als den eines Ausflugs.

'Botanische Exkursionen I' ist gemeint als Gedächtnisstütze und kleines Nachschlagwerk für Winterexkursionen allgemein-botanischen Charakters. Der Inhalt besteht hauptsächlich aus übersichtlichen, mit vielen Zeichnungen versehenen Tabellen der wichtigsten Bäume und Sträucher (sowohl wild als gezüchtet), Farnpflanzen, Laub- und Lebermoose, Flechten und Pilze. Jeder Abschnitt enthält eine Einführung über Morphologie, Evolution und Taxonomie der betreffenden Gruppe. Die Besonderheiten über Lebenszyklus, Ökologie und Geographie sind leider äusserst kurz gehalten. Selbstverständlich kann ein solches Taschenbuch vollständige Bestimmungsschlüssel, notwendig bei Untersuchungen, nicht ergänzen. Es ist den Autoren aufgrund ihrer Erfahrung im allgemeinen aber gut gelungen, auf jeden Fall diejenigen Taxa aufzunehmen, die für Anfänger gut im Gelände erkennbar sind. Als Interessierte kommen Studenten im 1. Jahr einer Lehrerausbildung meines erachtens an erster Stelle in betracht.

Der Inhalt bezieht sich auf Mitteleuropa, ohne Küstengebiete und Hochgebirge. Für die Niederlande wäre eine spezielle Bearbeitung notwendig, aus pflanzengeographischen sowohl wie aus sprachlichen Gründen (das letztere was die Brauchbarkeit für unsere Studenten anbelangt).

Der Preis ist, angesichts des soliden Bandes und der Qualität des Papiers (notwendig wegen des Verwendungszwecks) nicht zu hoch. Ein zweiter Teil (für Sommerexkursionen) wird demnächst erscheinen.

H. DOING

ERICH OBERDORFER: *Pflanzensoziologische Exkursionsflora.* Verlag Eugen Ulmer, Stuttgart 1979. 4th revised and extended edition, 997 pp., 58 figs. DM 58.– ISBN 3-8001-3424-1.

Contrary to normal floras an excursion flora should be made especially for the use in the field. Thus one would expect to find more information on vegetative characters than 'normal' floras give as well as identification keys primarily based on these. Obendorfer's excursion flora, however, has no such keys at all and its title is thus very inappropriate, perhaps even misleading.

As a flora it must compete with the other floras of Germany, e.g. 'Smeil-Fitschen', 'Rothmahler'. Considering the result, I cannot understand why Oberdorfer did not base the keys in his flora on one of the exsisting and well-tested keys in those floras. Apart from the typographically confusing form in which the keys are presented, the corresponding leads are too often not character-opposed; so leaf form may be opposed to a chracter of the tepals, leaf colour of fruit and anther (page 94, no. 14); or, the commonest subspecies of *Festuca rubra*, subsp. *commutata*, is (correctly) said to have no rhizomes, whereas it is only possible to reach *F. rubra* by choosing for 'rhizomes present'. These are not merely unfortunate exceptions, especially made for reviewers; examples of this kind are numerous. On the other hand the keys also contain characters that are clearly original compared with other floras. It is one of the few floras in which it is noted, for instance, that *Polygonum hydropiper* has 3–4 tepals, opposed to 5 in related species. The flora contains very few figures, nearly all schematic and worthless (see for instance the surprisingly bad drawing of *Calluna vulgaris* on page 698).

In his preface Oberdorfer critisizes the disorder in nomenclature of european plant names. He could have helped decreasing it by using the names (at least in synonymy) of Flora Europaea.

Although as a flora not of the same high quality as other German floras, the 'Oberdorfer' is famous for its information on geobotanic and syntaxonomic characteristics of the species in it. As such it is a very valuable concise cyclopaedia, especially since the present edition covers not only the Southern part of Germany and adjacent regions, but also the rest of Germany, including the DDR.

R. VAN DER MEIJDEN

Strasburger's Lehrbuch der Botanik, neubearbeitet von D. VON DENFFER, F. EHRENDORFER, K. MÄGDEFRAU, H. ZIEGLER. 31. Aufl. Gustav Fischer Verlag, Stuttgart, New York, 1978. XX, 1080 pp., 1031 figs., 51 tables, 1 coloured map. Price DM 69.–. ISBN 3-437-20140-9.

The English translation of the 30th edition was reviewed by LINSKENS in *Acta Bot. Neerl.* **26** (1977), p. 191.

Whereas in the past new editions of this classic textbook appeared every two and a half years, this 31st edition is published seven years after its predecessor. Consequently a fairly large amount of new information had to be incorporated in the text. To do this without unduly extending the volume of the book and nevertheless keep the text readable and easy to digest has been no easy task, but the authors have made a good job of it; apparently every paragraph has been carefully revised. In the extensive literature list at the end of the book (25 pages) about 40% of the items is of a later date than the 30th edition; at the same time it has remained a good introduction to the so often neglected older literature. Most parts are by the same authors as in one or more former editions: Introduction and morphology by D. von Denffer, evolution and taxonomy by F. Ehrendorfer and K. Mägdefrau, geobotany by Ehrendorfer; H. Ziegler has succeeded Schumacher as the author of the chapters on physiology.

The book is too well known as an excellent introduction to the whole field of botany to need an extensive description. a few remarks may be made. The classification of the plant kingdom is largely a modernised version of Wettstein's system. This will give the students a solid base for further taxonomic study, but in the later years at the university many of them will will attend lectures

by biochemists and microbiologists, who as a rule prefer different systems of classification. Therefore, a mere mention of the existence of other systems in the chapter 'Übersicht des Pflanzenreiches' without giving at least a rough outline of the basic principles of e.g. R. H. Wittaker's system, is perhaps not quite satisfactory.

The chapters on physiology have been completely rewritten by Ziegler. On the whole they give a well-balanced survey of its different branches, nevertheless the treatment of the optimum curve is as unsatisfactory as it was in former editions; even the graphs where the velocity of different processes is plotted as a function of the temperature, in which the maximum velocity is confusingly labelled 'optimum' have been retained unaltered (e.g. fig. 375, p. 391; also figs. 296, p. 288 and 981, p. 926). Much stress is laid on Sachs' 'cardinal points' minimum, optimum, maximum, without mentioning that the latter two are dependent on the duration of the high temperature treatment. A mention of this fact and of Ducleaux' explanation of both the optimum curve and the shift of optimum and maximum to lower temperatures with time of exposition would add to the students' understanding of these phenomena without requiring much space. In fig. 387 (p. 405) the dependence of differentiation in a short day and a long day plant on the duration of the dayly illumination is illustrated in the usual way by plotting the number of days needed for the differentiation to become visible. In the reviewer's experience most students prefer as easier interpretable a graph in which the reciprocal value of that time, i.e. the velocity of the processes preparatory to the differentiation, are plotted against the day-length.

In future editions in the maps of western Europe in the chapters on geobotany the coastline of the Netherlands could perhaps be brought in accordance with the actual situation. The Zuiderzee, which ceased to exist some fifty years ago is still present on these maps.

Compared with the bulk of very valuable and on the whole easy digestable information these few remarks are mere trifles. The book in this new edition certainly is one of the best introductions to the whole field of botany on the introductory university level and for every botanist for updating his knowledge in the fields outside his specialism and it can be unreservedly recommended to every one who is able to understand German, which in The Netherlands is unfortunately, due to the so-called improvements in the school system, a diminishing number. The book is well produced; its price moderate.

H. P. BOTTELIER

L. EICKHORST-HURDELBRINK, W. FREY, F. HAGEMANN, B. HALLER, W. HÖLL: *Botanik, Studienhilfe zu Strasburger, Lehrbuch der Botanik, 31. Aufl.* 2. Aufl. Gustav Fischer Verlag, Stuttgart, New York, 1979. 233 p. Ring Book, DM. 16.–.

The new edition of Strasburger's textbook, reviewed above, necessitated a new and adapted edition of the 'study aid'. The authors have collected 1949 questions – nearly two per page of the textbook – fairly evenly distributed over the chapters. The answers are either given directly (Q: 'what is guttation?'; A: 'active water exudation') with a reference to the page where the subject is treated, or the student is referred to the page or table where the relevant data can be found. This will prevent lazy students from using the 'Studienhilfe' as a substitute for a textbook. The answers are concise and to the point and that in itself will be a help for many students in improving their style and checking their usual verbosity.

The study aid will certainly help a student to memorize a large body of facts and for that purpose it can be recommended. Whether it will help him to get an idea of the interrelations seems questionable, but a good student will enjoy doing that himself unaided.

H. P. BOTTELIER

J. G. HAWKES, R. N. LESTER & A. D. SKELDING (editors): *The Biology and Taxonomy of the Solanaceae.* Published for the Linnean Society of London, by the Academic Press, London, 1979, 738 pages, many figures, tables, diagrams, photographs Price £ 45.–. ISBN 0-12-333150-1.

The latest landmark in the study of the biology and taxonomy of the economically important plant family Solanaceae was an international symposium, jointly sponsored by the Linnean Society of London and the Department of Plant Biology at Birmingham University. The papers, given at meetings in Birmingham and arranged into eleven major parts, deal with a variety of subjects, out of which only a few are mentioned here.

Part I is a most valuable account on taxonomy and floristics, of which the paper by d'Arcy on classification of the family is concluded by a very useful list of references. Other papers, giving a survey of Solanaceae in various parts of the world, stress the importance of filling large gaps in our knowledge of the taxonomy of the Solanaceae.

Part II discusses ethnobotany and contains interesting papers on Solanaceous hallucinogens in S. America, on the use of Solanaceae as poisons, in divination ('the stimulating effects of Datura are said to have been used to inspire the pythoness of the Dephian oracle') and in fertility cults.

Part III treats alkaloids. The paper by Bradley et al. is an interesting account of the importance of steroidal contraceptive alkaloids and the future role for Solanum steroid production. Papers on flavonoids, terpenes and proteins (chapter IV) and on anatomical and (micro-) morphological characters (chapters V and VI) stress their potential use to establish systematic divisions and to suggest phylogenetic relationships.

In the reviewer's opinion part VII treating floral biology, incompatibility and haploidy must be highly recommended to all biologists interested in plant breeding and evolutionary biology. Especially the papers by Pandey, in which the view is expressed that there is a close relationship between intraspecific and interspecific incompatibility, and those by Hermsen & Sawicka and Hogenboom, in which the concept of incongruity is described, referring to all crossing barriers that are independent of incompatibility, are of great interest.

The paper of haploid parthenogenesis in Capsicum treats important features of the origin, fertility and utilization in plant breeding of monohaploids.

Biosystematic studies in various genera are included in parts VIII and IX, of which those on speciation in Solanum by Whalen and on evolution and polyploidy in potato species by Hawkes deserve special mention.

This is by far the most important review of Solanaceae ever published and will be looked upon as a model.

The wealth of information will doubtless be of great value for future research. It can be most strongly recommended to all students and research workers in plant breeding and in systematic and evolutionary biology.

TH. W. J. GADELLA

A. F. DYER, (Ed.). *The experimental biology of ferns.* Experimental Botany vol. 14. Academic Press, London, New York, San Francisco. 1979. xviii + 657 pp., ill. Price: £ 37.50; US $ 79.00. ISBN 0-12-226350-2.

This 14th volume in the series 'Experimental Botany' deals with the various disciplines connected with modern research on ferns, including – as admitted by the editor – a number of purely descriptive fields as well. The heterogeneity of the subjects treated (see below) does not mar the framework of this book in any way; on the contrary, its value is appreciably enhanced. The different chapters are well introduced, easily accessible also to the non-specialist, and the scientific problems lucidly explained. The wider scope enables the reader to obtain a good survey of the great and

rapid development of pteridology in its widest sense since the initial work of scientists like Holttum, Manton, Wardlaw, and others. As put forward by J. Heslop-Harrison in an elegant introduction, this book well illustrates the great intrinsic interest of fern-biology in its own right and how ferns provide parallels for events and processes in other vascular plants.

The subjects covered include an ecological perspective and an environmental classification of fern diversity (C.N. Page); the contribution of the ferns to an understanding of the life cycles of vascular plants (P.R. Bell); the cytogenetics of ferns (T. G. Walker); the genetics and reproductive biology of ferns (E. J. Klekowski, Jr.); the ultrastructure of fern gametophyte cells (D. G. Cran); ultrastructure and cytochemistry of spore wall morphogenesis (J. M. Pettitt); cell division in fern protonemata (A. F. Dyer and M. A. L. King); biochemical and physiological aspects of gametophyte differentiation and development (D. L. Smith); photomorphogenesis of fern gametophytes (G. P. Howland and M. E. Edwards); antheridiogens and antheridial development (U. Näf); gametogenesis and fertilization in ferns (P. R. Bell); experimental investigations of fern sporophyte development (R. A. White); experimental aspects of fern ecology (C. N. Page); as well as some more specific essays about the biology and control of the bracken fern, *Pteridium aquilinum* L. (Kuhn) (W. W. Fletcher and R. C. Kirkwood); and the culture of fern gametophytes for experimental investigations (A. F. Dyer). The latter article is also very important for horticulturists considering the difficulties in cultivating the whole life cycle of especially tropical ferns in greenhouses in temperate areas. Literature, connected with the various chapters is very well covered, although articles in languages other than english receive less attention.

In conclusion, this book is highly recommended to all fern-specialists and non-specialists alike, who are interested in this fascinating group of plants and in modern developments in botany.

Unfortunately the price of this book seems rather high for senior graduates for whom this book is also intended.

Dr. Dyer and the Academic Press can be congratulated with this well executed milestone of pteridological research.

E. HENNIPMAN

A. F. DYER: *Investigating chromosomes.* Edward Arnold, London, 1979. 138 Pages, many illustrations. $ 6.75 (paperback).

The purpose of this book is to present an account of how to make chromosomes visible and to encourage the study of the structure and behaviour of the chromosome complement as seen down a light microscope. Much attention has been given to the choice of method as well as to the selection of suitable living material.

The first chapters describe simple techniques for obtaining preparations and various features of chromosome morphology during mitosis and meiosis. The third chapter is an introduction to cytogenetics, in the fourth a number of projects is presented, reflecting the main spheres of activity of chromosomes in division, development, reproduction and evolution. A special section, concluding chapter three, deals exclusively with an extremely useful list of material suitable for the study of chromosome mutations and karyotype evolution. Appendices I and II, presenting a 'chromosome calendar' and a 'genetic garden', respectively, are also very useful.

One of the examples treated in chapter four, *Ranunculus ficaria*, is regarded as particularly suitable for student investigation since it offers a number of cytogenetical problems capable of solutions. Unfortunately, this does not apply to Dutch material, since the recently found diploid cytotype is extremely rare and has a very limited disstribution in The Netherlands.

In the reviewer's opinion this is an indispensible book for anyone teaching or studying cytology at universities.

TH. W. J. GADELLA

W. HAUPT and M. E. FEINLEIB (Eds.): Encyclopedia of Plant Physiology, New Series. Vol. 7: *Physiology of Movements.* 1979. 185 figs., 19 tab. XVII. 731 pages. Cloth DM 198,–; US $ 108, 90. Berlin-Heidelberg-New York: Springer-Verlag.

The editorship of this volume was embodied in Mr. W. Haupt and Mrs. M. E. Feinleib, professors of Botany in Erlangen (FRG) and Medford (USA) resp. Haupt is the only author of this volume, who also contributed to the first series of 20 years ago. The two editions differ in that the articles of the present one are all in english whereas almost two thirds of the first series were in german or french. The previous series had 16 german, 3 american and 14 authors from 8 other countries. The present one has been written by 15 american, 9 german and 3 authors from other countries.

This new edition of the Encyclopedia – it is admitted in the Preface – is less 'encyclopedic' than the first one, which tried to comprise all information then available. It was preferred not to repeat all this knowledge and to emphasize those fields of plant movement where substantial progress in understanding was made or where new aspects are evolving. Almost every chapter of this volume proves that the biology of plant movements is no longer classical i.e. old-fashioned physiology. Fundamental discoveries have been made on the pigments, their localisation and multifunctionality, on the functions of membranes in stimulus perception and conduction. Identical changes of membrane potential, and hence in influx and efflux, are at the base of stomata movement and tendril curving, chloroplast reorientation and cilia movement. Actomyosin-like protein is active in protoplasmic streaming and chloroplast orientation, in movements of slime molds and of blue-green algae.

The editors have rendered the reader an excellent service by informing him in an Introductory Chapter on the recent lines of progress and where the new insights are to be found in the book.

The first chapters (Shropshire, Bentrup, Sweeney) deal with general aspects of plant movement: the nature of the stimuli, the localisation and orientation of the receptors, and sensitivity changes. As a matter of course, much attention is paid to plant cell electrophysiology. Many ingenious details have been discovered e.g. in the triggering and resetting of the blades of *Utricularia.* These chapters are certainly of interest to a wider circle of students on the functioning of cytoplasm.

The next 5 chapters are on Intracellular Movements (Britz, Filner, Seitz, Wagner, Yadav), followed by 7 chapters on the Mechanism and the Control of Locomotion in Microbial Plants (Bean, Häder, Halfen, Macnab, Ojakian, Poff, Satir, Whitaker). The most conspicuous discoveries in this domain are the remarkable properties of the bacterial flagellum, which is driven by a rotary motor, the power source of which is the proton potential across the membrane. In photokinesis, photophobic responses and phototaxis all kinds of pigments may function as photoreceptors. In cases where accessory photosynthetic pigments are involved, but not chlorophyl *a* itself, it is still impossible to propose mechanisms for the response. The linkage between the receptor and the effector in chemotaxis is still poorly understood. The Chapter on slime molds is full of results which may be extrapolated to higher plants.

There are 2 chapters on the Movements using Turgor Mechanisms (Raschke, Satter). The remaining part of the volume (± 200 pages) is related to the work on the growth movements. Phototropism is discussed by Dennison, gravitropism (geotropism) by Sievers, Volkmann and Wilkins. The significant frontiers are here at the subcellular level (photoreceptor, membrane transport). The way in which the gravity-sensing system initiates the lateral transport of growth regulators is still far from elucidated. These chapters are preceded by one on the induction of polarity, written by Weisenseel. The application of two new techniques, the vibrating electrode and the nickel screen method, has much deepened the insights into the early phases of cell polarization.

The final chapters are on growth movements not directed primarily by external stimuli: circumnutation (Johnsson) and epinasty (Kang). These movements have a variety of underlying mechanisms, but all have a strong autonomous component.

Plant physiologists, biochemists and biophysicists specialized in other fields of botany will find in this volume a wealth of data relevant to their own work.

L. ANKER

A. FAHN: Secretory Tissues in Plants. Academic Press, London-New York – San Francisco, 1979, 302 pp, 149 illustrations. ISBN 0.12.24.7650.6. Price £20.00 or $ 42.00.

This book brings together a wealth of information on secretory tissues in plants, hitherto scattered in numerous publications and added to by original results obtained in the author's institute.

In the introduction the classification of secretory tissues and types of secretion are discussed and practical solutions are proposed, explaining the division of the book into two parts dealing with: I. Structures secreting unmodified or only slightly modified substances, supplied directly or indirectly by the vascular system (viz. hydathodes, salt glands, and nectaries); and II. Secretory tissues sythesizing the secreted substances (viz. mucilage secreting tissues, glands of carnivorous plants, myrosin cells, stinging hairs, tissues secreting lipophilic substances, and laticifers). Of all these types of secretory elements or tissues the anatomy and development are described with due emphasis on ultrastructure. Function receives much attention and all individual chapters are concluded by 'Evolutionary Considerations'.

The author has chosen to describe and discuss a small number of examples of each category of secretory tissue in great detail rather than aiming at completeness in data on distribution throughout the plant kingdom. The latter would have provided a better basis for the implicitly speculative and vague evolutionary considerations.

In a scholarly written book of this kind one might expect that controversies from the literature would be solved or at least discussed, but often the author cites opposing views without taking sides. For instance, the reader is left in the dark about the nature of the secretory cavities in the leaves of *Citrus*, which is rather frustrating for teachers who use them as examples of lysigenous cavities. Personally I have searched in vain for information on pearl glands, on tannin cells (or the 'secretory cells with dark contents' so often recorded in the descriptive literature), and on the controversial trichome hydathodes in *Gonocaryum*.

It would do gross injustice to this reference book to concentrate on topics not covered. The integration of so much information on a very important subject, which is usually only stepmotherly treated in general textbooks, is highly welcome and makes it indispensable for all botanical libraries, irrespective of whether they are of experimental or descriptive specialization.

P. BAAS

W. FREY, H. HURKA, and F. OBERWINKLER (Eds.). *Beiträge zur Biologie der niederen Pflanzen*. Gustav Fischer Verlag, Stuttgart, New York. 1977, viii + 233 pp., 118 fig., 8 tab. Price: DM 58. ISBN 3-437-30262-0.

This book contains a number of essays written by mostly German authors on the occasion of the 70th anniversary of Prof. Dr. K. Mägdefrau. The larger part of the articles comprise taxonomy and systematics of fungi and bryophytes, but several other items are also included. Articles about algae are lacking, and it would have been better if in the title the word 'Landpflanzen' rather than 'Pflanzen' was used.

E. Müller discusses the life-cycle and the phylogenetic problems relating to the origin of the ascomycetes. F. Oberwinkler proposes an interesting new system of the basidiomycetes in which, amongst other things, the main groups of the holobasidiomycetes (Agaricales, Polyporales, and gasteromycetes) are replaced by the more natural, newly defined ordines Polyporales, Russulales, Thelephorales, and Hymenochaetales. W. Jung summarises the present knowledge about the explosive development of the early land-plants, as well as the many problems still to be solved. R. M. Schuster presents a colourful view on the phylogeny of the hepatics and anthocerotes; the latter are regarded by him as evolved perhaps even at a later date than the other land-plants. The mosses are treated by W. Frey who recognizes the subclasses Sphagnidae, Andreaeidae, and Bryidae, the latter with six new superorders.

J. Poelt and E. Romauch compare the anatomy of two species of six different genera of

lichens occurring in coastal and inland habitats respectively. The suitability of lichens and bryophytes as indicators for pollutants ('Bioindikatoren') is reviewed by S. Winkler. K. Dobat covers the curious field of spelebotany as far as the autotrophic plants are concerned that occur in artificial ecosystems found nearby artificial light sources installed in 30 caves in Germany which are on display to the public ('Schauhöhle'). This flora ('Lampenflora') is richer than expected: amongst the cryptogams found there are more than a hundred(!) different species of bryophytes.

The study of isoenzymes and enzyme polymorphism, as well as their relevance for systematic problems (speciation!) is introduced by H. Hurka. A. Bresinsky nicely illustrates the significance of metabolic substances for the classification of some groups of fungi.

Students, teachers and others with a lively interest in plant diversity will very much welcome this book, also because it makes the modern advances in the systematics of some complex taxonomic groups like fungi and bryophytes easily accessible.

The book is very well printed and illustrated, and – thanks to external financial support – also reasonably priced.

E. HENNIPMAN

P. MACURA: *Elsevier's Dictionary of Botany I. Plant names.* 580 pp. Elsevier Scientific Publishing Company. Amsterdam – Oxford – New York 1979. ISBN 0-444-41787-7. Price Dfl. 225,– or US $ 109,75.

This book consists of multilingual (English, French, German, Latin and Russian) listings of plant names. There is a basic numbered 'English' table with easy cross references to the numbers in the other tables. Unfortunately the basic table is confusing, one has to look for common names under adjectives like European versus Japanese, Chinese, and 'Common' versus Japanese, wild or no logical alternative. It would have been more efficient to treat the genera with a common name such as pine under one heading Pine: Arizona ponderosa through to Weymouth (here under main heading eastern white pine). There are problems with American spellings; gray not grey for instance, and further total confusion from transliterations to, or adoption of American names which are totally unknown to European readers. Thus, the genus *Lycium* is wolfberry; desert thorn; box thorn – in English it is Duke of Argyll's tea tree; *Phyteuma* is mixed flower instead of Rampion, *Eryngium campestre* is snakeroot eryngo instead of Watling Street thistle, *Ruppia maritima* is wigeon weed instead of tassel pond weed, *Centaurea* is centaurea instead of knapweed, *Quercus ilex* is holly oak instead of Holm Oak ----- really the list is endless. Furthermore, the usage of common names for different plant families is exceedingly American and would tax many a professional taxonomist.

In such cases it would have been of value if the author had included English and American names indicating the latter. Unfortunately, the author seems to have chosen to ignore the large number of widespread popular scientific books with lists of common names in the index, some of these even produced by Elsevier itself! The selection of material included is unbalanced due to lack of reference to such works. Thus, of the trees and shrubs, only a small percent of those listed by Hilliers' Manual as hardy in Europe are included, and of these e.g. *Quercus* (Oaks) only a small portion of American species are included. Again, why include golden elder (Sambucus) and not copper hazel, Irish yew, etc.

Errors abound, e.g. copper beech is 'var. atropunica' instead of '*atropurpurea*'. Fat hen should be *Chenopodium album* and not *Atriplex patula* which is common orache.

The value of such a book is only as good as the contents of the basic table. After serious and tedious checking I find that this is incomplete, full of inaccuracies and transliterations. The only conceivable market for this book would be French Canadians translating Russian, but for this small market I have not checked the French with the American names. The book is far below the standard one would expect from Elsevier if one compares it to their wood dictionary (the author also omitted to do this) and one is surprised that it was published. The price is excessively high.

C. E. RIDSDALE

W. J. WOLFF (editor). *Flora and vegetation of the Wadden Sea. Final report of the section "Marine Botany" of the Wadden Sea Working Group.* A. A. Balkema, P.O. Box 1675, Rotterdam, 1979, 206 pp; 47 figures, 38 tables and a checklist. Hfl. 17,50.

This is report 3 of the Wadden Sea Working Group, a group of Dutch, German and Danish specialists studying the Wadden Sea. Together with ten other reports it will be published in a complete clothbound edition (a set of three volumes) which will be named "Ecology of the Wadden Sea – Basic data for the management of Europe's largest marine wetland'. In the present report the conclusions and recommendations of the four main sections are summarized in the first small section.

In the second section a review is given about the role of marine plants in the ecosystem of the area. This is not only a compilation of often quite obscure literature, but many new data have been added and many published results have been re-interpreted or have been included in new tables or in new figures. This chapter gives an excellent piece of basic information.

In the third section, dealing with the epilithic algae and lichens, nothing new is added. It is an extract of the earlier work of Den Hartog on the epilithic algal communities occurring along the coast of The Netherlands.

In the fourth section, dealing with the salt marsh algae, however, much of the information given is new and not yet published elsewhere. Salt-marsh algae of 90 localities within the wadden area are listed and discussed in this important chapter.

In the last section the functional aspects of salt marshes are discussed, mainly levelled at primary production of phanerogamic salt-marsh vegetations and their fate. From this I learned that much more quantitative data are needed to give a reliable picture of the functional aspects of the salt-marsh vegetations.

The lay-out and typography of this report are not the strongest sides. Especially the pieces of text mixed between the tables are usually difficult to be traced. The useful checklist of the microphytobenthos and the phytoplankton has no caption at all. Explanation of the symbols used in the checklist (which starts on p. 172) are given on p. 107, without any cross-reference. The cover photograph was probably changed at the last moment, anyway, it does not show what its caption says. Nevertheless this relatively cheap booklet gives good value and a lot of very valuable information about this irreplaceable area, our Wadden Sea.

W. F. PRUD'HOMME VAN REINE

E. REID (editor): *Plant organelles.* (Methodological surveys in biochemistry; vol. 9) Ellis Horwood Limited, Chichester, 1979, 232 pages. Price $45.15/£18.50. ISBN 0 85312 123 0.

A subcellular methodology forum held at the University of Surrey in 1978 gave rise to this book. Contributions of many experts guarantee an up to date view in the isolation and purification techniques of cell organelles from higher plants. The contents of the book fall essentially into four parts. The first chapters deal with the various isolation methods (including phase partition and silica-sol centrifugation) of intact mitochondria and chloroplasts. Although both types of organelles can be obtained from various plants and plant tissues, true spinach is the preferred source for many chloroplast studies. This section is concluded with a chapter on isolation and properties of the envelope of the spinach chloroplast.

The second part of the book consists of seven chapters, which are devoted to various organelles. Recently developed methods for isolating intact vacuoles from red beet root storage tissue and the preparation (in the absence of fixatives) of a dictyosome fraction approaching 50% purity are the main parts of this section. The other chapters are concerned with preparation techniques on plasma membrane, microbodies and the hitherto unsuccessful isolation of plant microtubules.

The third part is devoted to some topics related to membrane associated molecules and structures (lectins, auxin binding sites) with emphasis on different types of glucan synthetases from corn coleoptiles and pea epicotyls.

In my opinion the small fourth section is the only disappointing part of the book. A rag-bag of miscellaneous comments and notes related to the preceeding topics is in the nature of a remaining homogenate which escaped from an appropriate fractionating. Sometimes the description of a method is insufficiently detailed or references are lacking.

The concluding survey deals with the current status of plant organelle markers and with their intelligent use. As uniquely located markers are exceptional, the authors have many thoughtful remarks to make for users of markers in plant cell fractionating.

The range of topics covered in this book is fairly wide. Although in the last decade various books devoted to a single type of organelle have been published it is very valuable to have their isolation and purification methods in one source together. In conclusion: apart from minor criticisms this is a well-balanced book, heavily packed with information and without frills.

H. W. GROENEVELD

L. BOS: *Symptoms of virus diseases in plants.* Centre for agricultural publishing and documentation, Wageningen, 1978. 225 pp, 71 illustrations of which 11 full colour plates. Price Dfl. 45.00.

What to see in a plant when virus is at work? The author describes and tries to standardize the names of symptoms elicited in plants following a viral infection. This small monograph is the third, but revised edition of a work published for the first time in 1963. To be accurate the present edition should have been called extended instead of revised, since most, if not all revisions are additions.

The book consists of four chapters. In the first the definition, significance and nomenclature (terminology may be meant) of symptoms are discussed. Pathogenesis is treated in the second chapter. The main part of the book being the third chapter deals with the description of symptoms caused by viruses. This chapter is followed by a useful text on deviations resembling symptoms of virus diseases. An index of names of symptoms in Dutch, English, German, French, Italian and Spanish, and a subject index complete this book.

Although the author is aware that conditions are rarely static in living material, his approach results in a description of separate symptoms to be seen at a given moment or as a final outcome of an infection rather than in a description of symptom-complexes and the often observed changes in symptom expression during the development of an infection. Notwithstanding this criticism the author has to be commended for the clear descriptions and for writing a book pleasant to read on such a specialized subject. Each plant pathologist dealing with viruses and each biologist working on abnormalities in plants should know the contents of this book.

D. PETERS

J. MENNEMA, A. J. QUENÉ-BOTERENBROOD & C. L. PLATE (editors): *Atlas van de Nederlandse Flora I. Uitgestorven en zeer zeldzame planten.* 226 pp., 16 figs., 333 maps. Uitgeverij Kosmos, Amsterdam, 1980. Price: Dfl. 59.50. ISBN 90 215 0847 8.
English edition: Atlas of the Netherlands Flora I. Extinct and very rare species. Price: Dfl. 125,– (excl. BTW). ISBN 90 619 3605 5; set ISBN 90 619 3889 9.

The publication of the first three volumes with maps of wild and naturalized plants of the Netherlands is the crowning of the efforts of hundreds of (mainly) amateur field workers on the flora over a

period of more than a century. The maps in the Atlas are the results of two rather complete inventories, one taken from c. 1900–1949, the second taken from 1950 onwards, to be finished in 1980; the first is based on a grid system deliniating "squares" of 20.8 km^2, the second on squares of 25 km^2. The records of each species in both periods are represented by symbols of different colour and form. Thus, differences in frequency and area before and after 1950 are visible at a single glance. Editors and publisher must be congratulated for the fine way of presentation. The circumstance that the maps are based on two inventories on different grid systems of relatively very small scale must be held responsible for the fact that it took time to produce them. Although the first series of plant maps for the Netherlands was published already in 1902, this pioneer work of Goethart & Jongmans has led to publication of plant atlasses in other countries before that of the Netherlands. Apart from the double inventories, the Atlas is unique thus far in Europe in presenting a text additional to each map. These can be seen as concise, separate articles (with english summaries) often presenting nearly maximal information on the subject; I suddenly realized how pleasant it is to read these articles compared to the apparently inevitably lengthy papers in many scientific journals. Judged as a scientific work dealing with the flora of a part of Europe it is by far the best of its kind, and it will be very difficult, if not impossible, to equal its quality for other parts of Europe.

There is still no "communis opinio" in this country regarding the question how it can be determined whether an "unexpected" record is the result of dispersal activities of the wild mother plant or not, and no criteria are formulated as yet as an aid to take specific decisions. Thus the editors left the eight different authors of maps and articles free in their decisions, leading, as could be expected, to different solutions for comparable questions. It is my impression, however, that as a rule all authors have left out records of a doubtful nature; these localities can be found in the text. In some cases the number of correctly identified records not accepted on the map exceeds by far that of the accepted records, as for instance for *Silene gallica* (formerly 65, after 1950 only 3, apart from 27 records not accepted), and for *Verbascum blattaria*. For the latter species all records outside the plant geographic areas in which it is supposed to be "wild" are left out, leading to the odd situation that the available space in the text became insufficient for full reference of all doubtful records. In a comparable situation, that of *Aquilegia vulgaris* (which usually is found as a garden escape, but is also wild in part of the country), two separate maps are printed, one for records of escaped plants, and one for supposedly wild plants.

It is praiseworthy that the authors have deliberately exposed themselves to criticisms by giving opinions concerning the reasons for extinction of a species or for differences in the number of records before and after 1950. I think, however, that rather often more is actually known about these reasons than is stated in the texts, or that the reasons mentioned cannot be true. As an example, it is unlikely that *Linaria arvensis* became extinct because of seed cleaning. It is also very unlikely that the latter species, found for the last time in 1939, as well as *Spergularia (Delia) segetalis* (last record 1939) will have suffered from the use of herbicides which were not or hardly used by that time. The decline in the number of records of *Hypericum hirsutum* is certainly not the "cutting of old woods"; in the regions concerned this has not been done. The destruction of its natural habitat: seams of decidious forests and old hedges, must be held responsible for its regression from 35 to 9 localities. I expect, however, that such errors will stimulate other botanists to react adequately so that the aim is still achieved.

The number of differences with the *Standard List of the Netherlands Flora 1975* is rather high. Regarding the number of species, 10 species are added to the list, 2 of which are found first after 1950; of 2, *Trapa natans* and *Iris foetidissima* (p. 28), no maps could be produced. Seventeen species (taxa) have been left out, as should have been done for *Hypericum* × *desetangsii*, too. A rather important difference with the List not mentioned or explained concerns the definition of the figure codes ("UFK") indicating the number of squares in which a species is found. For the species in part 1 more than 50% of the UFK's from the List differ from those in the Atlas. A large portion of the differences are simply due to differences in measuring of these figures. In the List the first UFK figure concerns the period 1900–1949 whereas in the Atlas all records before 1950 (sometimes dating back to the 17th century) are counted together for that figure; this explains why the first UFK figure is so often higher in the Atlas than in the Standard List. No less than 106 species which anno 1975 were thought to occur in less than 11 squares have been found in more squares in the period 1950–1979. As a result of modern agricultural practice, however, many plant species not uncommon or already rather rare in 1950 are in fact rare or very rare anno 1980. I am convinced that a large portion of the 106 species

mentioned above are indeed as rare as is indicated in the List, and should have been included in the volume on "extinct and very rare plants" instead of in the second volume dealing with less rare plants.

Striking is the difference in the total number of localities of all 322 species treated in volume 1 : 4054 before 1950, only 1159 after that year. Because of the differences in methods mentioned above and the difference in the grid systems it is not yet possible to measure exactly the loss of the flora of the Netherlands. I would not be surprised, however, if indeed about 70% of the flora has faded away in the last decades. Ninety-four (94!) species in part 1 (if I counted correctly) are now probably extinct in the Netherlands, being a loss of about 6% of the flora. The number of species that disappeared completely grew steadily from 1920 onwards towards the end of the fourties and it seems unavoidable that still many more will vanish in the next decades, in spite of the efforts of organizations on nature conservation. The direction of the largest nature conservation society, *Vereniging tot Behoud van Natuurmonumenten in Nederland*, decided against the offer to sell the Atlas to the members of that society for a reduced price, although quite recently R. M. Teixeira's Atlas of the Netherlands Breeding Birds is thought to be interesting enough for these members. One can only deplore this unfortunate decision.

The book looks excellent by its fine typography and beautiful lay-out using next to black ink only one colour of green ink; its price is surprisingly low. I think that no one really interested in the flora of this country should miss the opportunity to get a copy of it for his personal library. The general chapters on methods, on the history of plant geographical work in the Netherlands, on geography, climate and geology, are in itself worth the purchase of the book, with Weeda's outstanding article on the reliability of the older botanical literature concerning the Netherlands, as a masterpiece in its own.

Cuey-na-Gael's funny booklet "An Irishman's difficulties with the Dutch language" shows effectively that it may be not superfluous to translate Dutch texts. That is reason why simultaneously with the Dutch edition an English edition is published, giving a translation of the general chapters. As adequate summaries are presented with the articles accompanying the maps, these texts are not translated.

R. VAN DER MEIJDEN

J. P. GRIME: *Plant strategies and vegetation processes.* 1979. John Wiley & Sons, Chichester, New York, Brisbane, Toronto, 222 pp., 63 Fig., 35 pl. £11.50.

In this book the author has tried to find order in the multitude of ways by which plants survive in their natural environment. A naive reader may be astonished by the use of the teleological term "strategy" in a strongly Darwinistic discipline like ecology. As the author defines it, strategy is about synonymous with the old fashioned term "biology" as used e.g. in "Biological Flora".

The approach is plant-centred i.e. the external factors considered are not in the first place physical and chemical ones, but stress, disturbance and competition.

By their strategies plants are divided in three main groups: competititors (low stress, low disturbance) stress tolerators (low disturbance, low competition) and ruderals (low stress, high disturbance).

Though this approach seems at first sight a bit arbitrary, one is appreciating its value more and more, not in the least by the skilful way in which the author fits a multitude of interesting biological facts (often not published) into this scheme. Many interesting parallels are drawn with strategies in the animal world.

The second part of the book deals with vegetation i.e. with dominance, succession and diversity and again is full of interesting material such as the relation between productivity and species density.

For the scientific management of semi-natural vegetations the book provides many fundamental ideas and valuable facts.

The text is excellently supported by many photographs and figures.

I think this book is a very original addition to the ecological literature.

PH. STOUTJESDIJK

Ulrich LÜTTGE, Noe HIGINBOTHAM: *Transport in Plants*, 468 pp, 180 figs. ISBN 0-387-90 383-6, Springer Verlag New York Inc., 1979.

About half the text is devoted to transport phenomena on the cellular and sub-cellular level (Part II and Part III). Kinetics of uptake is treated in relation to two- and three-compartment models. The various views including the carrier-hypothesis, which have emerged from these studies, are evaluated critically. A historical line is followed and the treatment is concluded by a fine diagram.

Due regard is given to the relationship between structure and function. Cell walls, membranes, plasmatic vesicles and organelles are described in order. A concise up to date description of their physiology is included. This makes these chapters very useful to the reader as there is no need for consulting other books.

Respiration and photosynthesis are well treated in the context of energy supply to membrane-transport. It is to be welcomed that full attention is paid to the fundamental concepts developed by outstanding scientists like Lundegårdh, Conway and Arisz. Problems arising from the spatial separation of production and consumption of energy are indicated and some electrophysical notions e.g. that of membrane potential are rightly treated in this context. On the other hand I missed the notion of proton motive force which has at least the heuristic advantage of bringing together the various aspects of the relationship between metabolism and transport through membranes.

Intercellular transport is treated in the final part (Part IV) of this book. The apoplasmic and symplasmatic aspects of short-distance transport are well documented. It is heart-warming to Dutch physiologists that Arisz' physiological approach to symplasmatic transport has been given appropriate attention in a textbook. In addition, structural and electrochemical data in favour of Arisz' concept are given. Moreover, the contribution of protoplasmic streaming for this type of transport is not taken for granted but discussed critically. Some reference is also made concerning transport of metabolites, including the well-known shuttles, which makes for more interesting reading.

Transport in sieve tubes is stressed as far as long-distance transport is concerned. Again unique for a textbook is Arisz' idea that sieve tubes originate from ordinary parenchyma cells from which follows that different mechanisms may dominate at various stages of development.

Transport in particular organs and within the plant as a whole are dealt with in the last two chapters. It was pleasing to see that exudating root systems are compared to salt glands and discussed from that point of view. The still remaining uncertainties with regard to the complexity of the overall-transport in these organs is well illustrated, whereas a fine survey is given of present day knowledge of stomatal movements.

Finally, the many feed-back mechanisms involved in the integrated transport phenomena in the intact plant are discussed and illustrated nicely amongst others by experimental evidence from germinating seedlings.

The book starts with a survey of biophysical principles after a short general introduction. Items like chemical, electrical and electrochemical potential are mentioned, the principles of irreversible thermodynamics concisely touched upon. The criteria for active versus passive transport are discussed. An attempt is made to make this matter more interesting and easier for the reader to digest by including as many examples from recent research as possible. Still, this part of the book is at too high an abstract level for the beginner and can be appreciated and evaluated critically by him only after having studied the other sections. On the whole, those parts in which the phenomena are treated from the point of view of a physiologist and a historical line of approach is followed, will give most satisfaction to the student.

This textbook has grown out of the Heidelberger Taschenbuch: "Stofftransport der Pflanzen" by Lüttge. No doubt, most of its qualities are to be attributed to this starting point. Nevertheless, it must have been a formidable task to make the necessary revisions in view of the rapid advances made in the field of transport processes in recent years.

While reading this book, we were informed of the sudden death of one of the authors (Higinbotham); We can only feel the more grateful that they were able to complete this textbook which now emanates both the European and American approach.

R. J. HELDER

E. H. BARNES: *Atlas and manual of plant pathology*. Plenum Press, New York and London, 1979, 325 pp. $ 19.50.

The main part of this manual consists of individual descriptions of selected plant diseases caused by fungi (about 30), by bacteria (5), by viruses (3) and by plant parasitic fungi (2), followed at the end by a few pages about nematodes. Attention is paid to the disease syndrome, the microscopic symptoms, the life cycle of the pathogen and control measures. Three introductory chapters deal with definitions, the interpretation of microscopic observations and the principles of sterile technique. The purpose is not only to provide experience in passive observation of diseased material, but also to encourage active participation in experiments with plants and pathogens. Eighteen exercises are integrated in the text.

The book contains numerous well chosen illustrations. To many of the microscopic pictures a line drawing has been added, which makes it easier for the student to discern host tissue and fungus structures. In many cases a life cycle diagram is presented. The total set-up of the manual, the clear descriptions of diseases, the well chosen illustrations and experiments bespeak the hand of an experienced teacher.

This manual is a virtually unchanged reprint of the first edition, which appeared in 1968. As a consequence some new developments have not been included, such as the application of systemic fungicides, the use of pheromones to detect concentrations of the elm bark beetle and the biological control of crown gall. In a preface P. G. Pilley mentions that the part of the book dealing with viruses, contains diseases, which are now known to be caused by mycoplasmas. The taxonomy of the fungi is not quite up to date. It is further a pity that details of some of the pictures are not very clearly visible, probably due to the quality of the paper or the reproduction technique.

These small shortcomings, however, do not detract from the main purpose of this excellent guide: to make the beginning student acquainted, macroscopically, microscopically and experimentally, with the various types of plant diseases. The manual can be recommended not only to students but also to those who want to refresh or replenish their knowledge in this field.

J. DEKKER

SÁNDOR JÁVORKA: Ikonographie der Flora des Südöstlichen Mitteleuropas (with Vera CSAPODY). 793 pp., 4090 figures in 40 colour plates and 576 black and white plates. Gustav Fischer Verlag, Stuttgart, New York, 1979. Price: DM 240.–. ISBN 3-437-30294-9.

More than 4000 plant species have been depicted in one volume. Of nearly each species a habit drawing is present, usually at natural size, often accompanied by one or more taxonomically relevant details at different magnifications. Most species are unknown to the reviewer; it was, however, surprizingly easy to recognize those I had seen before: the habit drawings are really very characteristic, and, as a means to find the name of a plant, better than any photograph can be.

The present edition is a German version (by Szaniszló Priszter) of the Hungarian edition of 1975 which gathered in one volume the 19 volumes in which the drawings were originally published between 1929 and 1934. Geographically, the iconography is based on the species growing in Hungaria anno 1910–1920. Compared with the present boundaries this area comprises E. Czechoslovakia, S. Poland, a small part of the Ukraine, C. and W. Romania, Hungary, E. Austria, N. Yugoslavia (Slavonia and Croatia), and the Yugoslavian coastal region (Dalmatia). Fortunately the book contains a glossary of older geographic names, as well as a concise dictionary giving Latin and English equivalents of Hungarian terms enabling foreigners to understand the descriptions of Javorká's Flora Hungarica (1924–1925) on which the Ikonographie is based. A translation of the subscriptions in German (80 pp.) is presented as an addendum. Reszsö Soó critically revised the original names, bringing them in accordance with present day taxonomic and nomenclatural practice. The book is excellently printed. Its price, DM 240.–, is relatively low for a voluminous work of such outstanding quality. It certainly deserves a place in many personal (and institutional) libraries.

R. VAN DER MEIJDEN

IAWA Bulletin, new series. Published by the International Association of Wood Anatomists, Rijksherbarium, P.O. Box 9514, 2300 RA Leiden, The Netherlands. C. 160 pp. per annum. Annual subscriptions D*f*. 40.–.

Early in 1980 the first, double, issue of the IAWA Bulletin new series has come out. This Bulletin is the continuation of the IAWA Bulletin as published during the years 1970–1979. At first sight the main difference between both periodicals is found in the format: instead of a journal with a large page, such as one might find difficult to file on library shelves, we see a handsome booklet, in size about the same as Acta Botanica Neerlandica.

The IAWA Bulletins have always been – and will be – a means for distributing informal news and items of interest for wood anatomists from purely scientific as well as from applied, technological fields. Besided, however, in the course of the years the Bulletin has become a scientific periodical in which papers on varying topics, though all related to wood anatomy, have been published. The editors expect that this tendency will be continued and feel that the change of format is justified because it improves the possibilities for circulation. They also aim at maintaining a high quality level of the contents.

We may say, that the first issue is very promising. In addition to a bibliography on wood identification (reviewed separately below) and "wood anatomy news and association affairs", it contains papers on wood sampling methods, the problem of reliability and citation of wood specimens, the occurrence of individual wood characters, viz. cystoliths (in *Sparattanthelium*), silica (in *Cordia*), types of vestured pits (in *Pithecellobium* s.l.), on stem anatomy of *Clematis vitalba*, on statistical analysis of character correlation (in *Entandrophragma*). Technological sciences are represented by a paper on the relation between anatomy and physico-mechanical properties in beechwood, and the field of plant morphogenesis by one on the effects of chemical compounds on wood formation in *Salix*. Thus the contents cover a wide range of wood anatomical research, and are of interest to all institutes of general and taxonomic botany as well as forest products laboratories and wood-technological institutes. If the editors succeed in maintaining the present scientific level, their efforts will not have been in vain, but will result in an actually improved IAWA Bulletin.

J. KOEK-NOORMAN

M. GREGORY: *Wood identification: an annotated bibliography.* 1980. International Association of Wood Anatomists, Rijksherbarium, P.O. Box 9514, 2300 RA Leiden, The Netherlands. Price: D*f*. 20.–; £ 4.50; $ 10.–. Also published in IAWA Bulletin New Series 1: 3–41. 1980.

Wood identification – like all plant identification – is mainly the work of specialists, but it is often also done by less experienced people, mostly unfamiliar with the literature.

Up till now the essential literature was hard to get by: descriptions of and/or keys to woods of special regions or of taxonomic groups – if existing – are scattered over many books and journals. This meant a hindrance to most identification work.

M. Gregory (Jodrell Laboratory, Kew), highly experienced in indexing of the anatomical literature, has undertaken the listing of publications on wood identification. This has resulted in an up to date compilation of publications (up to and including 1979).

The nearly 500 titles are arranged by geographical areas and by systematic groups. Furthermore, a chapter with general reference works, works on single diagnostic features, and an author index are added.

For all titles has been indicated whether macroscopic or microscopic characters are used, the number of species of genera dealt with, the presence of specific or generic descriptions, the presence of keys or character lists, and the inclusion of photomicrographs.

All together, the bibliography will save time because it facilitates the search for literature enabling identification. Furthermore, it seems probable that many identifications will become more reliable because of the better access to existing information. Therefore, the incorporation in botanical

libraries seems fully justified, although the price of the booklet seems slightly high (Dfl. 20) as compared to the number of pages.

As part of the value of such a bibliography is found in its completeness, I really hope that from time to time miss Gregory will list recent additions. For these, the IAWA Bulletin seems the appropriate vehicle for publication.

J. KOEK-NOORMAN

Thomas C. MOORE: *Biochemistry and physiology of plant hormones.* Springer-Verlag, New York-Heidelberg-Berlin, 1979, 274 pages, 156 figs., 13 tables, XII.

This textbook, dealing with hormonal regulation of growth and development of seed plants has been written primarily for students majoring in botany, agronomy, forestry and horticulture. A background in fundamental biology, plant physiology and biochemistry is assumed. There is, however, an introductory chapter with elementary information for those students whose background is deficient. In three sections of this chapter the attention is directed to mathematical analyses of the time course of growth. The merits (instructive description of growth) as well as the limitations (no information about the causation or control of growth) of growth equations are critically discussed, with examples. In the next chapters the well-known plant hormones are dealt with separately, priority having been given to biochemical aspects. Each chapter starts with a brief history, but in at least seven cases, authors mentioned in the text (with year of publication) are not listed in the References. Much attention is paid to the biosynthesis and to the mechanism and mode of action of each hormone. Since it is a book on basic regulation mechanisms, it was a good idea to include an extensive chapter on phytochrome. Hormone action and hormone metabolism are often closely connected with this pigment system.

The following obscurities and omissions must be mentioned: the real significance of oxygen in ethylene physiology is not clearly explained; whereas a list of 14 physiological effects of ethylene is included, the role of auxin in root production, parthenocarpy and abscission is not even mentioned; the importance of abscisic acid in fruit senescence (ripening) has been overlooked. These shortcomings are partly due to Moore's belief, that it is more effective to guide students from a restricted information base such as this book provides than to start from a long integrated discussion of the physiological role of the different hormones and their interactions.

All the same, this book which is primarily intended as a major reference for a one-term intermediate-level or advanced-level course, is a valuable text on basic regulation mechanisms with many important data, missing in most textbooks of plant physiology.

L. ANKER

H. MUSSELL and R. C. STAPLES (Eds.): *Stress Physiology in Crop Plants.* John Wiley & Sons, New York, 1979. 510 pp. £19.85.

Stress physiology is one of the hot topics in applied plant science. As prices of agricultural inpunts increase, such as is the case with fertilizers, pesticides, water etc., the benefits to be gained from a limited application of these inputs become ever more interesting. Furthermore, agricultural production in tropical countries is often severely limited by deficient soil conditions such as acidity, aluminium toxicity and very low phosphorus content in the humid tropics and salinity and aridity in the dry areas. The appearance of the present book, which contains the material of the 1977 International Conference on Stress Physiology in Crop Plants, is therefore very welcome. In 22 chapters a large number of scientists covers most important types of stress, including disease, waterstress, salinity, aluminium toxicity, phosphate limitation, low and high temperature and air pollution.

It is significant that 9 chapters deal with water stress, water availability being one of the most important factors limiting crop production on a world-wide scale.

It is also significant that much of the discussions and conclusions are in the future tense: it is expected that the increased knowledge about the physiology of stress will lead to crops which are more productive under stress conditions. But the gap between physiology and e.g. plant breeding is still wide. Breeders would be only too glad to use physiological parameters for the screening of their breeding populations. But the lessons to be learned from physiologists are often still hard to apply in selection. Much emphasis is therefore laid in a number of chapters on the need for simple and unequivocal screening methods for stress tolerance.

Apart from the practical implications of stress physiology, another interesting aspect of this book is that the different subjects taken together, draw on a large part of the arsenal of plant physiology. Physiological principles involved in disease tolerance are of a different nature altogether from those related to frost hardiness or drought tolerance. Inevitably there are differences in scope and quality of the contributions. Some chapters mainly treat a limited number of experimental results, which should rather have been published in a scientific journal, whereas others present a more or less complete account of the state-of-the-art. As a whole, however, the book gives a very useful summary of the main topics in stress physiology, useful both to agronomists and to plant physiologists who are concerned with the practical implications of their activity.

H. J. W. MUTSAERS

R. VAN DER MEIJDEN, M. BRAND en E. 'T HART: *Grassentabel.* Rijksherbarium Leiden, 35 p., D*f.* 5,90.

The authors present a key for the identification of 141 Dutch grass species and their subspecies in the vegetative stage. The key parallels the booklet for vegetative identification of grassland species of KRUYNE and DE VRIES (edition Veenman, Wageningen), which treats 37 grass species. Different from the key of Kruyne and De Vries which is primarily based on leaf characters, the authors also use typical field characteristics of the species as stolons and rhizomes. The contents look very reliable and the illustrations are of good quality. Both keys can very well be used together.

The authors follow the nomenclature of part 5 of the Flora Europaea which means that 25% of the Latin names used in the current issue of the Flora van Nederland have changed. One may hope that these changes also will be carried through in other floras, to avoid confusion.

J. H. NEUTEBOOM