Acta Bot. Neerl. 34(4), November 1985, p. 439–448.

BOOK REVIEWS

R. KNAPP (Ed.): *Sampling methods and taxon analysis in vegetation science.* Handbook of vegetation science vol. 4. Dr. W. Junk, publishers, The Hague, Boston, Lancaster, 1984. 370 pp., ill. Cloth. D*f* 155,–; US$ 67.50; £ 39.25. ISBN 90-6193-185-1.

Part four of this series consists of 22 chapters by various authors. After two introductory contributions, one of which is by the editor – for whom this edition is a 'Festschrift' on the occasion of this 65th birthday – and the other by the late prof. Tüxen, two chapters deal with 'taxonomic units'. Landolt's chapter on 'closely related taxa' treats a problem which is probably one of the most important in this context. On the consequences of morphologically indentical ecotypes and the errors these may lead to more discussion seems to be necessary. On the use of apomictic taxa the author remarks: 'A good example is presented by Westhoff and den Held (1969), who mention a whole series of *Taraxacum* taxa as character species and differential species....'. Perhaps this is something to keep in mind by the authors of the next edition of the "Flora van Nederland".

"Objects, parameters and quantification in vegetation sampling" have been discussed by: Pakarinen (sampling of boreal vegetation), Londo (the decimal scale), Oksanen (Scandinavian methods), Rabotnov (various scales), Chessel and Gautier (statistical pattern analysis of a plant population) and Knapp (considerations). Reading these separate discussions on the various "schools" in European vegetation science one may question whether this is the approach a modern handbook should need. Vegetation science is a mature branch of ecology. Since Von Post in the middle of the last century a vast discussion on the methodology of sampling has been taking place. An objective of the editors of a handbook on this subject should have been a compilation of the approaches of various geographical origins, rather than inviting scientists who are well-known to use the methods, accepted by a determinate school. The young vegetation scientist, who – given his or her problem and the scale and structure of the object – who wants to find the appropriate method without taking into account the fact whether he is a Russian or a Scandinavian or a French-Swiss, will be disappointed.

An important entry such as "scale" is not dealt with (except for a classical review of the minimum area principle by Knapp). Also the consequences of hydrology, management and the abiotic environment on sampling methodology remain untreated. Vegetation dynamics has been left out of consideration, which is regrettable.

"Relevé areas and plotless sampling" is discussed by Knapp (regarding distribution, homogeneity, size and shape) and by Géhu (grid cartography, in French). The chapter by Kutschera-Mitter on "surveys of roots and subterranean parts", using own results and splendid illustrations is a pleasure to read. Numata's techniques with respect to the "analysis of seeds in the soil" are interesting, but as an overview his article seems rather incomplete.

The final part of the book (8 chapters) consists of articles on computermapping (Reader & Lieth), phenology (Ramirez), dispersion (Luftensteiner) macrophytic aquatic vegetation (Kárpáti & Kárpáti), phytoplankton (Ilmavirta), macromycetes (Winterhoff), subfossil plant residues (Knörzer) and reconstruction of fossil plant communities (Schwaar). These are well-written, interesting and mostly up-to-date examples of vegetation research not using standard techniques.

In spite of all criticism, an appropriate final conclusion must be that this handbook will undoubtedly be of great use for research and educational purposes.

L. F. M. FRESCO

H. F. LINSKENS and J. HESLOP-HARRISON (Ed.): *Cellular Interactions*. Encyclopedia of Plant Physiology N.S. Vol 17. Springer Verlag, Berlin, Heidelberg, New York, Tokyo 1984. xviii + 743 pp., 198 figs. Cloth, DM. 360, approx. US $ 134.30. ISBN 3-540-12738-0.

The excellent series "Encyclopedia of Plant Physiology" does not need introduction. Each newly published volume again is of good quality, well-edited, very useful as a reference-book or as an introduction in a special field. The large amount of reliable information usually warrants the price.

Volume 17, edited by Prof. H. F. Linskens and Prof. J. Heslop-Harrison, deals with cellular interactions. Thirty-three contributors were found to be willing in reviewing different aspects of this plant cell-biological topic, varying from the evolution of the eukaryotic cell to allergic interactions (both editors are pollen-experts). It is unfeasible to go over each chapter (28 in total) in detail. An introductory chapter of the editors precedes an overwhelming amount of exemplary plant cell interactions: algal associations, interactions between micro-organisms and plants, slime mould and fungal cell interactions, lichens, pollen-pistil interactions and plant cell contact phenomena.

This book clearly shows that nature offers the scientist far enough (too much?) interesting subjects for cell-cell interaction research. At the same time it becomes very clear how little is known about the biochemical basis of these interactions. As a review the book doubtlessly is a success, but in general it provides no insight in the methodology now needed to force a biochemical break-through in cell-to-cell contact studies, especially where higher plant cells are involved. After reading this volume my first impression was:

This volume again worthily marks the end of an era in biology in which description, reconnaissance, classification and comparative chemistry dominated research. Let us please select some suitable examples now and all together look for molecular interactions and regulation.

On the other hand, the book illustrates nicely that an open-eyed survey of nature can offer many intriguing research subjects, some of them offering better possibilities for the answering of basic scientifical questions than current research topics. From this point of view the contents of a book like this can not be extensive and detailed enough. The editors apparently chose for a review of present possibilities, and left the outlook on the future as a challenge for the readers.

In summary, this volume is a high-quality reference-book and remarkably up-to-date, certainly when you realize how a book like this is produced. For those readers who use parts of this series for teaching purposes or as an introduction in a special topic it is a pity that several chapters lack illustrations. But the exception proves the rule; this volume will not have a quiet resting place in your library.

J. W. KIJNE

M. ALEXANDER (Ed.): *Biological Nitrogen Fixation, Ecology, technology, and physiology*. Plenum Press, New York and Londen, 1984. 247 pp., 17 figs., 21 tables. Cloth. US $ 51.–; in U.S.A. $ 42.50.

The proceedings of a training course on "Biological nitrogen fixation and its ecological basis", held in Caracas (Venezuela) on January 18–29, 1982 and attended by representatives of several developing countries, have been published with the expectation that non-attendants also could benefit from the given information. Spread over ten chapters, most of them written by specialists in their field, the contents represent a mixture of fundamental and practical information on biological nitrogen fixation centered around the *Rhizobium*-legume association.

A training course in this field makes specific demands on the presentation:
- are the fundamental data when possible related to practical problems?
- is the methodology critically evaluated?
- is the information well-illustrated and are enough references presented, so that the book can

be easily used for teaching purposes?

Unfortunately the book is unbalanced in these respects and several chapters do not meet the conditions. For instance, the chapter on limiting soil factors lacks an evaluation of methodology, the chaper on host-specificity gives no relation with practical problems, and the chapers on rhizobial ecology and *Azospirillum* lack illustrations. Furthermore, the presentation of the *Azospirillum*-chapter makes it difficult to discriminate between facts and hypotheses which is quite unwise from a didactical point of view. On the other hand, the three chapters on genetics and breeding, strain selection and inoculant technology are clearly written and instructive, and represent the best part of this book.

In summary, this book is a semi-successful attempt to explain more or less recent data on soil nitrogen fixation. The surface-water nitrogenfixers probably have to wait for another training course. In view of the high price of this book it is hoped that the organizations sponsoring this educational program also subsidize potential buyers in third world countries.

J. W. KIJNE

W. A. CÔTÉ (Ed.): *Biomass utilization.* NATO ASI Series A: Life Sciences vol. 67. Plenum Press, New York and London, 1983. xii + 730 pp., 235 figs., 192 tables. Hard cover. US $ 114.–, in US and Canada $ 95.–.

After man had made the historical step from hunting to farming, the production and utilization of biomass became his major activities. On a global scale, today they still are. Plants not only carry the products they are grown for, but also less valuable parts. This book mainly deals with the utilization of the biomass of the byproducts. The attention for this subject has been revived in the last decade, especially because utilization of biomass has sometimes been viewed as a possible relief of energy shortage.

The problem when compiling a book on this subject is the great diversity of the sources of biomass material, as well as of their usage. As pointed out in a clear and well structured article by Sheppard and Young on the agricultural perspective of biomass, its value is intimately connected with its usage. This can be ranked in a hierarchical order with fuel at the bottom, and with increasing value as building material, feed, food and drug.

Utilization as fuel can only be economically viable if almost valueless sources are used such as waste, manure and crop residues. An additional premium is then sometimes the possibility to get rid of the stuff in a harmless way. In general there is however little perspective to enhance agricultural income by specifically growing crops for biomass.

This book consists of the proceedings of a conference sponsored by NATO. The fourty contributions vary tremendously, both in topic and in quality. This is typical for proceedings in general, but in this case it was enhanced by the variability in the subject. Unfortunately, a clear summarizing review of the whole field is lacking. But some specific articles stand out in quality. A nicely illustrated contribution of Côté highlights the morphology of wood. Soltes gives a natural continuation to this article with a discussion of cellulose, its properties and how it can be made chemically accessible. There are quite a number of contributions on the processing of biomass, some about biological methods and others about thermochemical methods. Two contributions of Vokes deal with municipal solid waste: its composition and how it can be processed.

An article of Becker on the production of microalgae as a source of biomass does not give reason for much optimism about the economic viability of this technology. Bottlenecks are the harvesting and the drying of the algae and the CO_2 supply to the water. A likely exception is combination of algal production with waste water treatment, where CO_2 and nutrients are freely available.

This book is not cheap, but it contains a vast collection of knowledge of experienced scientists and engineers from many different countries. It will help the newcomer to find his way in this complicated field.

J. GOUDRIAAN.

C. J. PEARSON: *Control of crop productivity*. Acadamic Press Inc. Sydney, Orlando, London &c. 1984. xvii + 315 pp., 68 figs., 15 tables. US $ 49.50; in U.K. only, £ 37.50. ISBN 0-12-548280-9.

This book aims to present examples of how interactions between development, physiology, management and environment control crop productivity. It consists of 18 papers all written by former students of Prof. F. L. Milthorpe to mark his retirement. The clarity of thinking and presentation of Milthorpe and Moorby's textbook "An introduction to crop physiology" has set the standard for this book. It encompasses an impressive diversity of subjects, typical for the different areas in which the authors now work. The book is divided into one group of papers on processes such as water loss, carbon gain etc. in general, and another one on specific crops. They are introduced by an opening chapter of the editor, who does a good job putting them into a well defined framework. The contributions on processes tend to be more theoretical like Cowan's presentation of his enchanting theory on how stomatal behaviour could optimize water economy, others give a broad review of experimental findings like Davidson and Christian's paper on flowering in wheat. Many species discussed grow in tropical and subtropical regions, such as maize, millet, bananas and mangroves, but there are also chapters on wheat, bean and temperate pastures. The processes discussed range from those on the microscale of electron transport in chloroplasts up to those on the large scale of forest restoration, taking decades. The integration of this diversity in subjects and in temporal and spatial scales calls for a modelling approach, but there is only one paper, the last one, taking up this technique. It presents remarkably good results of simulation of grain yield of wheat. Unfortunately a listing of the model, an essential component of documentation, was omitted, probably because it was found to be too lengthy to be reproduced.

Despite its title this book is not meant for the average agronomist. It will be more appreciated by students and scientists who are specialized in crop physiology. They will find that another outstanding contribution from predominantly Australian side has been made to this field of science.

J. GOUDRIAAN

D. VINCE-PRUE, B. THOMAS, and K. E. COCKSHULL (Eds.): *Light and the flowering process*. Academic Press, London, Orlando, San Diego, New York, Toronto, Montreal, Sydney, Tokyo 1984. xxii + 301 pp., 77 figs., 39 tables. Cloth. US $ 27.50; £ 19.00 (in U.K. only). ISBN 0-12-721960-9.

This book contains contributions from 19 leading specialists and forms the proceedings of a symposium organized by the British Photobiological Society at Littlehampton U.K., September 1983. The book, in camera ready copy format, is carefully prepared, very readible and contains a mine of information. Each chapter has its own reference list, an index of key words and plant species is found at the end of the book.

The contributions are grouped under 6 headings; 1. Light and the flowering process 2: Photoperception and transduction of daylength signals. 3: Light dependent changes at the apex – evocation. 4: Genetic studies. 5: Flower development and light. 6: Conclusions.

Evidence for the involvement of diurnal rhythms in the detection of photoperiodical signals is presented for short day plants as well as for long day plants. In both response types phytochrome is shown to be the light detector. The "Floral Stimulus" in the transduction of the signal from leaf to apex remains a mystery, the well known hormones having only modifying effects. New for this reviewer is the increase in evidence for an active rôle of substances which inhibit flower induction that are exported from non induced leaves. The chapters on evocation and flower development demonstrate that also in the processes photoperiodism sometimes is involved, but in contrast to what is found in flower induction, here the daylength effect can be simulated by an appropiate application of growth substances. Light intensity and spectral quality, photosynthesis, source and sink activation by light and by growth substances are related topics touched upon, especially in

relation to flower and development and to autonomous flowering.

Some chapters have a high input from research directed to practical problems in horticulture.

The book will certainly be useful to teachers in plant science on university level and will find its place in libraries of institutes with research programmes on plant breeding and on the physiology of plant development.

J. ROMBACH

J. L. HARLEY and S. E. SMITH: *Mycorrhizal Symbiosis.* Academic Press, London, New York, etc., 1983. v + 483 pp., 15 plates, 39 text-figures, 87 tables, £ 35.00 ISBN: 0-12-325560-0.

In 1959 the first author published "The Biology of Mycorrhiza" of which a second revised edition appeared in 1969. It was an extremely clear and concise synthesis of the knowledge on mycorrhiza at that time. In the meantime the amount of available knowledge has increased tremendously. It is therefore very fortunate that Harley has undertaken the task of another synthesis, this time in cooperation with S. E. Smith, another well-known expert on the subject. The resulting new book, itself a product of symbiosis, has retained many good features of its predecessor, but is yet quite another book.

The structure of the present book is such, that it is divided into two separate parts. These are preceded by a short (11 pp.), but very readable and lucid introduction. It deals among others with classification, which forms the basis of the broad division of the first part of the book, entitled "Kinds of Mycorrhiza", The four sections thereof deal with VA-mycorrhiza (90 pp.), ectomycorrhiza (133 pp.), mycorrhiza in Ericales (31 pp.) and orchid mycorrhizas (31 pp.). It reflects the more recent ideas on classification and turns away from the by now obsolete division into endo- and ectomycorrhizas. The VA-mycorrhiza being the most ancient and most frequently present type of mycorrhizas are now rightly treated first. Each of the groups is treated admirably complete and with the incorporation of the latest research, in a succint and very lucid manner, although the ectomycorrhiza are treated most extensively. For the first two groups the symbionts, infection processes, anatomy, modelling, physiology, nutrient uptake, etc. are dealt with in four and seven chapters respectively. The mycorrhizas of the Ericales are dealt with in two chapters, one on the ericoid mycorrhizas, the other on the arbutoid and monotropoid ones. The orchid mycorrhizas are treated in but one chapter. Here many gaps in our knowledge are indicated. The authors point out many interesting similarities as well as differences between the various groups of mycorrhizas, especially between those of the last three sections.

If the book had consisted only of the first part it would have been an excellent work on mycorrhizas all by itself. The second part (110 pp.) gives it still an extra dimension. It contains five "essays on mycorrhizal subjects". These rather independent essays deal with: causal anatomy of ectomycorrhizas (18 pp.), translocation in mycorrhizal fungi (22 pp.), transfer of metabolites between the symbionts (18 pp.), specificity and recognition (30 pp.), and ecological aspects of mycorrhiza (22 pp.). They supply the reader with much food for thought on special areas of mycorrhizal research. The accent is on ectomycorrhizal examples. Non-mycorrhizal literature on related subjects is frequently used to arrive at hypotheses in cases where mycorrhizal data are insufficient or lacking.

The authors state in the Preface to have mentioned only a fraction of the relevant papers, yet there are still 54 pages with references. The index (20 pp.), however is rather incomplete. Looking for a particular key-word it will often be absent or if present it may be difficult to find being hidden under a large subheading such as ectomycorrhizas.

Except for a few minor shortcomings, such as the poor index, poor quality of some of the plates and quite a few typographical errors not much can be said to distract from the value of the book as such. It makes for easy and pleasant reading by its clearness and conciseness of style, despite the tremendous amount of information presented. It presents us in a very thorough and penetrating way with a synthesis of existing information, points out the many gaps in our knowledge and suggests possibilities for further research. It will undoubtedly remain a much valued book for anyone interest-

ed in the subject and phenomenon of mycorrhizal symbiosis for a long time just as was the case with its predecessor "The Biology of Mycorrhiza".

T. LIMONARD

K. DOBAT, in Zusammenarbeit mit TH. PEIKERT-HOLLE: *Blüten und Fledermäuse (Chiropterophilie)*. Verlag Waldemar Kramer, Frankfurt am Main 1985. 370 pp., 108 figs., 24 tables. Cloth. DM 78.–. ISBN 3-7829-1095-8.

The first exhaustive treatment of bat pollination. With German *Gründlichkeit* the author deals with (as far as reviewer can ascertain) all aspects of the subject. After a general introduction concerning reproduction (not the best but anyway less relevant chapter), an historical most interesting and well-documented overview is given. There follow chapters on adaptations in chiropterophilous plants (flagelliflory and other chiropterophilous syndrome features and flower types, nocturnal flowering, nectar composition, etc.), and adaptations in anthophilous bats (as far as can be ascertained never compiled so neatly before): body hairs, skull architecture, dentition, glossal morphology, physiology, senses of sight and smell, echo-orientation in the Microchiroptera as against the lack of an ultrasonic system in the Megachiroptera, etc.), effectuation of the pollen transfer, records of pollen recovered from bats both externally and internally, etc. A chapter on the geographical range of chiropterophily is concise but interesting enough. Chapter 7 on the evolution of chiropterophily is admittedly speculative but certainly not the best. Continental drift is discussed in rather great detail, but since the evidence points to a "recent" (late Tertiary to Quaternary) advent of anthophilous vertebrates, the role of continental drift is negligible. Dobat also discusses Leppik's idea regarding the evolution of 'biological flower types", but this is hardly relevant (because chiropterophily is not correlated with a single kind of floral architecture). The evolution of the anthophilous groups of bats is more straightforward, because the trends of adaptive specialisation are so manifest (see above). Chiropterophily is by no means always a secondary change-over from onithophily (certain originally frugivorous bats such as several Pteropodidae consume parts of the floral bracts, or the flower, or special food-bodies and the initial pollination syndrome may have varied from anemophily – as in certain Pandanaceae – to several forms of zoophily). Chapter 8 is an exhaustive and very detailed enumeration of records of (presumed) chiropterophily, with such details as the bat species (when noted), the responsible author(s) and the country or region. Chapter 9 is the counterpart dealing with anthophilous bats and recording the taxa visited, localities and literature sources. The trouble with such records is that taxonomic misidentifications and other errors by the *original* author are included uncritically. Certain non-valid names and synonyms are obvious to specialists but may mislead uninitiated readers (a few examples: several names in the Sapotaceae are obsolete or incorrect; the *Kigelia* species mentioned on p. 224 are in fact only names for one species as far as Rev. remembers; the twenty *Gesneria* species certainly do not all belong to this genus as at present understood). Another drawback is the listing of authors that mainly repeated or compilated original records of others workers, because one cannot see whether they confirmed or otherwise verified the claims made. A typical example concerns *Ipomoea albivenia*, a species occuring from the drier NW areas of southern Africa north- and northeastwards. The only original references can be those of Vogel and possibly of Kock, not of Van der Pijl (as indicated); the other workers cited most probably never saw this plant because as far as reviewer can ascertain they did not ever visit that part of the world! One cannot glean from the enumeration whether a record was based on observations of bats on the flower, or merely by inference from anthecological syndrome features. A critical point is intimated by the author but not critically taken into account, *viz.*, the records of chiropterophily in other countries than the native one of the plant species involved. *Adansonia digitata* is a good example: it is clear that in Africa African bats (such as *Eidolon helvum*) visit baobab flowers, but elsewhere (Indonesia, Philippines) Asian bats are the visitors. Chapter 9, as mentioned before, deals with bats recorded from flowers and is an enumeration of the systematics and the plants visited but does not mention the distribution of the bats. To Rev.'s mind the usefulness of such insufficiently critical compilations is doubtful.

The criticism does not distract much from the merits of the book: it is well-printed, very rich in excellent photographs (some in colour), the list of references seems to be very nearly complete and up-to-date, and the price is reasonable. It will prove to remain a useful reference manual for quite some time and is undoubtedly a "must" for every student of anthecology and teachers of biology, and is to be recommended for inclusion in biological and general libraries. The language in which it is written in may be a snag for prospective Anglosaxon users, so that I suggest the publication of an adequate English translation as soon as possible.

A. D. J. MEEUSE

H. SENGER (Ed.): *Blue light effects in biological systems.* Springer Verlag, Berlin, Heidelberg, New York, Tokyo, 1984. xvi + 538 pp., 298 figs. Cloth. DM 142,—. ISBN 3-540-13462-X.

In 1979 the first International Conference on the Effect of Blue Light in Plants and Microorganisms was held. The papers were published in the The Blue Light Syndrome, edited by H. Senger. In 1984 a similar conference was held and H. Senger succeeded to publish the proceedings within half a year.

Whereas the usefulness of such conferences is undisputed, the usefulness of the publication of their proceedings is more doubtful, particularly when the papers describe recent experimental work. However this does not apply to the present book since about half of the papers are small reviews on a limited area of research or on recent work of the author, stressing theoretical backgrounds. This makes the book a readable account of the recent developments in the research on blue light effects.

Many topics covered in the preceding volume are treated again and it appears that the basic problems are not much nearer to a solution. Nevertheless, many data have been gathered. In many reactions a flavoprotein is now considered to be the responsible pigment, though sometimes more pigments seem to be involved. A new section is the one on genetic analysis and moleculair biology of the blue light responses. Although as yet not many results have been obtained, the approach seems promising.

Like its predecessor, the book can be recommended to all who are interested in the effects of blue light on plants.

J. LION

H. J. TEAS: *Physiology and management of mangroves.* Tasks for vegetation science vol. 9. Dr. W. Junk, publishers, The Hague, Boston, Lancaster, 1984. 106 pp., ill. Cloth. D*f* 100,—; US $ 38,—; £ 25,—. ISBN 90-6193-949-6.

This book is connected with a former one of the series "Biology and Ecology of Mangroves". This explains the otherwise strange combination of physiology and management.

The chapters on physiology deal with fundamental aspects of gas exchange, photosynthesis, photorespiration, and productivity on the one hand and with ion absorption, ion transport and ion secretion on the other. They are very interesting since the responses of various species to a wide variation in salt concentration are compared.

The chapters on management show how the maintenance of mangrove ecosystems stands under the pressure of wasteful consumption. The problems are very much the same in various countries.

The book is, together with the foregoing number of the series, all-important for libraries of institutions working in the field.

R. BROUWER

H. WALTER and S.-W. BRECKLE: *Ökologie der Erde*, Band 2. *Spezielle Ökologie der Tropischen und Subtropischen Zonen*. Gustav Fischer Verlag, Stuttgart 1984. xx + 461 pp., 330 figs. 116 tables, 4 maps. DM. 48.–.

This book clearly has its origin in the earlier text produced by the senior author (H. WALTER, *Die Vegetation der Erde. I. Die tropischen und subtropischen Zonen*, G. Fischer Verlag, Stuttgart, 3rd edition, 1973). The new book is enlarged by the incorporation of some aspects of animal ecology. Conform Walter's subdivision of the earth in 9 zonobiomes based on the main climatic zones this book contains three of them: the equatorial zonobiome of the humid tropics, the tropical zone biome with summer rains, and the subtropical arid zonobiome. Due to the preference of both authors for the latter zonobiome more than half of the book is devoted to the deserts and semideserts of America (Sonoran and Peruvian desert), of Africa (Karoo, Namib, Sahara, Negev and Sinai) and of Australia.

The advantage of this book is not only its high-standard text on the ecology of plants from these zonobiomes, but also the ambition of keeping the literature up-to-date (even a thorough Ph. D. thesis by Bruinzeel from December 1982 is integrated in this 1984 edition).

There are some minor points of criticism. The first one concerns the effort with regard to the zoological literature. It is very doubtful if two botanists can adequately cope with the assimilation of the animal components of ecosystems. As demonstrated in chapter 6.5 on the Swakop river system satisfaction is not achieved. One example: seed predation of bruchid beetles is essentially better known than the presentation in this chapter (HAVELY 1974). Nevertheless, such a treatment can perhaps stimulate zoologists to study more than only systematics (cf. VAN BRUGGEN 1978). Another point of criticism concerns the quality of the photographs: Due to the scale of reproduction and the inferior paper quality a lot of the excellent photographs taken from Walter's Vegetation der Erde lost their value (e.g. fig. 387 vs. now 3.85, 424 vs. 3.130, 229 vs. 2.27).

But this criticism in no way should detract from the true value of this book. The authors are to be congratulated for the breadth of their vision.

A. C. VAN BRUGGEN (1978). Land mollucs. In: M. J. A. WERGER (ed.), *Biogeography and Ecology of Southern Africa*, pp. 877–923, W. Junk Publ., The Hague.

G. HAVELY (1974). Effects of gazelles and bruchid beetles (Bruchidae) on germination and establishment of Acacia species. *Isr. J. Bot.* **23**, 120–126.

W. H. O. ERNST

D. J. GALLOWAY: *Flora of New Zealand lichens*. P. D. Hasselberg, Government Printer, Wellington, New Zealand, 1985. lxxiii + 662 pp., 8 colour photographs. Cloth. NZ $ 39.95.

A milestone in lichenology of the Southern Hemisphere, and a useful book, nothing less.

After the Preface, a brief history is given of lichenological exploration in New Zealand, followed by a list of collectors (both living and deceased) and the herbaria holding their collections. References to literature on lichen taxonomy (from 1781 to 1983), abbreviations used, information on signs and measures, and names of authors take up 18 pages. The key to the genera occupies pp. xlvi to lxxiii and is followed by the descriptive part, pp. 1–622. A glossary of technical terms, a number of addenda to some genera, and an index conclude this work. 210 lichen genera are discussed, references to pertinent literature are given, and 966 taxa are described which are thought to represent about 60% of the lichens actually to be found in New Zealand.

In the eyes of the reviewer, a one-time beginner in lichenology who subsequently fled into mycology, this book is a proud accomplishment, so it is with some hesitation that he offers the following comments.

In the second part of couplet 165 (p. lxii), "when present" should be deleted. A serious difficulty

arises from the obvious possibility that apothecia may be lacking altogether. What criterium, then, is there to make one choice more plausible than the alternative one?

A somewhat similar case is couplet 220 (p. lxvii), where there is an equal chance of the apothecia being present or not present. But, if apothecia are lacking, the difference between a "pubescent" and a "± tomentose" lower surface as a differentiating character is not very convincing, while the absence of rhizines does not necessarily lead to *Nephroma. Dirinaria* although indicated in the key as belonging to the group possessing rhizines, is described (p. 162) as "without rhizines".

To determine the two New Zealand species of *Cetraria* (p. 82), it would have sufficed to point out the different C-reaction of the medulla. To mention the thallus colours is of no real help since these are variable and predictably confusing.

Cladonia scabriuscula (p. 120) is described as having its podetia "partly or entirely isidiate-sorediate" and the [podetial] apices "granular sorediate". However, to key out this species, the second part of couplet 32 (p. 103) must be chosen which says: "Esorediate".

One of the features mentioned in the key (p. 544) differentiating *Stereocaulon fronduliferum* from four other members of the genus is that the hypothecium in this species is said to be brown, colourless in the others. One of these others – *S. argus* – appears to have the hypothecium "colourless to pale brownish." No description is given of the hypothecia of *S. ramulosum* and *S. trachyphloeum.*

In the description of *Umbilicaria polyphylla* (p. 593), the upper surface is claimed to be "rough or cracked peripherally", but in the key it is indicated as "without cracks".

A final remark concerns the scarcity of illustrations in this book. The reviewer firmly adheres to the opinion that small but characteristic pen drawings illustrating the species would be no luxury.

R. A. MAAS GEESTERANUS

R. M. T. DAHLGREN, H. T. CLIFFORD and P. F. YEO: *The families of the Monocotyledons, structure, evolution and taxonomy*. Springer Verlag, Berlin, Heidelberg, New York, Tokyo 1985. xii + 520 pp., 225 ill. Hard cover. DM 294,—. ISBN 3-549-13655-X; 0-387-13655-X.

This is the last part of a trilogy on the Monocots (Dahlgren & Clifford, "The Monocotyledons: a comparative study", 1982; Dahlgren and Rasmussen, "Monocotyledon Evolution: characters and phylogenetic estimation", 1983). Here an integrated account is presented of the states and distribution of morphological, anatomical and chemical characters previously discussed and their possible interpretation in a phylogenetic context. A great number of families are accepted, and for those still used to the Englerian concept of the Class the results are astonishing and perhaps even unacceptable. However, the authors present their case with a great number of arguments, making it very difficult for anybody to refute their model. It would seem that the traditional classification of the Monocotyledons is too much based on phenetical considerations, and that a survey taking into account other fields gives a completely different picture.

In an extensive introduction even elementary morphological, anatomical, chemical and cladistic concepts are explained. The Monocots appear to have 2 monothetic characters only: one cotyledon and the sieve tube plastids which accumulate protein in the form of triangular bodies. The other, polythetic characters are discussed. The authors express their preference for Burger's theory that the Monocotyledons are a derivative branch of early dicotyledonous ancestors. From this hypothesis the evolution within the Monocots is then further discussed. The two preceding volumes are summarized in some chapters but the bulk of the book consists of descriptions of the superorders, orders, families, subfamilies, and tribes or groups. I had hoped to see a full key to the Monocots, but unfortunately there are only keys under the orders to the families. In view of the lengthy discussions on affinity, derivation, cladistics, etc., it is an elementary fault to suggest that dichotomous key can show relationships in this multidimensional complex. For identification, which is quite another matter, they are sometimes quite useless. What to make of the couplet "Chromosome complement strongly dimorphic (x = 30; 5 large and 25 small)" vs. "Chromosomes more uniform in size and not as above" (p. 133)? Surely some more obvious macromorphological useful character could have

been found to distinguish the Funkiaceae and Agavaceae subfam. Yuccoideae. If not, few will be convinced that they would be distinct taxa. As "a guide to the kinds of character that may be useful for distinguishing between families" (p. 132) a synoptical key would have been much more useful and would even have aided in attemps in identification.

The book is well-executed with a clear print in 2 columns on heavy paper, nice line drawings well-gleaned from various sources and with an extensive bibliography including references as recent as 1983. It should be present in any main library of a taxonomic institute as a ready reference for many years to come.

J. F. VELDKAMP

O. POLUNIN and A. STAINTON: *Flowers of the Himalaya*. Oxford University Press, Oxford and New York 1985. xxx + 580 pp. (of which 74 pp. drawings) + 128 pp. with 694 colour plates. £ 29.50. ISBN 0-19-217623-4.

Like Polunin's previous field guides of SW. and SE. Europe the present work covers a botanically very interesting region of which no concise flora exists: the Himalaya from Kashmir in N. India to E. Nepal, an area with 9000 species of flowering plants. Of this vast number nearly 1500 species are included in the book; grasses, sedges, etc. are not included, however, and of the *ca.* (!) 86 *Saxifraga* species "only" 22 have been briefly described and keyed out. Having used Polunin's Iberian book quite often in the field I can state that it is of tremendous help for a quick and easy identification of nearly all plants with not too small flowers. I expect that the same will hold true for the Himalaya book. No less than 1000 species are illustrated in the book, either by good quality colour photographs or by excellent line drawings, including *Hobbit*-plants like *Rheum nobile* and *Saussurea simpsoniana*. Merely from looking through the colour pages the true florist will feel the urge to pack his travel outfit and go off to the Himalaya with this book in hand.

R. VAN DER MEIJDEN