

XI. REVIEWS AND NOTICES

ABEYWICKRAMA, B.A. (ed.), A revised handbook to the Flora of Ceylon, Vol. 1, part 1 (1973) 107 pp., 12 fig. Local orders to Royal Botanic Gardens, Peradeniya, Ceylon, Rupees 10. Orders outside Ceylon to Smithsonian Press, Publ. Distribution Section, 1242 124th Street, N.W., Washington, D.C. 20037, U.S.A., US\$ 5 or £ 2.

This is the first fascicle of a revised edition of Triemen's excellent 'A handbook of the flora of Ceylon'. It is the result of a project sponsored jointly by the University of Ceylon, the Royal Botanic Gardens Peradeniya, the Ceylon Department of Agriculture, and the Smithsonian Institution of Washington, D.C. (Principal Investigator Dr. F.R. Fosberg; co-principal investigators: Prof. Dr. B.A. Abeywickrama, Dr. J.W.L. Peiris, Mr. D.M.A. Jayaweera, Prof. M.D. Dassanayake, and Mr. K.L.D. Amaratunga).

During the past six years specialists were invited to participate in this enterprise and all have been for a shorter or longer period in the field, in addition to the study of herbarium specimens. This appeared necessary as after Triemen's effort exploration activities in Ceylon were almost at a standstill for more than six decades.

The style and printing of this Flora shows distinct resemblance to that of Flora Malesiana; emphasis is naturally that of a more concise, local flora, in that keys are simpler and references confined to Ceylon literature. Specimens examined are all cited; so are basionyms and types. Naturalized plants are included and commonly cultivated species are often included in the keys and are described separately. In some families figures are given, in others not.

The following families have been treated: Apocynaceae, Periplocaceae, Asclepiadaceae (all by Hüber), Loranthaceae and Viscaceae (by Wiens), Bignoniaceae, Gesneriaceae, Pedaliaceae, and Martyniaceae (by Theobald).

Although the editorial work shows minor deficiencies, the Flora makes in general a good impression and a testimony of thorough work. It will be an important new asset to the knowledge of the flora of tropical South East Asia.

A point we want to make is that in scanning we find the keys less full than desired, and not infrequently tuned to the necessity of having living specimens, by using colours, texture of the leaf etc., e.g. in the key to the species of *Taxillus*, *Chirita*, and *Viscum*, and in the generic key sub fork 18 the distinction of *Pagiantha*. In other cases the key forks consist of feeble one-line alternatives, e.g. in *Tylophora*. It would be desirable to provide generally ample and sharp morphological distinctions and be more precise; e.g. in the key to the genera of Loranthaceae in fork 2 the number of

petals is mentioned which should be "petals or corolla lobes" as several genera are sympetalous.

Sesamum indicum L. is accepted instead of *S. orientale*; obviously the argumentation of the second undersigned in *Flora of Java* (2: 544, note 1), who showed that Graham was the first to combine the two names, choosing *S. orientale*, has escaped the author.

It is also not clear why the name *Anodendron manubriatum* Merr. is accepted; this should nomenclaturally be (*Fl. Java* 2: 236) *A. paniculatum* DC., according to Art. 72 note of the Code.

In *Cerbera*, the name *C. odollam* Gaertn. is cited as a synonym of *C. manghas* L., although Corner has clearly demonstrated that two allied species are concerned. None of the two clear distinguishing characters (*Fl. Java* 2: 233) are mentioned in the description so that the reader cannot find out which of the two species occurs in Ceylon, or whether both occur in the island.

Under *Oroxylum indicum* there is a note that it is assumed by the senior author that *Arthrophyllum zeylanicum* Miq., based on a specimen from Ceylon, is a synonym. Why is this not mentioned in the synonymy? The type in question should have been examined by the author.

Of genera the original description is mentioned in a reference under the genus, but this is absent in *Loranthaceae* and *Viscaceae*.

Of genera also in some families the type species is cited but in others not. Why these inconsistencies, as surely a sample model for drawing manuscripts must have been made?

In *Loranthaceae* the author names of *Macrosolen* and *Tolypanthus* are erroneous; both are from Blume.

Family descriptions are generally full, but I miss e.g. the mention of floral scales in certain genera of *Apocynaceae* which are recorded in the generic descriptions.

Dr. Fosberg communicated that several more fascicles are in press, each about 100 printed pages. The editorship for the subsequent parts has been assumed by Prof. M.D. Dassanayake. — van Steenis & Bakhuizen van den Brink Jr.

Materials for the Flora of Bhutan, edited by the Director of the Botanical Survey of India. *Rec. Bot. Surv. India* 20, no. 2 (1973) 278 pp. Bound \$ 9.85 of £ 4.

A concise Flora without keys, arranged by families; within the families genera and species in alphabetical order. This is mainly the result of 14 expeditions during 1963-1965 by various botanists of the Survey. Families are elaborated by a team of Botanical Survey officers. In all there are about 2000 Pteridophytes, Gymnosperms, and Angiosperms. The survey was mainly done at the request of the Bhutan Govern-

ment for the search of medicinal plants of which some 30 are listed. Systematically there are a few new names, e.g. in *Corydalis*, a variety in *Rorippa*, a new name in *Senecio*, and a variety in *Utricularia*. Nomenclature and systematics are not particularly up to date and there are rather many typographical errors. As a listing survey it may well serve the purpose. — van Steenis.

CLIFFORD, H.T. & G. LUDLOW, Keys to the families and genera of Queensland flowering plants (Magnoliophyta). Univ. Queensland Press, P.O. Box 42, St. Lucia, Queensland 4067, Australia (1972) xii + 211 pp., 8 pl. (with line drawings). 8°. Cloth-bound \$ 8.

This is as far as I know the first published general key to Queensland genera for which an unpublished key to the families of the late Prof. A. Cayzer served as the basis. Surely there must be a need for such a key among students and amateurs, and taxonomists as well.

The work consists of two keys to the families, one for Magnoliatae (Dicots) and one for Liliatae (Monocots). This is followed by an enumeration of the 217 families, for each of which a brief diagnosis is given (4-6, rarely 9-10 lines) and a key to the genera of each family with two or more genera. Keys and family descriptions apply in particular to Queensland species. Of several families there are rather coarse but clear structural details. There is also a glossary, an explanation for the use of the keys, and a list of the abbreviations. All native and fully naturalized genera have been included. Also a few of the commoner families represented only by cultivated plants in Queensland have been included for the convenience of students. Genera listed by Burbidge as occurring in Queensland were taken as the basic list for the state.

The authors make in their introduction some reservations; they state that the keys have been tested for many plants: obviously not all genera were tested by them. They say, that in several instances "the available descriptions were too inadequate to enable them to be included in keys"; the meaning of this is obscure to me. They anticipate "that mistakes will be detected more readily by users of keys than by their makers."

Indeed, the proof of the pudding is in the eating. I innocently started with fork 1 and went to 685 for Magnoliatae lacking a perianth, and having passed some families with latex, or being parasitic, arrived at no. 688, where it is asked whether the flowers are 1-sexual or 2-sexual. Taking 688a (1-sexual flowers) one arrives at Piperaceae, Callitrichaceae, Batidaceae (but here the male flowers have a perianth, sic), Casuarinaceae (male flowers doubtfully with a

perianth depending on interpretation), and Haloragaceae. In taking 688b this leads to 695 Salicaceae and Balanopsidaceae. However, in this way forks 693-694 are blocked (cannot be reached) and equally well forks 696-698. The end of the key 685-698 seems to be in a muddle.

Then I tried to identify the Bignoniacea Dolichandrone heterophylla. Fork no. 2 gives difficulty, as it asks how many "perianth segments" there are, counting calyx and corolla together. Now the calyx in this plant is one spathaceous whole and should count for 1 segment. In doing so one arrives nowhere; if one assumes the calyx to consist of 5 connate segments, one arrives indeed (with some uncertainty left) at Bignoniaceae sub no. 369(3) or 379 or 380.

Then I looked at the description of Bignoniaceae, which I find inadequate and partly faulty: the occurrence of a spathaceous calyx is not mentioned, the stamens are said to be epipetalous which they are not and some very characteristic characters have been omitted, viz. that the capsule is 2-valved dehiscent, that the seeds are winged, and that the leaves are mostly pinnate and decussate. In the key to the genera sub 6 the genera Tecomaria and Spathodea are badly distinguished, Tecomaria is said to be a climbing shrub whereas it can equally be an erect shrub; why not simply: Calyx regular, 5-toothed Tecomaria against: Calyx spathaceous Spathodea?

Further I took Canarium which could not be identified unless one assumes under fork 62 that it has 7-8 anthers by which one arrives at fork 75 Burseraceae. But Canarium has 6 anthers. In the family description of Burseraceae it is said "ovules 2 or rarely 1 per loculus", obviously an ancient vestige of an error made in the last century, as Canarium has always 2 ovules per cell, the essential difference with Anacardiaceae. Furthermore, Burseraceae are not exstipulate as stated in the description.

Also we tried Dichapetalum, which is inserted as family 104, but is omitted from the key.

In trying Mitrasacme we arrived correctly at Loganiaceae, but observed that the whole fork 362 is superfluous, as all is contained in fork 363.

Under Elaeocarpaceae it is said in a footnote that some members of Meliaceae may key out to this family. I cannot quite well understand this remark, as this would then only be possible for Vavaea and Turraea which are the only ones with simple leaves in Meliaceae (as all Elaeocarpaceae), but both possess the connate stamens in a tube as characteristic for Meliaceae; obviously this family character has not been utilized.

It may be that I have the evil eye, but one should admit that the result of these random checkings is very disappointing indeed.

I know from my own experience (my key to 121 families in my Flora for the Indonesian Schools) that such artificial general family keys are not so difficult to make, but the work needs care and accuracy; the conciseness of such a key depends on the choice of suitable characters and for this again a thorough knowledge of family characters and generic characters is needed. One should strive to start with obvious vegetative and habit or habitat and family characters which makes the use of all sorts of "mechanical technical characters" to a large extent superfluous. In this key this principle is not followed so that easily recognizable families occur sometimes many, or even very many times in the key, making it elaborate. Sometimes forks make the impression of questions put to a computer.

It seems to me also for this reason that updating this key will make it still more elaborate. A completely new family key must be made to fit the issue. I should point the attention of the authors to the more simple family key made by J.H. Willis in his Handbook to Plants in Victoria; he uses for the dicots 191 forks, as contrasted with the 698 forks in the present work for the same group.

In a new edition it would also be advisable to abolish the use of abbreviations which are quite unnecessary as far as printing space is concerned. Also I advise not to use consistently the term 3-foliate leaves for 3-foliolate leaves and not to use Vitidaceae for Vitaceae as prescribed by the Code of Nomenclature. — van Steenis.

COOK, C.D.K. e.a., Water plants of the world. A manual for the identification of the genera of freshwater macrophytes. W. Junk, The Hague, Netherlands (1974) vii + 561 pp., 266 fig. 80.

Keys to the families and within the families to the genera, with notes on the distribution and ecology of noteworthy species. Families are arranged alphabetically. This work was chiefly designed to be a source for the identification of all genera of aquatic macrophytes, thus including also certain Characeae, Bryophytes, and Pteridophytes. Also it is intended for the non-botanist, for which reason botanical terminology has been kept to a minimum and wherever possible vegetative characters have been used in keys and descriptions. A glossary is added. No attempt has been made to separate water plants and marsh plants, in fact the bulk are not representing true aquatics. A useful, up to date, handy account. — van Steenis.

DASMANN, R.F. e.a., Ecological principles for economic development. John Wiley & Sons, London (1973) ix + 252 pp., 31 fig. Price c. US\$ 5.

Ecology and economy are in this book marvellously connected. It explains the value of biological diversity, particularly in the tropics, with a clarity and versatility that are a delight in themselves. A sample:

"No claim is put forward here that ecology is a touchstone for success in international development, where economics and engineering have often failed. But just as it has long been obvious that development efforts which ignore economics and engineering are likely to founder, so it should by now be equally obvious that development effort that take no account of the ecological 'rules of the game' are also bound to suffer adverse consequences. Although not stressed in this book, examples are also quoted to show that ignorance of human behaviour has been a further reason for lack of success. Hopefully, through this and future work, a truly interdisciplinary approach for international development can be achieved that will permit mankind to reach the high quality of life to which all people aspire" (p. vii).

Development takes place within natural ecosystems, may modify these to a degree, but is always subject to limiting factors: climate, soil, water, biotic factors, the movement of energy and of nutrients, the impact of parasites. Diversity ensures the stability of ecosystems. Any ecosystem can be pushed to a 'point of no return', the humid tropics being particularly diverse and fragile; this is a benefit to man if he exploits with restraint, but an obstacle towards unwise development efforts, which are likely to backfire.

A main ecological principle is: keep your options open. A 6-stage scale of development intensity from virgin lands to urbanization is projected. While one can always move on in the scale, it is impossible to return from the far end. Therefore: "protection of species and natural communities is a logical first step in the development of a region" (p. 26). The more so, since conservation and development have, in last analysis, the same goal, namely "the rational use of the earth's resources to achieve the highest quality of living for mankind" according to UNESCO and FAO definitions quoted on page 17.

Starting from these principles, the book deals with Goals of development and their attainment; General ecological consideration; Development of humid tropical lands; Development of pastoral lands in semi-arid and sub-humid regions; Development of tourism; Agricultural development projects; River basin development projects. Of course, the book which aims to set forth an understanding of an entirety should be read whole, but I may here select Humid Tropical Lands. In that chapter, the characteristics of tropical forest ecosystems are explained, and the great role therein of edaphic factors under influence of the climate, and the ecology of shifting

cultivation, with an interesting table of 21 points of difference between four stages of succession: pioneers, early secondary, late secondary, climax. Limitations to development are then discussed on the strength of the assertion that "Simplification of tropical ecosystems, such as necessarily accompanies agriculture or pastoralism as well as intensive forest culture, must always tend to upset the balances developed in the mature biotic community. Where only one or a few species of plants are encouraged to grow in place of the diversity of the natural forest, an environment is created that is highly favourable to the rapid increase of their predators or parasites" (p. 62). This idea is worked out for agriculture, forestry, road building, and chemical control.

Altogether, the book makes an eloquent and convincing plea for retaining the whole spectrum of biological diversity, and for this reason any taxonomist should read it, to prepare himself for a dialogue in which he can explain the value of the biological diversity which he knows as no other.

It has all been packed harmoniously in 200 pages (if we subtract the many references under each chapter), well executed. The 'Summaries of the Chapters' in the beginning make a good invitation to the reader for going on to appreciate the elegance in which a very complicated subject has been made intelligible and applicable. This book deserves a wide circulation and much discussion. — M.J.

FOX, J.E.D., A handbook to Kabili-Sepilok Forest Reserve. Sabah Forest Record no. 9 (1974) 102 pp. Published by Forest Department, Sandakan, Sabah, Malaysia; also available from Borneo Literature Bureau, Kuching, Sarawak, Malaysia. Mal. \$ 15.

This handbook puts on record the research done so far on plants, animals, forest types and forest regeneration and the relations with climate, geology and soils of the main research Forest of the Sabah Forest Department, an area around 10,000 acres (400 ha) with an arboreous flora of about 450 species including one third acres of all the Dipterocarps known from Sabah.

The great significance of this Reserve is (1) easy access, now at the backyard of the new Forest Research center and Forest School, (2) long range records of botanical exploration, (3) the reserve shows side by side exploited and non-exploited forests, (4) the flora of the Reserve is representative of a very large area of commercial lowland forest on the East Coast of Sabah in the so called Lohan penneplain and Eastern lowlands.

Compared with other tropical areas in the world, in nearby Indonesian Borneo (Kalimantan), the Philippines, in Africa and Latin America it is remarkable with how much detail the

tree flora of this research forest is known now. It is a bit regrettable that the present reviewer's botanical notes on the reserve dated 1960, eight years before he left Sabah were not updated more, but this is compensated more or less with fairly detailed lists of identifications of some of the older sample plots which were checked up to 1968 at least and updated all the time with monographic revisions made by Flora Malesiana botanists and by the Forest Botanist himself.

A cross reference index to numbered trees, arranged by families and genera would have made the handbook more useful for botanical visitors and only insiders will know where all the trails with numbered trees are. A glance through the species lists of sample plots made after 1968 shows a rather serious incorrect identification, *Gonystylus bancanus* - the Ramin Tree - That must be another species of that genus. Ramin is a peatswamp tree never found yet on the East Coast of Sabah. It goes all around Borneo from the Klias Peninsula in Sabah, Sarawak, West Borneo and South Borneo, West of the Barito-River (see Meijer: Field Guide for Trees of West Malesia, 1974, 261).

The important detailed work by Nicholson on Forest composition of 5 acres of ridge forest is now supplemented by equally detailed analysis of other types by Dr. Fox and others though no plant-sociological conclusions are drawn from them. The most important aspect of the handbook is solid documentation and detailed analysis of vegetation. Quantitative ecologists and plant-sociologists can use these data for further analysis and illustration of their theories. One would wish that other tropical rain forests would be so much known in detail and so much used for Forest research and Forest Education and such a well utilized source of material for study. Kalimantan needs a similar research forest at Surga Tiram near Samarinda with further logging kept out of it.

We can especially recommend this handbook for study by Indonesian botanists and foresters and for all biologists, interested in tropical forest ecosystems. — W.Meijer.

GARAY, L.A. & H.R. SWEET, Orchids of the southern Ryukyu Islands. Bot. Museum, Harvard Univ., Cambridge, Mass. (1974) 180 pp., 18 fig., 3 photogr. vistas, 7 maps. 8°. Bound US\$ 16. It can be obtained directly from the Botanical Museum.

This most excellently executed booklet is more than a very full revision of the 95 species and 5 varieties of orchids of this south Japanese island group, which covers together 3417 sq.km land-surface. Besides keys, descriptions and distribution (all collections cited) there is a very full synonymy of each species, not only as far as the Ryukyus are concerned; it contains also many reductions newly made by the authors.

As the majority of the species is Indo-Malesian in distribution this aspect makes it important for wide circles in the tropical East. As far as known chromosome numbers are mentioned, without source, however.

The book is preceded by a general introduction on orchids in which facets are touched on age, development, pollination, distribution and dispersal, and the affinities of the Ryukyuan species is tabulated.

There are a few new combinations: 2 varieties, 2 species, and there is one new genus Siderea, based on Aerides japonica. A rather remarkable phenomenon is that epithets are not all decapitalized. Why must this be?

This nice book originated through a request for an account in Walker's Flora of Okinawa and S.Ryukyus, but it was thought advisable to publish more full in advance, in a separate way. In the introduction the authors state that activities of the Oakes Ames Orchid Herbarium will in future turn again to the Eastern tropics, after a long lapse of time when it worked mostly on neotropical Orchidaceae. This we welcome very much indeed. Elsewhere in this Bulletin it is with pleasure announced that this most important Orchid Herbarium will now also have space for better working conditions. — van Steenis.

Index Herbariorum. I. The Herbaria of the World, 6th ed. Compilers Patricia K. Holmgren & Wil Keuken. Oosthoek, Emmalaan 27, Utrecht, Netherlands (1974) vii + 397 pp. Cloth. Dfl. 65 (i.e. + US\$ 26).

Ten years have elapsed since the last edition in its now dirty yellow paper cover, so long in fact that younger botanists may not know that the Index Herbariorum is a directory of Herbaria, giving address, status, year of foundation, number of specimens, coverage, names of director and staff with their specializations, periodicals issued, facilities, and whether a garden is attached. The present edition almost equals in size Stafleu's Taxonomic Literature and is similarly bound, but since the next edition of the latter, too, has been planned much bigger, the confusion will end in the near future. The difference between editions 5 and 6 amounts to a genuine dried plants explosion. Look, for instance, under the letter E. Where 10 years ago at Eger in Hungary there was nothing, there is now a Ho Si Minh Herbarium (67,000 specimens). Edmonton had one Herbarium in 1964, now there are four. Altogether, the number of entries under this letter doubled from 15 to 30. I must, however, mention that one of the additions occurred in East Orange, New Jersey, but what there is except an abbreviation (EONJ) remains in the dark. The most spectacular increase no doubt took place in Calcutta, from 1 million in 1964 to 2 millions in 1974. On the

other hand, in ESK there are still the same 725 specimens as there were ten years ago, although through addition of a curator the staff has now been doubled. Yet far better staffed is Cairo (CAIA): 19 botanists for 1300 specimens. Perhaps they have a few staff to spare for Lyon, to assist the lonely director in the study of 3,8 million specimens? Altogether, the number of staff increased in ten years from c. 2900 to c. 4650; conclusion: the birth rate of botanists exceeds that of mankind in general, but much more so in Egypt than in France. As for the scope of the Index itself, there is a gain in that important collections in each Herbarium have been listed and indexed at the end, 1800 in all. In not a few cases, such 'important collections' are the director's own.

There were also disappointments. The chapter 'Geographical arrangement of Herbaria' was omitted from this edition. It might have contained many surprises. I had never heard, for instance, that in my own country Herbaria existed in Rijswijk and Wijster. On the other hand, Herbaria which I well remember having seen at Delft and Nijmegen were apparently not there*. The number of Herbaria in Buenos Aires rose only by one, from 8 to 9; I had expected more. I checked the whereabouts of some colleagues I know, and found that the new edition is quite up to date; a few Addenda make it even up to date. But how could come under Addenda, at Budapest (BP) a decrease from 1,690,400 specimens (page 40) to 1,500,000 (page 394)? And where have the specimens gone, the loan conditions still being the same? There are quite a number of 'empty Herbaria' like the East Orange one, and I must confess that this still puzzles me. The only positive thing I can say about them is that many of them not yet in the 5th edition occur in the United States and that I suppose that it must have taken Miss Holmgren (who did the U.S.; Miss Keuken the rest of the world) quite a lot of effort to find them, a sort of Black Holes of Botany.

The total number of entries is about 1420; in 1964 this was 1188, as I learnt from S.G. Shetler's paper The Herbarium: past, present, and future (Proc. Biol. Soc. Wash. 82, 1969, 687-758). In this paper, the data of the Index Herbariorum 1964 are analysed with a computer, and hence far more thoroughly than I could do it here. The same author gives a list of the 29 Herbaria larger than 1 million specimens; new members of this Big Brothers' Club are Kiev (KW) and Tokyo (TI). This fact may show that the really significant changes are not quick. Still, all big Herbaria are located in the northern temperate zone save 3: Bogor, Calcutta, and Melbourne. Yet if Shetler could be persuaded to analyze the present edition, the results might be interesting, and so it would be to see if he still would stick to his conclusions, now that the 'future' of his ideas is five years old. The new Index Herba-

riorum offers much food for thought, especially now that the Directors (those of Herbaria in Malesia included) are obviously spending more care on filling in the questionnaires, after I don't know how many letters from the compilers. The prize for accuracy goes to the Arnold Arboretum for their 1,000,559 sheets.

We really feel obliged to the authors and the IAPT: such a funny book, so complete, so accurate, and so well executed. It was worth waiting for. — M.J.

* I made telephone calls to find out. In Nijmegen University there is indeed a collection of at least 1000 specimens, of the Netherlands and Alps, but these are the property of Prof. V. Westhoff, although they can be consulted on request. In Delft there are at least 10,000 specimens, in the Laboratory of Technical Biology, Julianalaan 67, with Dr. P. Kooyma as curator.

JERMY, A.C., J.A. CRABBE & B.A. THOMAS (ed.), The phylogeny and classification of the ferns (1973) xii + 284 pp. Academic Press, 24-28 Oval Road, London NW1, England; 111 Fifth Avenue, New York NY 10003, U.S.A. £ 9.

It is hardly necessary to recommend this book to all who are interested in the study of ferns, not so much as a document of how much has been achieved in this field, but more especially as to how much still has to be done to arrive at a generally acceptable system of classification of the Filicopsida. It is, perhaps, not a mere commonplace to say this here, as many botanists, not so well acquainted with the peculiar problems which the ferns present to modern scientists, are of the rather vague opinion that this class of plants is so well studied that further general considerations regarding their taxonomy and systematics are mere small modifications of an overall, traditionally accepted, pattern.

Nothing is further from the truth and from this point of view it is hoped that this most valuable publication of the Linnean Society will appeal to an even more general public than those immediately connected with this particular group of plants. Granted that ferns are perhaps better collected and more fully described than any other class in the plant kingdom, including Angiosperms, they still present problems that in other groups seem better solved, where at least a basic agreement on classification exists and a general consensus of how phylogeny should be interpreted has been reached. That this makes the study of Filicopsida particularly fascinating in modern research is therefore self-evident, and this book is properly a great challenge to solve at least part of the uncertainties, still existing.

It is not by chance that the first paper by Prof. Holttum bears the title "Posing the Problems" and also Wagner's "Some future challenges of fern Systematics and Phylogeny" and Manton's "Closing Address" emphasize the necessity of a renewed approach to the problem of fern-classification and to give due consideration to all possible disciplines, now at the disposal of systematists, but still not widely applied. That this means good communication with Anatomists, Morphologists, Palaeontologists, Cytologists, Geneticists, Ecologists and Phytochemists, to name a few branches of science pertinent to unravel the particularly difficult classification of the Filicopsida is stressed by these authors and the plea for cooperation, as Manton advocated, can be fully subscribed.

It is the charm of this book that all these aspects of research, as an aid to arrive at a good insight in phylogeny and true affinity as a base for a proper classification, are represented in the various papers.

Cytogenetic studies that have contributed so much to modern taxonomy, are given by Walker and Lovis. Morphology, for too long a stepchild in the study of ferns, is the subject of the contributions by Van Cotthem (stomatal types), Atkinson (gametophytes), and Wood (spore morphology). Anatomy is treated by Sen & Sen; palaeontology by Harris; ecology, a most neglected discipline, by Wagner.

Phytochemistry is treated in a general way by Swain & Cooper-Driver and how difficult and full of pitfalls this field can be, is again emphasized by a remark from Prof. Reichstein, the nestor of biochemistry, as included in the closing address of Manton.

A most traditional taxonomic approach is provided by Michel (Dennstaedtiaceae), Tryon & Tryon (Cheilantheid ferns), Holttum (Thelypteridaceae), Sledge (Aspidiaceae and Athyriaceae) and De la Sota (Polypodiaceae). As a most controversial note the paper by Bierhorst on *Stromatopteris* provides proof that "inferred thinking" should not prevail, when being involved in problems of phylogeny, and that traditional concepts should not be taken for granted.

Last but not least, the "Historical Review of the higher Classification of the Filicopsida" by Pichi Sermolli does not only give a most interesting account of how the development of fern-classification took place, but also provides the reader with the best effort up till now of how this classification should be conceived. If one cannot agree with him that "in rebus dubius melius distinguere quam confundere", one could sympathize with him that in cases of doubt the splitter, often, has an advantage over the lumpner!

This book owed its origin to an initiative of the British Pteridological Society to organize a Symposium on the subject

in question which took place in May 1972. The stimulating atmosphere of that meeting, in the delightful rooms of the Linnean Society as Prof. Manton put it in her summing up, was an unforgettable experience to all participants and certainly reflected in the contents of this book. That through the untiring efforts of Mr. Jermy c.s. this book could be published only a year after the symposium, is an achievement gratefully acknowledged. — G.J.de Joncheere.

JOHRI, B.M. & S.P. BHATNAGAR, Loranthaceae. Botanical Monographs, Council Scientific & Industrial Research, New Delhi, no. 8 (1972) 155 pp., col. frontispiece, 4 fotogr., 81 fig. 8°. Bound RS 32. (US\$ 11 or £ 3.20).

In this book is brought together an important survey of general matter concerning the Loranthaceae, with only casual reference to Viscaceae which are suggested to represent a separate family. Introductions are given on the historical development of our knowledge and of the systematics, and a list of the Indian species is given. A detailed account is given on the anatomy, the haustorial system, the floral morphology, and the curious, most interesting embryology. Furthermore, a list is given of all genera, supplemented by maps of distribution, but most of all this matter is condensed from literature. A survey was made of the chromosome numbers of which the base (1n ?) numbers run from 14 to 9 (and 8), and some conclusions were based upon these; the higher, primitive numbers are southern. In vitro studies were reported to have been made on embryos. Brief chapters deal with hosts, control measures, and lists of host plants are given of *Dendrophthoe falcata* and of Loranthaceae in Australia and Africa. It is discussed that Viscaceae should be arranged in a separate allied family within Santalales.

Much work has gone on in the past twenty years in this family by quite a few botanists and by Indian students and workers stimulated by Prof. Johri to do theses and precursory studies in India; this information is all digested in the present book, which hence contains, as I see it, few quite new data. — van Steenis.

KARTAWINATA, K. & R. ATMAWIDJAJA (ed.), Coordinated study of lowland forests of Indonesia / Papers from a symposium, Darmaga, Bogor, July 2-5, 1973, stencilled, 183 pp. (BIOTROP, P.O.Box 17, Bogor 1974). Price unknown.

A collection of 18 papers (not separately mentioned in the Bibliography), many noticing the same problems and proposing similar remedies. A rough-and-ready summary follows.

A plan has been endorsed by LIPI to receive information gathered by ERTS-satellites, in cooperation with Survey & Mapping, and NASA, to obtain data about the physiography of

the country and changes in it. Of Indonesia's total estimated forest area of 120 million hectares, half is considered productive, but 3/4 part is still unsurveyed. For this vast area, 400 foresters are available, perhaps only 300, while Sabah in 1969 had 394 foresters for 4,1 million hectares. Control on logging operations is admittedly very poor. While there are 157 nature reserves (a list with data is given), and much useful legislation, funds for proper management are very low, and at least 1 million US dollars is needed every year, which seems fair enough a share of the 180 million dollars expected from the annual export of 12 million cubic metres of clear-bole logs under the 'Master Plan', till 1990. In order to safeguard genetic potential, c. 2% of the forest area now under concession should be left untouched. A plea is made to recycle part of the forest revenues into research and education, notably a crash program in dendrology, forest ecology, and silviculture. Large-scale forestation is recommended in denuded areas. Botanical exploration should be extended, but not by teams of 'scientists' who avoid going into the forest but write voluminous reports based on information from local people. Plants of (potential) economic or genetic value are to be studied. A center at Sungai Tira in East Borneo with 1600 hectares of forest for research and training is recommended, and Sabah is to be looked at as an example.

The timber boom started in 1967 found Indonesia totally unprepared. This Symposium is a praiseworthy, desperate effort to catch up with a process that in thirty years may have brought ruin to the country. It is good that 57 persons came together to assess the problems, and that the editors brought out the work in short time and useful form. As a general note of criticism I must say that I am struck, while the word research is reverberating on almost every page, by an alarming indifference towards earlier published knowledge; Zoefai Hamzah's paper on the teak forests in Muna and Buton is a rare exception. There is more concern with ideas and proposals than with real possibilities, more with sustained yield than with sustained work. As Meijer keenly observes, students should be shaken loose from their desk and learn to be in the forest and see how matters are. All the talk, for one thing, did not result in Indonesian money being budgeted for the Gunung Leuser nature reserve, where yet a vigorous and concentrated effort is made to protect a large tract of fine forest, and with some success. We can only hope that Indonesia will overcome her awesome reality before all her forest is gone. A Symposium like this is an essential step, but only a first one. — M.J.

PRESTON, R.D., The Physical Biology of Plant Cell Walls. Chapman & Hall, London (1973) 491 pp., many illust. Distributed in U.S.A. by Halsted Press, John Wiley & Sons, New York. £ 12.

This book provides an excellent source of fundamental knowledge on physics, chemistry, ultrastructure and biosynthesis of plant cell walls. Besides dealing with all these aspects in a very detailed way, the author treats the theoretical background of the different methods suitable for cell wall studies, viz. optical microscopy in all its varieties, X-ray diffraction, and electron microscopy.

These days it is only a short way from the primary forest to sophisticated or crude cell wall products. Fundamental research as expertly reviewed in this book will continue to play an important part in the ultimate fate of our forest products and other natural resources, and this short review in *Flora Malesiana Bulletin* is therefore not so much out of place as it might seem. — P.Baas.

SNEATH, P.H.A. & R.R.SOKAL, Numerical taxonomy / The principles and practice of numerical classification. W.H. Freeman, San Francisco (1973) xv + 573 pp., many diagrams. Also Freeman, 58 Kings Road, Reading RG1 3AA, England. £ 9.40.

This completely new edition of the controversial 1963 text is in all respects a great improvement. Gone is the original unfair attack on taxonomy; there is now an openness to criticisms and limitations, and advertising of the sort that "the systematist who ignores numerical taxonomic methods in his own work does so at his own loss" (page xiii) has been reduced to better proportions. An effort has been made to deal with the subject from all sides, and to sketch the applications of numerical methods outside taxonomy. The style is clear, balanced and concise. The list of literature is very extensive; also a list of groups on which numerical studies have been made is given. The execution is very fine.

No doubt the book will be thoroughly discussed by many reviewers (see *Taxon* 23, 1974, 388-391), so a few remarks may here suffice on a field of study which at the moment has but marginal bearing on tropical botany. A tropical botanist may burst in laughter on reading that "the taxonomy of the future will be greatly aided if not entirely carried out by computers", and say that he has looked in this book in vain for one figure of a plant or an animal. Perhaps the idea of Jean-Jacques Rousseau will now come true that it should be possible to be a great botanist without knowing a single plant? 'Numerical Taxonomy' is 100 per cent theory, and at the present state of the science, its value for tropical botany seems 100 per cent theory, because the available material from the tropics still seems to be insufficient in quantity

and quality for numerical elaboration. Computerizing the problems involved in typification, comparison of fragments, localization of specimens and bibliographical study would merely complicate the taxonomist's task; admittedly "there have been so far few attempts of making actual time efficiency estimates in classification" (p. 424). Such estimates will no doubt be made in the near future. If they reveal that with numerical methods taxonomists can work faster, even with the fragments by which the richest floras still are represented, of course such methods will be applied. Conservative as I am (in the sense implied by Sneath & Sokal) I do not think that a tropical botanist should try to learn the prescribed mathematics. Dealing with the real plants and with the geographical, historical, and bibliographical aspects is already difficult enough. Besides, numerical methodology seems complicated and rich enough to be a specialism in its own right, particularly if its implications are so great as Sneath & Sokal suggest. Such a specialist before long may make himself indispensable, enter a dialogue with the tropical botanist, and lend the latter whatever strength numerical taxonomy may have; I hope it will be much. — M.J.

SPECHT, R.L. et al. (ed.), Conservation of major plant communities in Australia and Papua New Guinea. Austr. J. Bot. Suppl. 7 (1974) vi + 667 pp. CSIRO Publications Service, 372 Albert Street, East Melbourne, Victoria 3002, Australia.

This volume is the impressive result of an inventory that can serve as a basis for a comprehensive plant conservation policy. Altogether, Australia has about 900 different kinds of plant community (in Queensland 153), c. 250 of them now fairly well represented in reserves, and c. 300 not at all. The introductory texts and conclusions are brief; much of the book is in tabulated form. Plant communities (alliance, association, society) are listed with indication of the reliability with which they have been surveyed (good, fair, poor, no information), and assessment of their conservation status (excellent, reasonable, moderate, poor, nil).

Data are given for each state of Australia, and Tasmania (which is particularly rich), in a separate chapter. It gives regulations and other administrative details, and bioclimatic regions, followed by tables. These give: 1) important plant formations recorded (e.g. open woodland 10-30%, with a few typical species, and distribution of this type), 2) site and size of conservation areas with main plant communities (also many islands off Queensland), 3) conservation status of the plant communities, 4) rare and endangered plant species, in 6 categories (probably extinct, endangered, rare, depleted, badly known, remarkably distributed). Summaries of data and literature are given for each chapter.

At the end, there is an annotated list of Primitive seed plants in the Australian flora, on criteria mainly adopted from Takhtajan. A density map of the 126 relict genera with primitive flowers (with 592 species) shows a high percentage along the eastern coast. There is another list of 381 species with primitive morphological characters, concentrated in S. Queensland, Tasmania, and SW. Australia. Finally, the main plant formations are listed with their conservation status. In Queensland, there is some 45,154 sq.km of closed forest, including tropical rain forest (estimated in 1955 at 36,470 sq.km). Guidelines for further action are given.

Eastern New Guinea has been treated more concisely, by R. Schodde mainly from CSIRO land survey data. He lists 96 communities, the 'tropical complex mesophyll vine forest' counted for one, and therefore in no way reflecting the great floristic diversity; if Australia has 15,000 species, Papua New Guinea may well have half that number! A plea is made for accelerated survey and more reserves.

The book is a bit dry but packed with useful data in a readily accessible form, produced with clarity, and could well serve as a model for other countries. — M.J.

UNESCO, Natural resources of humid tropical Asia. Unesco, Paris (1974) 456 pp. There is also an edition in French: *Ressources naturelles de l'Asie tropicale humide*, 490 pp. Available from Unesco Office, Place de Fontenoy 7, Paris 75700, France, and from Swindon Book Co., 13-15 Lock Road, Kowloon, Hong Kong, and other distribution centers. Price paper cover French Fr. 96 (equals about US\$ 20).

This is volume 12 in the series 'Natural resources research'; it intends to summarize and open up the available knowledge on climate, geology, soils, plant world, fauna, and environment for human habitation, leaving out agriculture (but includes rice), demography, and socio-cultural aspects. The area covered lies E of the Indus, S of the Himalaya and of China, east to New Guinea which is mostly included. Most chapters are accompanied by a list of relevant maps, of institutions dealing with the region, and by an extensive bibliography. The text is in two columns and illustrated with line drawings, sketch maps, and diagrams; the execution is firm and handsome.

Here is a list of the 19 chapters: Topographic mapping; Climate and meteorology; Geology and geophysics; Seismicity; Hydrology; Soils; Vegetation by De Rosayro - note: papers cited with author's name have been listed in the Bibliography - Forest resources, by Tran Van Nao; Vegetation and flora of humid tropical continental Asia, by Legris; ditto of Malesia, by Jacobs; Grasses and grasslands, by Whyte; Fauna; Entomological problems; Biology of inland waters; Marine biol-

ogy; Flora and fauna conservation by IUCN; Rice; Deltas as population centres; Man and the monsoon in southern Asia. Most chapters were already concluded in 1970-1972.

In general, the papers are well-written, full of information, rather in the form of general statements than of figures, and indicate problems and possibilities. The human factor is touched upon in many papers, and is given special attention by Pierre Gourou, who in the last two chapters points to the potential of deltas for habitation, thanks to modern technology, and makes a plea for more efficient agriculture. It is, indeed, a big tenet of the book that the shifting cultivation, wasteful and ecologically disastrous as it is, should be abolished.

The structure of the book is sound and clear; the overlap between the various chapters is but slight. Lacking is an index, even to the main subjects; as it is, the book must be read whole, which readers of very varied description, if they have an elementary knowledge of geography and technical terms, may do with profit. Some subjects are, however, wanting. The 'minor products' from wild plants, like rattan, bamboo, resins, wax, honey, fibres, fat, fruits and vegetables, drugs, poisons, &c. &c., which together make a huge and typical part of the economy of these countries have not been treated. Also a chapter on geomorphology would have made a valuable addition, to elucidate the interaction between geology, climate, vegetation, soil, and human influence which together determine the features of a landscape. Special attention might well have been given to biogeography to explain in more detail than now has been done the distribution of plants and animals as a reflection of physiography in past and present, as well as to the genetic potential of the native flora for improvement of species in cultivation.

It is hard for me to judge completeness of the contributions in the non-botanical field, but it occurs to me that Phoon Phon Asanachinta on p. 14 does not display sufficient knowledge of the Dutch pre-war efforts in Indonesia summarized in Honig & Verdoorn, Science and scientists in the Netherlands Indies (1945) p. 471-473 and 484-486. From Roy's paper I miss the fine book by Visser & Hermes, Geological results of the exploration for oil in Netherlands New Guinea (reviewed in Fl.Mal.Bull. p. 1028), while De Rosayro seems to have been unaware of The role of forest-based industries in West-Irian, a United Nations book of 1968, which summarized the large scale survey of forest resources made by the Forestry Service. But these gaps are minor in comparison with what the book gives, however long the time it took to grow to its present state of completeness. A word of congratulation to the (unnamed) editor; it is well-produced and is well worth the price. — M.J.

WHITMORE, T.C., Change with time and the role of cyclones in tropical rain forest on Kolombangara, Solomon Islands. Commonwealth For. Inst. Oxford, Institute Paper no. 46 (1974) 78 pp., graphs, forest profiles.

A fairly detailed analysis of forest plots together 33 acres (13.7 ha) set into a background of forest types and primary versus secondary forest. A detailed study is made on autecology of the 11 main constituents which partly consist of primary forest trees and others which behave rather as nomad species. In plantations growth rates are measured of a number of these trees. It is assumed that cyclones play a substantial role in forest composition which defines the mixture of these two categories. Soil factors play a very subordinate role for composition; for a great deal forest composition at small scale is ascribed to chance factors; dispersal strategies are not so much responsible. An interesting study on forest composition in an area which is botanically much less rich than most Malesian primary forest, showing even here the difficulty in defining forest types in the mixed tropical forest. — van Steenis.

World Atlas of Agriculture. Volume 2: Asia and Oceania. Istituto Geografico De Agostini, Novara, Italy (1973) folio, 671 pp., illust., Atlas 34 maps. Monographs edited by the Committee for the World Atlas of Agriculture, under aegis of the Int. Assoc. Agric. Econ.

Geographical accounts about population, resources, crops, timber, agriculture, economy, land utilisation, land tenure, but sometimes also climate etc. of the following countries in alphabetical order: Afghanistan, Bhutan, Brunei, Burma, Cambodia, Ceylon, China, Gulf States, Hong Kong, India, Indonesia, Iran, Iraq, Israel, Japan, Jordan, Korea, Laos, Libanon, Malaya & Singapore, Mongolia, Nepal, Pakistan & Bangla Desh, Philippines, Portuguese Timor, Sabah, Sarawak, Saudi Arabia, Southern Yemen, Syria, Taiwan, Thailand, Vietnam North & South, Yemen, and Oceania: Australia, Easter Island, Fiji Is., French Polynesia, Gilbert Ellice & Line Is., Guam, Hawaii, New Caledonia, New Hebrides, New Zealand, Papua & New Guinea, Pitcairn Island, Samoa, Solomons, Tonga.

Each of the two sections, Asia and Oceania are introduced by general sections.

There are many useful maps, but it is not clear how they are compiled, by whom and on what basis. The one on the rainfall of Asia (p. 3) is, as far as Malesia is concerned, very inaccurate, although excellent data are available from the publications of the Meteorological Institute at Jakarta.

The coloured very large maps of the Atlas are insofar botanically interesting in that the mapping includes woods &

forests, permanent grassland, and (potential) rough grazing land, mangrove, shifting cultivation land; for Malesia pl. 28, 29, and 30. — van Steenis.

RIGHT FROM THE PRESS is the report by W. M e i j e r, Indonesian Forests and Land Use Planning (1975) 112 pp., which was announced in the author's earlier paper in *Fl.Males.Bull.* no. 27: 2200. The result of a fact-finding tour by a determined botanist well-acquainted with the country and the language, it gives a close up critical view on Indonesian forestry (mal)practices, both the negative and the hopeful sides receiving their due. Of special interest are the several ERTS satellite photographs, reproduced together with ordinary maps on which timber concessions are outlined, in Sumatra and Borneo, making a contribution towards monitoring destruction (e.g. illegal logging for the Indonesian Navy in the nature reserve South Sumatra I). The many figures related give an impression of the size of the exploitation, its economical and social aspects and ecological consequences (in East Kalimantan by 1980 to be logged and left alone 13,200 sq.km). The human factor is given ample attention, including the shamefully low salaries of the lower foresters and the poor staffing of the service. No one concerned with the situation should leave it unread. It is attractively produced and well-illustrated. It can be ordered from the University Book Store, Lexington, Kentucky 40506, at US\$ 3,50 post free. From the same address for US\$ 2 can be ordered W.Meijer's Field Guide for Trees of West Malesia (1974) 328 pp., 25 phot., 80 drawings, which gives descriptive notes on species preceded by a 48-page introductory text. Review in the next issue.

REPRINTS AT BARGAIN PRICE. Bookmark Inc., 357 T.Pinpin/Escolta, P.O.Box 1171, Manila D-401, Philippines, offers paperback reprints of E.D.Merrill, A Flora of Manila (1912) at US\$ 5 paper, 7.50 cloth, and of R.E.Dickerson et al., Distribution of Life in the Philippines (1928) 332 pp., colour plates, at US\$ 5 paper, 8 cloth. These are 'published prices' according to a very recent letter; it is not clear if postage is included. Discount is 10% for 2-9 copies, 15% for 10-15 copies, 20% for 16 or more copies.