XI. REVIEWS

BABU,C.R., Herbaceous Flora of Dehra Dun, 721 p., 1 map (1977, Publ. & Information Directorate, New Delhi). 8°. Rs. 144, $ 50.00, £ 22.00.

A useful local Flora which will be very handy for schools, colleges, foresters, agriculturists and laymen as well. It is a very full flora, with a key to the families, and within the families keys to the genera and species respectively. Emphasis is on the species, which all carry a description; there are no generic descriptions, only a brief indication of the size of the genus and its occurrence in India.

The work is preceded with some general features on topography, historical development of botanical knowledge, vegetation types, effects of biotic factors and a brief phytogeographical analysis.

The total number of species recorded is 1230, including 930 native species, 239 introductions, and 55 species of uncertain origin, in all belonging to 115 families and 624 genera.

Although the title suggests the sole inclusion of herbaceous plants, I find vines and some shrubs also included (Buddleja, Trema, Maoutia, Villebrunea, etc.).

There is a full bibliography of cited references and a list of abbreviations and signs, testimony of the great care the author devoted to his work, which is a valuable and most welcome acquisition to the Flora of India. It is based on the author's doctoral thesis at the University of Calcutta, 1969. — C.G.G.J.van Steenis.

FLENLEY, J.R., The equatorial rain forest: a geological history, viii + 162 p., many illus. (1979, Butterworths). Hardcover. £ 25.00.

"Twenty years ago it was considered that rain forests were essentially static and that the upheavals in climate which had affected the temperate zone had left them basically undisturbed." However, "research carried out principally in the last five years has shown that they are essentially unstable." Moreover, "speculative evidence such as that deduced from plant distributions is avoided in order to place the arguments on a firm and up-to-date scientific basis." This text from the back cover, also found in the preface, sounds full of promise: "it is in fact an attempt at a vegetational paleoecology of equatorial regions".

All ideas about stability and floristic diversity were wrong (p. 1); this whets our curiosity as to what better ideas we will buy with this beautifully illustrated and tastefully executed, yet not inexpensive book. The implications may be great: if "equatorial vegetation is essentially dynamic" we perhaps need not be so careful with it. Having regenerated so freely in the past, it may be able to do so again, one might conclude.

By 'equatorial' is here meant the zone between 10° N and S. Chapter 1 briefly sums up the main vegetation types: rain forest, semi-evergreen and deciduous forests, savannah, mountain vegetation (the 1000 m boundary "can be taken only as the vaguest of guides", p. 3), swamp vegetation and secondary vegetation. It very briefly discusses changes in vegetation, glacial cycles, and fossils. Chapter 2 takes us on a quick excursion through geological history, from the Cretaceous, in 13 net columns of

text, on 13 net pages, the other half is illustrations. Then we arrive at the main subject: the Quaternary changes in the main tropical forests regions, Africa (26 p.), Latin America (22 p.), and Indo-Malesia (24 p.), followed by chapters on Seral Changes (15 p.), Influence of Man (11 p.), Trends and Prospects (7 p.). Three appendixes give notes on pollen types. There are 468 references.

"The evidence of abundant change in the equatorial vegetation is one more nail in the coffin of the climax theory" (p. 128) is one of the scientific conclusions of this book. It is clear enough that the author hopes we will believe him. 'Equatorial vegetation' is a generalizing word which denotes all vegetation types in the tropics from sea level up to the snow line. And it is not the only big catch in one word: "the rain forest is similar throughout Malesia", Flenley observes on p. 77, as if not the Dipterocarpaceae dominate those forests in the western part but not in New Guinea. It is but one example of wrong emphasis. On p. 79, for instance, Euphrasia is called of northern affinity, but Van Steenis explained (Blumea 11: 259. 1962) that the greatest morphological diversity of the genus is actually in New Zealand and New Guinea.

Emphasis matters in what I still perceive as a speculative discipline. I would like nothing better but "a firm and up-to-date scientific basis". Only, on p. 94 it is assumed that at Trinil, in Java, on account of fossil leaves with entire margins and some drip-tips, the site was formerly under rain forest. "This is an interesting conclusion, for the present vegetation of the area, in so far as it has not been destroyed by man, is teak forest." Actually, all these teak forests are plantations.

In other sectors, too, author seems partially informed. He claims that the problem of Wallace's line is not yet solved and that not much is to be expected from vegetational history (p. 100). I believe that Lam in his Celebes paper gave quite a feasible solution, by suggesting a former connection from Borneo through Mindanao, Celebes and the Moluccas to New Guinea (Blumea 5: 633. 1945), although it may of course have been rejected beforehand as 'speculative evidence from plant distribution'.

However, this is a book chiefly dealing with palynological matters: vegetation changes are reconstructed on account of microfossils in sediment cores often deposited in lacustrine sites. Evidence from work by Flenley and others is given, and we get the impression that he took great trouble to present all relevant knowledge to date, and in many a fine diagram. The basis of fact is sometimes swampy like the boring sites: occasional Alnus grains were found in the Orinoco delta 800 km from their source at 2000 m (p. 58), and Muller's observation is added that in lowland swamp forests lateral movement of pollen was very restricted, so that samples tend to be dominated by nearby trees (p. 85), and on the same page it is revealed that pollen types in the lowland yield a striking diversity, e.g. 60 types, "many still unidentified and capable of subdivision".

Higher up, not all is well, either. In Sumatra, sites at 950-1050 m were investigated to learn if the boundary between hill and montane forest was always in place. On account of occurrence of Podocarpus, Symingtonia, and Engelhardia in the deposits and in modern pollen rain, it is

suggested that "an altitudinal shift in the vegetation zones of at least 500 m in this area" took place (p. 96). Symingtonia is recorded as low as 800 m (Fl. Males. i 5: 376. 1957), and Engelhardia goes down to sea level (i 6: 145. 1960), so the weight of the evidence eludes me.

This may not matter much, since nearly all dates were in fact collected at much higher elevations. In New Guinea the best samples came from 2500 m, in Africa a fair number came from 3000-4200 m, and what on p. 51 is termed 'lowland evidence' is from 1130 m at lowest. It is well-known that during the Pleistocene Ice Ages altitudinal zones moved downward, and on these movements the book concentrates. Fig. 4.27 gives a fine reconstruction of zonation in the Andes 14,000-20,000 years ago in comparison with the present: the snowline, now at 4500 m, was then at 3500; the sub-páramo belt now at c. 3500 m was then at 2000. In relation with changes in sea level (lower) and climate (cooler, drier), this is interesting enough. We may suspect, with the author, that migration possibilities for cold-loving mountain plants from temperate regions into Malesia were much greater, and also that at present the climate is still becoming warmer and moister, whereby the potential rain forest area would be on the increase were it not for man's interference.

But how were the lowlands affected, if at all? In Fig. 4.27 the upper limit of the lowland rain forest, currently at 1000 m, is projected at 500 m during the Ice Age. It seems doubtful that in the Amazon Basin such a lowering of limit would rule out a great expanse of lowland forest to remain in place. While various authors now agree that during the Ice Age the savanna was much more extended than nowadays, we must be careful not to assume as a matter of course that the forest was then confined to a few refugia. Professor H. Sioli kindly pointed my attention to the possibility that gallery forests remained along the rivers, thus supplying pathways for migration and fronts from which the rain forest could reoccupy the land. This possibility seems not to have been considered by Flenley on p. 76; he rather thinks of separate blocks of rain forest.

It is an author's fate when he claims that big changes must have affected the lowland rain forest, to bump into its astounding richness of species. Flenley does so on p. 57: "If there is a problem associated with the lowland rain forest, it is its diversity ... there is as yet no widely agreed explanation for any particular degree of diversity in rain forest, so that diversity is always a biogeographical problem here." Permit me to think that this can only be a problem to him who is disinclined to recognize that the lowland rain forest is the product of a long evolution under stable conditions.

Yet the change for change's sake is not given up: "Rain forest cannot be the paragon of stability it was once held to be. This is not to say that rain forest is necessarily <u>inherently</u> unstable, but <u>in practice</u> it has changed a great deal in response to climatic changes at least in some places." (p. 128). On the other hand, it is admitted that "in neither Sumatra nor New Guinea is there yet any Quaternary vegetational evidence which can <u>only</u> be explained in terms of a formerly <u>drier</u> climate" (p. 100). Even 30 % less rain might not have made a crucial difference.

No one should therefore be impressed by statements like "the fact of

change, even in some areas of the lowlands, can now be taken as established" (p. 127). For the mountains yes, but that is not exactly news. For the species-rich lowland rain forest I rate the evidence too flimsy and the thinking too wishful. — M.J.

Flora of Taiwan, Volumes 1-5 (1975-1978, Epoch Publishing Company Ltd., P.O. Box 1642, Taipei, Taiwan).

In this Bulletin (n. 29, *pages 2623-2625*) we have extensively reviewed the first volume of this monumental Flora which has now been finished in a surprisingly short time. With the Floras of Japan and the Ryukyus it is the third Flora of East Asia which has become available in the English language. Together the five volumes contain about 4500 pages in print with 1653 plates of illustration, to all standards a formidable achievement.

The layout of the work gives all that can be expected from a rather concise Flora; also paper, printing and plates leave nothing to be desired, while prices are very moderate, volume 1 costing US$ 22.00.

The preparation of the work has been jointly sponsored by the National Science Council of Taiwan and the U.S. National Science Foundation, since 1972.

It is a joint anonymous editing effort, published under an editorial Committee consisting of Prof. Hui-lin Li, University of Pennsylvania, Dr. T. Koyama, New York Botanical Garden, and Dr. Ch.E. DeVol, Prof. Tang-shui Liu, and Prof. Tseng-chieng Huang, all of the National Taiwan University of Taipei. All of them made substantial contributions themselves; besides they engaged several other contributors or specialists. All contributions are signed.

Efforts have been made to make the work as critical as possible; this was especially important because previous workers on the Taiwan flora had frequently neglected comparison with species of surrounding floras, especially the Philippines and mainland China, which resulted in describing many 'pseudo-endemics'. As far as possible this situation has been repaired in the new Flora, which is therefore a basic contribution to the botany of the Far East.

A sixth, smaller volume is contemplated to be published in 1980, which will contain essays on the physiography of Taiwan, the history and affinities of its flora, the plant-geography, and a complete index to all names. — C.G.G.J.van Steenis.

FORD, E. (ed.), Papua New Guinea resource atlas, iv + 56 p. (1974, Jacaranda Press, 37 Little Bourke Street, Melbourne, Australia). 43 by 60 cm, hardcover, leather, screws.

The odd pages contain a map 1 : 3,500,000, or sometimes four maps 1 : 7,000,000, all coloured, and often with extra diagrams; the opposite page carries an explanatory text in four column print, sometimes with tables, also with notes and suggestions for further reading. Each map is a signed contribution.

The vegetation map, by Ross R o b b i n s, distinguishes 11 vegetation types; primary vs. secondary not indicated. The text is very general.

This atlas is a glorified elaboration of the same field as covered by the one edited by Ward & Lea (see *page 2232*) which is one quarter the size and not in colour, but also gives maps on soils, economic activities, languages, &c. The latter is for the kitchen, this one for the drawing room; it is splendidly executed, and gives longitude and latitude for c. 2250 names. — M.J.

GREGORY, M., Wood Identification — an annotated bibliography, 41 p. (1980, International Association of Wood Anatomists, Rijksherbarium, Box 9541, 2300 RA Leiden, The Netherlands). Paper. Dfl. 20.00, US$ 10.00, UK£ 4.50.

Wood identification remains one of the major applications of wood anatomical science. In the international timber trade, the precise identity of a consignment is crucial, and misleading or erroneous names may involve severe financial losses, usually on behalf of the buyer. Not only commerce, but also paleobotany, praehistory, archeology, art history, systematic botany and even forensic science, are from time to time vitally interested in the identification of secondary xylem. At the Rijksherbarium incoming plants of doubtful affinity are often brought to their proper family after consulting the wood anatomical features of a fragment from a herbarium twig.

The bibliography by Miss Mary Gregory from the Jodrell Laboratory, Royal Botanic Gardens Kew, will be a most useful asset for all those who are involved in wood identification from time to time, but lack the background of a long experience and a well-stocked reference slide collection. There are three main parts to the bibliography: 1. On general reference works, listing 36 publications of wide application and giving fundamental background knowledge to the uninitiated; 2. A major geographical section, listing 385 references by continent and country (for the Malesian area not less than 50 references are included; for the Indian subcontinent another 27, and for Australasia and the Pacific also 27); 3. A systematic section providing special references for important woody families and giving elaborate cross references to the geographical section. An author index concludes this bibliography, which must be warmly recommended to all wood anatomists or others interested in wood identification. The relatively high price is perhaps due to the limited edition of this IAWA publication, which was also published in volume 1 of the 1980 IAWA Bulletin New Series (see review under 'New Journals'). — M.J.

HEDBERG, Inga (ed.), Systematic botany, plant utilization and biosphere conservation, 157 p., illust. (1979, Almqvist & Wiksell International, Stockholm, Sweden). 8°. Hardcover.

This volume contains the Proceedings of a symposium held in Uppsala in commemoration of the 500th anniversary of the University. It consists of contributions by many authors to the following headings: Origin and importance of systematic botany, The present stage of botanical exploration, Extinction and conservation of plant species, and Biosphere exploitation and conservation; illustrated by examples of mainly the African and American floras.

The concluding resolution is worthwhile to reproduce here, as it is so much in agreement with our Flora Malesiana effort:

"Resolution 1977-05-18 — It was the unanimous opinion and resolution of the Systematic Botany, Plant Utilization and Biosphere Conservation Symposium held as part of the 500th Anniversary celebration of Uppsala University that although plants are the world's basic life support system, our plant knowledge is not adequate to be able to make satisfactory suggestions for plant conservation in any but a few temperate areas of the world. — The absence of check-lists and Floras for many countries of the world means that no basic documentation is available on which plant conservation recommendations and action plans can be based with any certainty. — The Symposium delegates therefore recommend most strongly to their governments that it is of the utmost importance that immediate increased support both financial and academic is provided for the developing world to produce such Floras and detailed lists before it is too late! It is also urgent to provide increased facilities for training and study in the relevant Botanical sciences to produce the expertise necessary to correct this deficiency; but in view of the extreme urgency arising from the rate of destruction of primary vegetation, we would press for the preparation of ecologically appropriate land management plans now, even if the preliminary floristic data are incomplete. — Attention of Governments is drawn to the importance of various international conventions, in particular the "Convention on Trade in Endangered Species", the "Convention for the Protection of the World's Cultural and Natural Heritage" and the "Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere", for the purpose of providing effective international action."

HEYWOOD, V.H. (consultant editor), Flowering plants of the world, 336 p., many illus. and maps (1978, Oxford University Press). Cloth. UK£ 10.00.

The first two left pages read like the cast of a major motion picture, and the book is indeed quite a production, with Heywood in the role of Ingmar Bergman, and his wild strawberries making quite a show. Scientifically, the book is rather conventional: a brief introduction, which explains that Stebbins's system of 1974 has been followed for practical reasons; then a synopsis of (super)orders and families, in the dicots 58 orders and 248 families, in the monocots 19 orders and 58 families; then a 10-page simply-illustrated Glossary; then the families. Under each family is listed the best-known products as catchwords for recognition; a few general remarks as characteristics; distribution, loosely worded with an occasional ecological note; diagnostic features, in 12-40 lines; 'classification', which covers subdivision as well as affinities; economic uses, with interesting notes to genera. To each family belongs a 6 by 4 cm world map with the area in red, and in the caption the number of genera and the number of species (also again the outlines of the area are put into words, and economic uses are briefly repeated). For most families there is a 'panel', i.e. a half page plate to illustrate the main features, on various species. For a few well-known families, there is also a full page colour plate. Families were divided among 44 botanists, who signed their contributions. Documentation is only given in the most general of forms: one page at the end with titles of standard works.

As the Flora Malesiana is not among them, we should not be surprised

to find a few lapsus in this area. I am not even sure (see e.g. under Burseraceae, p. 196-197) that all contributors clearly perceive the difference between Malaya, Malaysia, and Malesia. Batidaceae (p. 76), mentioned for the New World only, were already recorded for New Guinea in 1956 (with a monoecious species, see Fl. Males. i 5: 415). For Datiscaceae (p. 114) the area indicated is far smaller than the actual area, given, with maps, in Fl. Males. i 4: 381-387 (1953). After that time, Tetrameles has also been found in Queensland (Blumea 20: 338. 1972). Dipsacaceae, unmentioned for Malesia (p. 261) is known from New Guinea (Fl. Males. i 4: 290. 1951). That Nyssaceae (p. 166) are not mentioned for Malesia is particularly strange, as in Wangerin's monograph of 1909 already a Nyssa javanica was given (see Fl. Males. i 4: 294. 1948). Staphyleaceae (p. 190), not mentioned for Malesia, do nonetheless occur as far to the East as New Guinea, with 12 species in Turpinia altogether (Fl. Males. i 6: 49-59); naturally, Van Steenis's interesting suggestion about affinity with Sambucus remains also undiscussed. Of course, for families not yet in the Flora Malesiana, the situation is no better: Elaeagnaceae not mentioned; Dipterocarpaceae are concentrated also in the Philippines and not, formally spoken, in Indonesia which includes New Guinea where no concentrations are found. Pakaraimaea can hardly count as "an undescribed genus" of this family; see Taxon 26: 353 (August 1977).

However, all such shortcomings mean little to those who are familiar with the Malesian flora, as they have learnt to use the Flora Malesiana and therefore easily can put in corrections. As for the other parts of the world, I have not ventured to check. Certainly the book is attractive, and nearly all families have been dealt with, although sometimes we could do with a bit more clarity. Oxalidaceae is announced as herbaceous (p. 209), and only at the end of the text (p. 210) is remarked that "the tree genera Averrhoa and Connaropsis ... are now sometimes separated as the family Averrhoaceae", but nothing more is said about such a family. On p. 297, under Strelitziaceae, it is said that the Lowiaceae does not have an entry in this book, and then a few remarks on it follow. While most oddities, for which in other works sometimes separate families are created, have been duly mentioned and can be assigned to a family, wouldn't it have been better here not to leave things like ligneous Oxalidaceae and Lowiaceae in the dark but accord them unambiguous treatment?

A special word deserve the 'panels', in brown half-tone, with part of one of the plants on them coloured: a sort of pictorial understatement which gives a touch of distinction. They have been very well done and convey a good idea of each depicted family (although the Shorea on p. 85 deserves a four times longer bole). Printing errors are very few (Hyphaene thebiaca on p. 303, Monentes on p. 85). The index has a very satisfactory coverage. Execution is in excellent taste, and I have no doubt that this book will find a wide circle of grateful readers — except in Hawaii, which does not figure on the maps, although Argyroxiphium and Batis have specifically been recorded. It is the sort of book that draws glowing reviews; more keenness in the next edition will only enhance its glamour. — M.J.

HO, Feng-chi, Tropical plants of Taiwan in color. Vol. 1 (1977) 193 p., 177 col. photogr.; Vol. 2 (1979) 292 p., 257 col. photogr. (Publ. by Heng-chun Tropical Botanical Garden, Ping-tung, Taiwan). Text in Chinese. Clothbound. 8°. US$ 20.00 and 30.00, respectively.

This ambitious work is planned in five volumes, vol. 1 covering the Gymnosperms and part of the Angiosperms, to Leguminosae, vol. 2 from Saxifragaceae to Euphorbiaceae, vol. 3 rest of Dicotyledones, vol. 4 Monocotyledones, and vol. 5 Pteridophytes.

The orders and families are arranged according to A. Engler (for Gymnosperms), J. Hutchinson (Angiosperms) and E.B. Copeland (Pteridophytes, modified).

The purpose is to issue companion volumes to the Flora of Taiwan for the general public and for popular education, to attract attention and raise interest in the tropical species of this botanically so much interesting island, for the greater part woody plants, especially those with economic or ornamental value, by means of colour photographs and a number of drawings. Both native and introduced species are included. A glossary of botanical structures and their terminology is included and is illustrated by excellent and instructive drawings.

The photographs are in general very good and will assumedly include quite a number of species never photographed alive. A number of species are only represented by line-drawings, and have value for both the public and botanists.

For each species, one can find the scientific name in Latin with original literature citation, often included also recent bibliographic reference(s), common name(s), concise description and ecological data mainly based on living material and field observation, geographic distribution or origin, uses, and sometimes recommending means for growing the plant.

The systematical disposition follows in general the Flora of Taiwan and modern namings are accepted, although not for Pygeum (= Prunus) and Laportea (= Dendrocnide). There is one curious new combination proposed: Meximalva retusa (L.) Ho, as a substitute for Sida retusa.

The author is the botanist of the Heng-chun Tropical Botanical Garden, with an area of 50 ha the largest in Taiwan and affiliated with the Taiwan Forest Research Institute.

A laudable effort to make Taiwan people aware of the botanical treasures of their island. — C.G.G.J.van Steenis.

KENG, Hsuan, A monograph of the genus Phyllocladus (coniferae), vi + 112 p., 1 col. pl. (no date, recd. 1980, Natural Publishing Company, 16 Lane 40, Tai Suen Street, Taipei, Taiwan). Paper. US$ 10.00, post free.

This is a series of reprinted previously published papers. Only one is new, namely that in Reinwardtia, which was reprinted from unpaged proofs. Also new is a correcting note on p. 29. Only these are therefore to be cited with the pagination here given at the bottom centre. All others should be cited by the original pagination, under careful avoidance of the pagination of this book.

Author deals extensively with the only Malesian species, P. hypophyllus, and gives many clear sketches. Bibliographically, this book is full

of dangers. Neither the listed order nor the actual arrangement is completely chronological, not all end pages have been correctly cited in the list, and no illustrations mentioned in it. Here we list the pages chronologically, giving Keng's pagination (through which they can be located in the book), omitting for brevity's sake the title, citing the place only, and give a terse note on the contents.

31-34 (1963) Gard. Bull. 20: 123-126, 10 fig. — P. hypophyllus, the one Malesian species: collections cited.

35-46 (1963) Ann. Bot. n.s. 27: 69-78, 14 fig. + pl. 1 — Morphology of P. hypophyllus.

92-108 (1969) J. Arn. Arb. 50: 432-446, 6 fig. + 2 pl. — Amentotaxus formosana, from Tonkin, S. China, and Formosa, not Malesian.

1-3 (1973) Taiwania 18: 142-145 — Phyllocladaceae described as a new, monotypic family.

47-55 (1974) Ann. Bot. n.s. 38: 757-764, 26 fig. + 1 pl. — Morphology.

109-112 (1975) Taxon 24: 289-292 — Rearrangement of conifer family names.

75-91 (1977) Pl. Syst. Evol. Suppl. 1: 235-252, 28 fig. — Comparison with fossil progymnosperms, viz. Archaeopteris.

5-30 (1978) J. Arn. Arb. 59: 249-273, 43 fig., 4 maps — Taxonomic monograph of P., 4 sp., 2 var. (one new from New Zealand), one sp. Malesian. Morphology; fossil distribution. Correction on typification inserted.

57-66 (1979) Bot. Bull. Acad. Sin. 20: 9-17, 13 fig. — Morphology, derivation.

67-74 (in press) Reinwardtia, unpaged, 28 fig. Cite: repr. in KENG, Monogr. Phyllocladus (1980) 67-74. — Derivation of Amentotaxus and P. from fossil Cordaites; no taxonomy. — M.J.

Kinabalu, Summit of Borneo, editors D.M. LUPING, W. CHIN & E.R. DINGLEY, 482 p., 5 maps, 27 fig., 51 photogr., 41 col. photogr. (1978, The Sabah Society, Box 547, Kota Kinabalu, Sabah, Malaysia). Paper. Mal$ 30.00.

The editorship is somewhat enigmatic, hence the book is listed under the title. The word Kinabalumay means Chinese widow as well as solitary father (p. 31), according to the late Tom Harrisson in an entertaining introductory chapter. Following this, D. V. J e n k i n s sums up 'The first hundred years', after the ascent by Low in 1851: an account of 53 visits documented by 47 references.

Marine sediments deposited in North Borneo were uplifted; what erosion left is now the Crocker Range. Under it, a mass of magma intruded and solidified; 1-2 million years ago it began to rise 5 mm a year. This became Mt. Kinabalu, the solitary mountain with its broad, jagged summit, its highest point 4175 m. During the Pleistocene, 5 sq.km of the summit was under ice, except the steepest peaks which protruded as 'nunataks'. The ice left a moraine at 3100 m, not far from Pakka Cave. The Pinosuk Plateau lower down was overrun by mixed gravels. The rock of the level summit plateau is still peeling off in flakes; this is thought to be an after-effect of the stress inside the rock during the uplift. The whole process is neatly explained by L. C. M y e r s, although his timing is much at variance with the one supplied by geologist G. J a c o b s o n

on p. 104. The original crystalline basement, two main crops of ultrabasic rock and some porphyry are beside the big dome of hornblende adamellite.

E. J. H. C o r n e r 's paper on Plant Life covers pages 112-178. He led the Royal Society Expedition in 1961, and revisited the mountain three years later. Sure enough, he established 78 species of Ficus for the mountain, 13 of them endemic, out of 135 for the whole of Borneo. The genus reaches its altitudinal record here at 10,600 ft (3200 m). In an animated manner he discusses this group, and many others, viz. herbs (16 items), Nepenthes, parasitic flowering plants (4 items), Rubus, common trees and shrubs (13 items), and other plants of particular interest (22 items). References are 58. Englehardia should be spelled Engelhardia, of course.

P. F. C o c k b u r n in a paper on the flora (p. 179-190) briefly discusses the zones, one of them ultrabasic, as if this were an altitudinal feature. Some typical plants are named; most noticeable are the fine pen drawings by Ms. C h i n Pak Hau. R. E. H o l t t u m 's paper on ferns (p. 199-210) expertly discusses 9 categories in popular terms; it is somewhat reminiscent of his chapter 13 in Verdoorn's Manual of Pteridology (1938). In a paper by A. L a m b & C. L. C h a n on orchids (p. 219-252), some fantastic ideas about vegetation history are set forth, together with chatty notes on genera and species; there may be in Kinabalu Park "a thousand species, if not more".

The zoological part seems particularly informative as it contains a Checklist of the Butterflies (345 sp.), of Fishes (32 sp.), of Frogs and Toads (43 sp., none endemic, with ecological notes). As for the birds, Smythies gives notes to some 80 species, numbered in accordance with his Birds of Borneo; also a systematic annotated checklist has been given of 289 species in 44 families, 254 are resident, 30 are migrants. For the small mammals, too, there is a checklist: 101 sp., with indication of altitude and preference (1/3 on the ground, 2/3 in the canopy). There is only one big cat, Felis bengalensis.

Kinabalu National Park, gazetted in 1964, now occupies 301 sq.mi. (c. 750 sq.km), more than the land area of Singapore Island, and receives about 10,000 visitors annually. In 1972, an addition was made of 36 sq. mi. around Mt. Templer (1200 m) in the little-known North, but 25 sq.mi. were excised in the Southeast to work a deposit of 77 million tons of copper ore. A dam was made at 15½ km from the mine to keep the tailings produced by the floatation works at Mamut. The lifetime of the mine has been estimated at 15 years, "and problems could arise if there is no alternative employment for those people who have changed their traditional way of life" (p. 83). In the 1950's, vegetable cultivation was introduced at Ranau (1300 m); this cut into the forest in various places. In 1972, the road connection between Kota Kinabalu, Ranau (pop. 2000) and Sandakan was completed.

The book ends with biographical notes on the 18 collaborators, a list of publications not mentioned in the foregoing papers (103 titles), a list of prices for visitors (address of the Warden: Box 626, Kota Kinabalu, Sabah, Malaysia), and an index.

Production is good, illustrations are copious; the book is well worth its price. Notwithstanding its weight of just over 1 kilogram, it should be in the rucksack of every visitor, amateur and professional. If the Sabah Government, justly proud of the park, wishes to make Kinabalu still more valuable as a reserve, let a good tract of lowland forest be added! — M.J.

KLEINSCHMIDT, H.E. & R.W. JOHNSON, Weeds of Queensland, 469 p., many illus. (no date, probably late 1979; Information Branch, Primary Industries, Box 46, Brisbane, Qld. 4001, Australia). Hardcover. A$ 14.00, post free.

The weeds discussed are in 369 numbered entries of one page each; in some a group of species is comprised. Under an entry, the vernacular name is given, like the intriguing 'Paterson's Curse or Salvation Jane' (Echium plantagineum): the botanical name is given in small type. Then follow a 6-10-line description; origin and distribution mingles with some notes, control (mostly recipes for spraying), and an illustration 1/3-1/2 page.

Spraying is also the main theme of chapter 1, which gives a rich menu. In chapter 2, legislation, chemicals recur, with maps of 'hazardous areas'; there is also a list of declared noxious plants. Chapter 3, entitled 'Identification of weeds' merely contains instructions how to send specimens to the Botany Branch ("do not cut off the tops of grasses or send only the seed heads"). Chapter 4: 'Weed descriptions' is equally surprising: it repeats the invitation to send weeds (there may be new ones among them, which we should know before they have spread). Then follows a key in the best Backerian tradition: 3a ferns, 3b other plants. This key leads to a total of 25 groups, each illustrated by 2-4 colour photographs of plant habits, e.g. milky sap, underground sprouters, clovers, peas, cassias, tough bark, 4-angled stems, turnips and mustards, curled spikes (Echium), wind-blown seeds, leaves not deeply divided — a funny company.

Under these groups the plants are arranged, often in sub-groups, e.g. under the 'grasses and grass-like plants' 8 of these categories, each characterized by a few words, and concluded by 'other grass-like plants' with Asphodelus amongst them. However, the categories are not found to break up the weed series of the main text.

The vernacular names are confusing, to say the least: kyllinga weed is a Cyperus, not C. kyllingia but C. sesquiflorus; burr applies to weeds in ten families — but family names are not given, and Oxalis species are listed in two places: under Plants with underground runners, bulbs or tubers with shamrock-like leaves and under Clovers and clover-like plants — however, with cross-reference in the key! The illustrations are a motley: fine drawings, parts and whole habits, sometimes with striking details, the photographs are very uneven, and those of e.g. the Cucurbitaceae make a sorry lot.

Nevertheless, when Mr. A.P. Everaarts, a weed specialist, had studied the book, he found it quite useful: botanically simple, but eminently practical. The keys for which I had such mocking words, actually work well; it also seems to contain an expert selection of species. Spellings

are correct. The execution is good, the binding firm. We must conclude that the Queensland botanists, who know their land and their customers, have done just what was needed. — M.J.

KOCHUMMEN, K.M., Pocket check list of timber trees, by J. Wyatt-Smith. 3rd Edition, viii + 362 p. (1979, Forest Department HQ, Jalan Swettenham, Kuala Lumpur, Malaysia). Small 8°, hardcover. Price (awaiting official approval) probably Mal.$ 20.00. Malayan Forest Records No. 17.

It is with pleasure that we announce the new edition of the pocket check list of timber trees of Peninsular Malaya, of which the 2nd edition became exhausted in 1976.

In this new edition botanical names have been brought up to date in line with recent revisions published in the Tree Flora of Malaya (3 vols.) and Dr. P.S. Ashton's revision of Dipterocarpaceae.

From the preface to the third edition: "The important new features of this 3rd edition are (a) a new dichotomous key to the groups of Dipterocarps, (b) a key to the identification of all Dipterocarp species based on bark and bole characters, (c) a revised key to the non-Dipterocarps with greater emphasis on bole and bark characters, (d) simplified chapter on field and herbarium characters, and (e) a key to the mangrove and estuarine trees replacing the former Field key to the Mangrove Trees. Line drawings of species have been removed. The chapter on "Dafter pokok-pokok kebanyakan mengikut mutunya" has been removed and replaced by The Regeneration Sampling List of 1974. The new species symbols are in accordance with this list. The Lists of Dipterocarp and non Dipterocarp Trees have been extensively revised to cover all species groups and since these lists are arranged in alphabetical order by Malay plant names a separate index to Malay plant Names is no longer necessary." — C.G.G.J.van Steenis.

LEKAGUL, B. & J.A. McNEELY, Mammals of Thailand, 21 + li + 759 p., many fig., photogr., maps + 8 col. pl. (1977, Sahakharnbhat, 4 Old Customhouse Lane, Bangkok, Thailand). Bound. Price unknown.

This book contains many Malesian species, part of them already known for their ecological relations with plants. Areas are clearly outlined for each species, enabling plant geographers to make comparisons. Consultation is very easy, and also, conservation has been one of the viewpoints in the compilation.

The total number of species written up is 264 (93 bats, 69 rodents, 36 carnivores), in 121 genera, 43 families. Only 8 species are endemic in Thailand; 168 also occur in Malaya and beyond (pan-Sundaic are 62, Malayan only 36, Borneo Sumatra 34, Sumatra Java 13, Borneo Java 3, Sumatra only 11, Java only 3, Borneo only 6).

The ecological relations with plants are manifold, sketchily indicated ("frequently associated with bamboos, roosting in dead or damaged stalks; they also roost in crevices of rocks and in new banana leaves" — of a bat, on p. 216). Ecology is also discussed in relation to habitat. In a total forested area of 170,000 sq.km, several types are distinguished and sketch-mapped: tropical evergreen rain forest with as subtypes evergreen rain forest (3500 sq.km), semi-evergreen (8000), dry evergreen (39,000),

hill evergreen (3500), mangrove (3000), pine (2500), mixed deciduous (42,000), dry deciduous dipterocarp (68,500). Other habitat types are limestone, savannas and grasslands, forest plantations, bamboo, agricultural areas, and urban areas.

Distribution of each species is described and illustrated by a 6 by 6 cm map, mostly but not always giving the range for whole islands; in terminology of this book, range encompasses distribution, which is expressed in localities. Thailand lies in the centre of the 'oriental region', with the Indian subregion West of it, the Sunda subregion South of it (the boundary coincides with the botanical one), and the Wallacean subregion East of the latter, with the Philippines (33 species listed), Celebes (25), and Lesser Sunda Islands (27), but these include common rats and mice. The occurrence of all species in the Oriental region is tabulated (on p. xxxiv-xxxix) for 23 areas, which allows for detailed comparisons. Not all these species occur in Thailand, only 189 out of 249 do. Many more figures are given in the Introductory Part.

Presentation is clear in 2-column print, with good illustrations. Adopted name and Thai name are given, main synonyms with author and year, and as 'diagnosis' the shortest possible characteristic in the genus, like "smaller and darker than H. tickeli, with a pad of skin at the thumb" (of a bat, p. 225). A number of elementary sizes are given, with their range. The descriptions consist of 10-15 lines, and focus on external appearance, skull, and sometimes skeleton. Distribution, already mentioned, if often followed by Ecology and Behaviour, in a few to twenty lines, with entertaining details like that of the house shrew, whose call sounds like the clinking of coins (p. 35). A habit photograph or drawing is given, and detail photographs of the skull, for each species. This means that skulls and portions of it can always be identified with the aid of this book — a gain for ecologists in the region. In addition to these 'permanent' elements, there are identification keys in the larger groups like bats, with series of diagnostic characters illustrated, also dimensions are tabulated, and colour plates of all the squirrels and flying lemurs are given.

A synopsis at the beginning of the book lists all species under (sub)order and (sub)family. Every family is preceded by a general introductory part, and to the clear presentation also contributes the instructive notes on taxonomy and classification, and on the geological and evolutionary history of the region.

Conservation transpires in the latter subject, among others. Reasons for conservation are concisely set forth, in plain language; legislation is mentioned and categories of protected species listed. A map is given of the 25 parks and reserves, totalling 8884 and 13,704 sq.km, i.e. 4.49 % of the country's land area. — M.J.

MARTIN, Peter J., The altitudinal zonation of forests along the west ridge of Gunong Mulu, (iv) + 77 p., 35 fig. + 5 p. + 18 appendixes + 23 tables (1977, Forestry Department, Kuching, Sarawak, Malaysia). Price probably low.

This report contains the results of two years of work by a Voluntary

Service Overseas Volunteer, in G. Mulu National Park and in the SAR-Herbarium, where (often sterile) specimens have been indexed under the code MVS: Mulu Vegetation Survey.

The subject is interesting and not much is known of it, from lower altitudes, that is; the report will perhaps not be widely circulated, and as it has not been edited for easy consultation, a review is in order.

An inventory was made of the trees in 16 plots: at 220 m, on 0.4 ha, there were found 38 families, 78 genera, 136 sp.; at 500 m, on 0.4 ha, the numbers are 37, 79, and 129; at 700 m, on 0.4 ha, 36, 55, and 83; at 820 m, on 0.16 ha, 29, 56, and 86; at 900 m, on 0.12 ha, 29, 50, and 78; at 1020 m, on 0.12 ha, 34, 64, and 97; at 1180 m, on 0.1 ha, 34, 59, and 102; at 1310 m, on 0.1 ha, 32, 48, and 76; at 1410 m, on 0.075 ha, 27, 40, and 64; at 1580 m, on 0.05 ha, 31, 43, and 64; at 1650 m, on 0.05 ha, 19, 25, and 37; at 1730 m, on 0.08 ha, 27, 40, and 58; at 1860 m, on 0.06 ha, 24, 38, and 55; at 1930 m, on 0.05 ha, 18, 22, and 32; at 2070 m, on 0.04 ha of steep terrain, 19, 22, and 25; on 0.03 ha of undulating terrain, 14, 20, and 23. At the summit, at 2377 m, there was also a plot.

Girth measurement of trees is the main key to the work. Other life forms have well-nigh been disregarded. Minimum girth has been the prime criterion for consideration at all. Analysis of the stands reveals number of stems, girth class distribution, and measured basal area of trunks (mba), absolute and in %. Profile diagrams with species lists are given for most plots.

Tree families are also rated for % of stems and of mba. Over the whole range, 8 are strongly represented: Dipterocarpaceae, Ericaceae, Fagaceae, Guttiferae, Lauraceae, Myrtaceae, Podocarpaceae, and Sapotaceae; 45 families are listed as less important. The whole number of tree species dealt with is about 600; the majority of them showed a very localized distribution. Representation of these main families in the plots have been worked out (fig. 28-35), and for some plots, the largest trees, the commonest trees, and the less common trees have been tabulated.

Conclusions about vertical distribution of families and species are listed on p. 65-71. Throughout, we are reminded that the survey concerns the ridge of Mulu, and that situations elsewhere may differ.

As 'seldom encountered' above 800 m are listed Annon., Apocyn., Bombac., Linac., Ulmac.; as not usually encountered above 1180 m: Anacard., Flacourt., Icacin., Lecythid., Legum., Morac., Proteac., Tiliac., Trigoniac., Verben.; as not usually occurring above 1600 m: Celastrac., Dipteroc., Ebenac., Gonystylac., Melastom., Meliac., Olacac., Polygal., Sabiac., Sapindac., Stercul., Thymelaeac.; usually not above c. 1900 m are found: Burserac., Cornac., Compos., Cunon., Euphorb., Logan., Myrist., Rhizoph., Rubiac., Rutac., Sapot. Not to occur below 1200 m seem: Compos., Cunon., Ericac., Illiciac., Myricac., Podocarp., Winterac. At family level, 1200 m seems to be an important limit.

Few species are wide-spread below 800 m. Species in Fagaceae, Guttiferae and Myrtaceae have wide altitudinal ranges, in Dipterocarpaceae they have not. "Most species appear to have a narrow altitudinal range of occurrence. Species with a wide altitudinal range are usually more typical of high altitude forests than of low altitude forests" (p. 71).

Author arrives at a zonation as follows (p. 6):

Forest type:	Altitude:	Floristic zone dominated by:
UPPER MONTANE FOREST	above 2000 m (slopes?)	Ericaceae, Guttiferae, Myrtaceae, Podocarpaceae (PEGM)
	above 1600 m (ridges?)	Fagaceae, Myrtaceae, Podocarpaceae (FPM)
LOWER MONTANE FOREST	1600-1900 m	Fagaceae, Guttiferae, Myrtaceae, Podocarpaceae (FPGM)
	1200-1600 m	Guttiferae, Myrtaceae, Sapotaceae (SGM)
	800-1200 m	Fagaceae, Guttiferae, Myrtaceae (FGM)
LOWLAND RAIN FOREST	0-800 m	Dipterocarpaceae (mixed)

He notes that no 'oak-laurel' zone can be distinguished; the listed families in the right column are the most important. Lauraceae are rather evenly present in all zones (fig. 35).

Author agrees with Burgess (Mal. Nat. J. 22: 119-128. 1969) to reject Symington's distinction between lowland and Hill Dipterocarp forests (boundary at c. 1000 ft). To me, evidence is here insufficient. First, Burgess's does away with the 1000 ft limit only in passing, and without considering the paper by Robbins & Wyatt-Smith (Mal. For. 27: 188-216. 1964), or Wyatt-Smith's other papers (which Martin does not list, either). Second, only one of Martin's plots was located below 1000 ft, namely the one at 220 m, and of this no detailed account of species composition has been given, no profile diagram, and no detailed comparisons have been made. Third, in the three plots at 220 m, 500 m, and 700 m, 30 or 33 cm girth has been set as the lower limit for consideration; higher up it is 20 cm. I do not know what difference this makes. Even so, the quoted figures give the impression of a gap in genera and species richness between the 500 m and the 700 m plot, but this has not been further examined. (Author has apparently not searched the forest in between plots to define altitudinal breaks with more accuracy.) It occurs to me therefore that awaiting more evidence, Symington's limit must stand. And, after all, we remember that habit and girth were applied to narrow the selection of species for floristic study, which seems questionable practice. Also, all plots were admittedly on the ridge or near it, and this, too, may have had its effects.

Emphasis in this work is clearly not on the 'Lowland Rain Forest' (6 pages), but on the Lower Montane Forest (10 pages for the lower zone, 19 for the higher), and even the Upper Montane Forest (9 pages) fares better than the lowlands. Plot density is highest between 820 and 2070 m.

From the latter plot, two profiles were made: the one in Appendix 7 on undulating terrain 10-20° steep, and the one in 8 on a site 20-60° steep. The differences are so striking that I can't resist tabulating them:

Ridge effects, revealed by a comparison of the profiles in Appendixes 7 (undulating terrain, 10-20°) and 8 (slope 20-60°).

		Number of trees (7)	(8)
Aquifoliaceae	Ilex havilandii	0	2
	Ilex laurocerasus	1	0
Elaeocarpaceae	Elaeocarpus congestifolius	2	6
	Elaeocarpus ferrugineus	4	0
Ericaceae	Diplycosia heterophylla	0	3
	Vaccinium clementis	0	7
	Vaccinium coriaceum	1	0
	Vaccinium pachydermum	0	9
Escalloniaceae	Polyosma mjobergii	0	1
Fagaceae	Castanopsis foxworthyi	1	0
	Lithocarpus revolutus	2	0
	Quercus valdinervosa	5	0
Guttiferae	Calophyllum garcinioides	4	16
	Garcinia cuspidata	1	0
Lauraceae	Cryptocarya tuanku-bujangii	0	6
Magnoliaceae	Aromadendron nutans	0	1
Myricaceae	Myrica javanica	0	1
Myrtaceae	Eugenia attenuata	1	4
	Eugenia kinabaluensis	12	0
	Eugenia prasiniflora	6	0
	Tristania bilocularis	1	0
Oleaceae	Linociera coriacea	0	1
Podocarpaceae	Dacrydium beccarii	0	2
	Phyllocladus hypophyllus	3	6
Rosaceae	Prunus arborea	6	1
Symplocaceae	Symplocos pendula	1	0
Theaceae	Ternstroemia denticulata	3	2
	Species	17	16
	In common: 6		
	Trees	41	80

Within its pre-set limitations, many original data have been given, for which this work deserves to be known. It would be interesting to see if an altitudinal study of lianas, epiphytes, terrestrial herbs, and bryophytes would confirm the findings. A larger inquiry is needed into the zonation of the lowland forest. — M.J.

MEYENFELDT, C.F.W.M. von, e.a., Restoration of devastated inland forests in South Vietnam, c. 440 p. in 3 vol. (1978, Bosteelt, Wageningen). Offset, paperback, 20.4 by 14.5 cm. Available from Centraal Magazijn, De Dreyen 4, Wageningen, The Netherlands. Dfl. 16.50 excl. postage.

During the 1967-1975 war, c. 1040 sq.km of forest were completely destroyed by bombs and shells, c. 50,000 damaged. Bombs shot shrapnel into trees, and compacted the soil inside craters. Some 14,000 sq.km were sprayed with herbicides, which defoliated the trees; the result was a strong regrowth of bamboo and other monocots. The area sprayed amounted

to 8.3 % of the land area; of the mangrove, 36.4 % or 1050 sq.km was affected, of the inland forests 10.4 % or 10.780 sq.km. This work does not consider the mangrove. 'Rome ploughs' denuded some 3250 sq.km of land; this better than spraying served the purpose of denying the guerillas cover.

A group of 7 forestry students led by Dr. J.H.A. Boerboom (address: Hinkeloord, Foulkesweg 64, Wageningen), who shared the general concern about Vietnam, set out to bring together such materials as might be useful for ecological restoration. Being Dutch, they read English as well as French, but also could draw on the extensive silvicultural literature on Indonesia; there are 232 references in vol. 1 and 224 in vol. 3. The result is an impressive compilation of fact, with much background information included, and presented with clear reasoning. Much silvicultural information has been digested, systems and methods been described, also (in vol. 2) on bamboo, Imperata, and erosion. A nice invention is the annotated key to silvicultural measures according to terrain conditions and damage. Conclusions are given in vol. 1, p. 96-99, in 28 points.

It is considered that guided natural regeneration will take long times of research and training; planting of suitable tree species seems much more feasible. Vol. 3 presents an enumeration of possibly suitable species, with: name(s) in science and trade, range and ecology, climate, soil, characteristics, silviculture, growth and yield, pests diseases and calamities, wood properties, uses in the broad sense, remarks (in addition to ecology, mostly left open), evaluation, references. The species have been tabulated for a number of properties.

Altogether 112 species have thus been listed, on an average of 1½ page of typescript each. Emphasis is on species from India-Burma-Thailand-Indochina-Malesia-Australia; the 112 were selected out of an original 300 studied, on vaguely defined criteria (vol. 3, p. 1). My impression is that so much information from everwet Malaya was incorporated, that in general the emphasis may be a bit too humid, so to speak. The stricken regions: moist evergreen forests in the N, moist semi-deciduous forests and the dry deciduous forests N and NW of Saigon (vol. 1, p. 22); in this region climatic conditions form a patchwork, and it might be hard to chose the right species in all cases.

The botanical side could have been improved by some updating (Pterocarpus pedatus belongs to P. macrocarpus), more accuracy in citation of author's names, drawing on works like Burger's Seedlings book, Corner's Wayside Trees of Malaya, Meijer's Guide to the Trees of West Malesia, and making specific references to good descriptions and figures. Nevertheless the work seems useful, and a nice introduction to reforestation in general, of value in all humid and hopefully the drier tropical regions. Production is somewhat, well ... barefoot, but so is the price. — M.J.

MOORE, L.B. & J.B. IRWIN, The Oxford book of New Zealand plants, 234 p., 112 pl. (32 in col.) (1978, Oxford University Press). 4°. £ 32.50.

This work presents drawings of some 400 native species out of a total of c. 1500, providing a fair insight in the New Zealand flora. The drawings, made during ten years by Mr. Irwin, are artistic-botanical which,

combined with the many dissections revealing the beauty that can be observed by a simple hand lens, gives a unique aspect to this beautiful book. Lucy Moore is responsible for the botanical text: family descriptions and notes on the species, as usual containing a wealth of readible information. Among the Cryptogams there is a fair representation of the Ferns, but necessarily a sketchy one of Diatoms, Algae, Fungi and Lichenes. There is no key, but for the Dicots there is a clear tabulation of family characters replacing a key, and there are also guides to the families of Monocots and Gymnosperms.

A magnificent, semi-popular introduction to the fascinating New Zealand flora, a pleasure for the eye, an excellent guide for the layman, and of distinct value to the professional botanist who in browsing the volume will find unexpected observations. — C.G.G.J.van Steenis.

PANCHO, J.V. & M. SOERJANI, Aquatic weeds of Southeast Asia, x + 130 p., 98 fig. (1978, U.P., College, Laguna 3720, Philippines and BIOTROP, Bogor, Indonesia). Cloth. Price unknown. Presumably available from Clearinghouse Manager, BIOTROP, Box 17, Bogor.

"References to aquatic plants, in general, of Southeast Asia may be found in local floras, monographs, and ecological studies, but the information is too widely scattered to be of practical value", authors write on page 1. Actually, 81 % of the 112 species and varieties (in 69 genera, 43 families; key to the latter given, but a far more extensive one is in BIOTROP Bull. 11: 139-149. 1979) are dealt with in the Flora of Java which, strange enough, I found nowhere mentioned. But certainly a public is served by an overview of such weeds as often are bothersome in wet rice fields and irrigation works.

In some features, a really taxonomic scope is suggested: herbarium specimens are cited, nomina conservanda indicated, even a "pro stirp. ind. orient." on p. 71, but a plainly useful item as magnification in the figures is given only by exception. Altitudinal distribution is not given either, and readers who'd like to look it up are not helped. Reference to Flora Malesiana is made but erratically, e.g. under Sagittaria in one species but not in the other, while a third, S. platyphylla (FM i 5: 330) has here been depicted under the name Alisma plantago-aquatica!

Perhaps the distantial look towards the Flora Malesiana stems from authors' opinion, expressed on page 1, that through it is revealed a paucity of information about the aquatic weeds and their distribution. Not wishing to look biased, I leave it to the readers to compare the two works for coverage and detail under Distribution and Ecology. Certainly, much is still to be desired, and new data are always welcome. But take Sagittaria guyanensis subsp. lappula; in Flora Malesiana (i 5: 329) it is complained that no field notes about the flower colour were available. What could be more interesting than some new observations, also to solve the question whether the purple spot on the petals is geographically defined or not — but if a new contribution was here made, it cannot be read from the text. In case of Ludwigia octovalvis (p. 41), fresh study might have led, independently, to the same conclusion reached by Raven (FM i 8: 102. Dec. 1977): that the subspecies (here still retained) had to be withdrawn.

Dealing with Cyperaceae is, of course, a problem in a popular book: how to justify the selection of species, how to describe them diagnostically so as to avoid confusion with similar-looking species, especially since a key is given which might give people false hope that they always arrive at a species written up here. It is then a pity to see in Cyperus elatus that no mention was made of the characteristic appendage of the anther connective, neither in the description nor in the drawing. This one and the next confused me: the nut in C. elatus is described as 0.4-0.5 mm long, drawn as 0.5 mm, but in FM (i 7: 602) described as 0.8-0.9 mm; the nut in C. imbricatus is described as 0.9 mm, drawn as 0.35 mm, and in FM (i 7: 603) described as 0.6-0.8 mm. Also in fig. 54, of Xyris indica a confusion may have crept in: 7 actually seems to be the basal bract, 8 the median bract, 9 the lateral sepals, and the staminodes have not been drawn. Speaking of confusion: Figure 11, announced as Alternanthera philoxeroides, answers this species as for the details, but the habit lacks the axillary, stalked inflorescences with inconspicuous bracts, and rather looks like Enydra fluctuans (Compositae). I do not venture further on this, let us say aquatic, terrain. If the book is found useful by those who must work with it, so much the better. — M.J.

SMITH, A.C., Flora Vitiensis Nova: A new Flora of Fiji (Spermatophytes only), Volume 1, 495 p., 101 fig. incl. maps, photogr., partly in col. (1979, Pacific Tropical Botanical Garden, Box 340, Lawai, Kauai, Hawaii 96765, U.S.A.). Hardbound cover. US$ 48.00 postpaid.

Welcome to the long-awaited first volume of the new elaborate Flora of Fiji, the author's life-work! It embraces the Gymnosperms and Angiosperms and is preceded by an interesting nearly 90-page Introduction including the plan of the work, an explanation of the treatment of vernacular names, brief outlines of vegetation types, geomorphology and geology, climate, and a detailed history of exploration.

The sequence of the families is following Takhtajan's scheme; keys to phyla, orders and families are interspersed in the text. Of each species there is a full synonymy, typification, distribution, local name and uses, and an account of available collections. Of common species, of which sometimes hundreds of specimens exist, a choice has been made and only one specimen has been cited for each island or province. In genera with more than one species, stress is laid on the generic description and the key; the proper specific description is supplementary and brief. Under several species there are critical notes and additional information and argumentation. There are of course quite a large number of introduced species, old and newly arrived. Remarks are made on the date of introduction; it would have been handy if they had been marked by an asterisk, to facilitate perusal of the native species.

In the Introduction it is indicated that delimitation of taxa follows the splitting tendency in all ranks. A few families were entrusted to collaborators: Araceae by D.H. Nicolson, Cyperaceae by T. Koyama, grasses by J.W. Parham, and palms by H.E. Moore Jr.

The present, magnificently printed work is of great advantage to Pacific botany with which both the author and its sponsor, the Pacific Tropical Botanical Garden is congratulated. — C.G.G.J.van Steenis.

SOERJANI, M. e.a. (ed.), Weed problems in Southeast Asia, vii + 343 p. BIOTROP Bulletin 11 (1979, BIOTROP, Box 17, Bogor, Indonesia). Paper. US$ 16.00, incl. postage, acc. 00.11.128 Bank of America, Medan Merdeka Utara, Jakarta, Indonesia.

This is the proceedings of the Weed Conference held in Yogyakarta in 1973, under the aegis of the Weed Science Society of Indonesia*. Agricultural land occupies only 6.8 % of Indonesia. Weed control by herbicides was at the time just beginning; in 1972 Indonesia spent c. US$ 1 million on such imports, which still were (reservedly) welcomed. Presumably, after the oil crisis of 1973, the problem of herbicides vs. employment looks different.

Going through this volume as botanists for Malesia, we find as the most interesting contents: Striga asiatica (Scroph.), a hemi-parasite, is in Java but of local significance. Control of the noxious Cyperus rotundus (Cyp.) is very difficult and best achieved by clipping. Salvinia molesta (fern), introduced from South America through the Bogor Gardens in 1950, has already become a pest in open water and lowland rice fields in Java and S. Sumatra: paper by N g u y e n - van-Vuong (p. 99-114). A key is given to 30 species of weed seedlings. Another key is given to weed families in SE. Asia, 68 of flowering plants (including Anacardiaceae, Myricaceae), 17 of algae, bryophytes and ferns: by J. V. P a n c h o (p. 139-149). Besides a brief account on rice weeds in Laos, there is a more extensive one on S. Vietnam in five kinds of rice field by N g u y e n - van-Vuong (p. 155-161). For Cambodia, 63 sp. are listed. Seed germination is described of Chromolaena odorata (Compos.), name not in Flora of Java but synonymous with Eupatorium. So is that of Euphorbia geniculata, correctly E. prunifolia. Eichhornia crassipes (Ponteder.), not known to set fruit in Malesia (Fl. Males. i 4: 260), was found to produce viable seed from artificial pollination and perhaps from insect pollination too: paper by A. D j a l i l (p. 181-188). The floating islands in the Rawa Pening (35 km S of Semarang, Java) are described. Of 8 Salvinia (fern) species, a world range map is given (p. 228), and a detailed map for the 3 species in Java, in a study on competition, by N g u y e n - van-Vuong & T. S u m a r t o n o. Alang-alang can be overgrown by Eupatorium odoratum (Compos.), which is followed by young secondary forest, paper by J. H. H. E u s s e n & S. W i r j a h a r d j a (p. 245-251). Root systems and their competition are described and drawn for Artemisia (Compos.), Borreria (Rubiac.), Drymaria (Caryoph.), Panicum, Paspalum and Setaria (Gram.), by A. S o e d a r s a n e.a. (p. 273-277). Bryophytes were collected in a tea plantation in Central Java: 15 sp. and listed, by J. V. P a n c h o (p. 279-282, 11 fig.).

Production is good. — M.J.

Tree Flora of Malaya. A manual for foresters. Edited by F. S. P. N g, written principally at the Forest Research Institute, Kepong, Selangor, Malaysia, for the Forest Department of Malaysia. Volume 3, 339 p., illus. (Dec. 1978). M$ 65.00 (locally).

The first and second volume of this important work were published in

* The 121 participants are listed with address on p. 321-326.

rapid succession in 1972 and 1973 and have been reviewed extensively in this Bulletin on *pages 2060-2061* and *2227-2228*.

For several reasons the publication of the third volume was obviously delayed and we are glad that the difficulties with the compilation could be overcome. For a few families the delay also had a beneficial effect in that in the interval monographs of these families were published of which the authors of the Tree Flora could have the benefit.

Mr. K.M. Kochummen has covered the largest part of the text in treating several large families, being responsible for Bignoniaceae, Connaraceae, Cornaceae, Icacinaceae, Moraceae, Myrtaceae, Symplocaceae, and Verbenaceae. Dr. Francis Ng revised Casuarinaceae, Ebenaceae, Ericaceae, Ochnaceae, Violaceae, and Styracaceae (with F.E. Putz). Further contributions are by Mrs. Ruth Kiew (Aquifoliaceae), Dr. Stone & Dr. Frodin (Araliaceae), and Prof. Hsuan Keng (Theaceae).

The style used is the same as in the first two volumes, with full bias on the vegetative and field characters (bole, bark, and crown) and notes on distribution and ecology, seedlings, saplings, and economic uses.

Work on the final volume 4, which will cover 24 families, has already started; among these families are important and large ones such as Anacardiaceae, Lauraceae, and Meliaceae. — C.G.G.J.van Steenis.

TROLL, C. & W. LAUER (ed.), Geoecological relations between the southern temperate zone and the tropical mountains, xxx + 563 p., 69 pl. (1978, Steiner, Box 5529, Wiesbaden, B.R.D.). Cloth. DM 197. Erdwissenschaftliche Forschung vol. 11.

Carl Troll, who died in 1975, was Chairman of the International Geographical Union Commission on High Altitude Geoecology, which organized this symposium in 1974. He extensively toured the Andes and eastern Africa, became impressed by the similarities in life forms between the two, and also fascinated by the interplay of altitude, latitude, and seasonality. This symposium bears the mark of his predilections. Malesia (where the mountains are far more humid) figures in the papers to a much smaller extent; New Zealand fares better, and the subantarctic islands play a major role.

Geoecology looks for broad resemblances and interpretations and there is no lack of them, although most papers do contain valuable original matter. Quite a few deal with climatology, many touch on plant distribution, some on life forms, four deal with zoological subjects. There is not much on plant areas, nor in the field of geological and plant geographical history. Out of the 30 contributions, 20 are in German — actually the title of the book is bilingual — 8 in English, 1 in French, 1 in Spanish; only 11 carry a summary and there is no overviewing introduction. The photographs have been printed at the end of the book, four on a page, at standard size of 6½ by 10 cm, which does them little justice.

Some papers have a direct interest in our region; these we mention. U. S c h w e i n f u r t h (Südasieninstitut, Box 10 30 66, Heidelberg, B.R.D.), Geoökologische Beziehungen zwischen der temperierten Zone der Südhalbkugel und den Tropengebirgen im australasiatischen Sektor, p. 29-

48, 1 fig. + phot. 1-14, compares canopies of forest formations in cooler climates, with reflections on exposure and seasonality. English summary is given. E. J. G o d l e y (Botany, Scientific & Industrial Research, Christchurch, New Zealand), Cushion bogs, p. 141-158, 3 fig. + phot. 103-112, is confined to bog-forming cushion plants (those in The Mountain Flora of Java, phot. 20 and 50 are in dry habitats). Their habit is characterized by a continuous surface. Bog cushion plants are a typical southern hemisphere phenomenon, crossing the equator in Malesia and the Pacific. In Malesia (where 9 species are listed) they occur on the high mountains of New Guinea, Celebes, the Philippines, Kinabalu, and northern Sumatra. In New Zealand there are 10 sp., in Tasmania and Australia 8 sp., in S. Chile and the equatorial Andes (with an unexplained large gap between them) 8 sp., from Juan Fernandez, Tahiti and Hawaii also species are reported. Emphasis is on distribution, not on ecology. Dispersal might have been effected by birds. The New Guinea migration track of mountain plants into Malesia is however not discussed. A table lists other genera in the same habitat. References 47. R. J. H n i a t u k (Herbarium, George Street, South Perth 6151, Australia), The growth of tussock grasses on an equatorial high mountain and on two subantarctic islands, p. 159-190, 9 fig. + phot. 113-122, is a study on leaf area and bioproductivity on Mt. Wilhelm in New Guinea at 3200-4380 m in Deschampsia klossii, and on Campbell and Macquarie I. at 50-55°S in Poa foliosa; in the subantarctic islands the bioproduction was much greater.

H. S c h w e i n f u r t h - M a r b y (Südasieninstitut, Box 10 30 66, Heidelberg, B.R.D.), Ueber Verbreitung und klimatische Voraussetzungen des Teeanbaus im austral-asiatischen Raum und auf den Inseln des Indischen Ozeans, p. 415-440, 5 fig., discusses the occurrences of tea cultivation (up to 2800 m) in relation to climate. Differences are reflected in harvest pattern, organisation and quality. Details on Ceylon are given. Summary in English. — M.J.

VERDCOURT, B. A Manual of New Guinea Legumes, 645 p., 149 page-size fig., map (1979, Office of Forests, Division of Botany, Lae, Papua New Guinea). Bot. Bull. no. 11.

This work is a boon to Asian and Malesian botany in particular. It covers 115 genera with some 440 species, including naturalized and cultivated species. Descriptions are excellent and are often followed by notes; many keys are given, sometimes also double ones (for flowering and fruiting material, separately, e.g. for Mimosaceae), enhancing the practical value of the work. Of course many genera (55) are merely represented by one species, or by two (16), or three (14). The largest genera are Archidendron (almost endemic) with 44 species, Desmodium 37, Cassia 27, Crotalaria 23, Mucuna 17, Acacia 14, Albizia 13, Derris 13, Maniltoa 12, Tephrosia 12, Indigofera and Vigna both 10. Distribution and ecology are concise but clear. References are extremely concise; basionyms are generally omitted and no earlier literature referring to Papuan plants is mentioned, all this obviously for keeping the text within bounds. A benefit is further the excellent illustrations, many of which are new. Botanically another great benefit is the reduction of

quite some names and the discovery of several distinct new records of species and genera.

The account, which the author made in an astonishingly short time, is of course tentative, and in many genera there are unnamed specimens or taxa (taken up in the keys) which wait further revision, e.g. Adenanthera, Albizia, Archidendron, Crudia, Cynometra, Derris, Kingiodendron, Maniltoa, Mucuna, Pithecellobium and Zornia.

A few remarks: Verdcourt appears to have a tendency to rather small generic and specific concepts. The senior undersigned cannot quite well understand why he accepts Mezoneuron on the argument that its reduction must wait for a general review of Caesalpinia, since Hattink has shown that the only character separating Mezoneuron from Caesalpinia is the wing on the pod, and that with gradations; no revision will change this fact.

A few authorities are wrong: the combination Peltophorum pterocarpum (DC.) is not by Heyne, but by 'Backer ex Heyne'; the botanical basis and name-giving of Heyne's work, influencing also that of Burkill's Dictionary, is entirely by the great C.A. Backer, who laid in his 'Schoolflora voor Java' (1911) the basis for leguminous botany in Malesia, on which Heyne, a chemical engineer, entirely depended. Also the combination of Pueraria pulcherrima (Koord.) is not by Mrs. Koorders-Schumacher, but by Merrill, as stated in her work; she was a devoted housewife lovingly administering her husband's herbarium.

Unfortunately Verdcourt did not visit the Bogor Herbarium when returning from Papua New Guinea. This herbarium contains quite a number of unicates and undistributed collections, which should have been consulted. The last (115th) unnamed genus could have been identified with both versions of the key to the genera of the Southeast Asian Leguminosae-Faboideae, prepared by the junior undersigned (1976, 1978).

These remarks are of course very minor things compared with this magnificent effort for which we tender our warm congratulations and appreciation. — C.G.G.J.van Steenis & R.Geesink.

VOGEL, E.F. de, Seedlings of dicotyledons / Structure, development, types / Descriptions of 150 woody Malesian taxa, 465 p., 178 fig. + 20 col. pl. (1980, PUDOC, Box 4, Wageningen, The Netherlands). Cloth. Dfl. 150.

In March 1979 De Vogel obtained his Ph.D. degree at Leiden University on a thesis entitled Seedlings of dicotyledons / Structure, development, types. It was published in a limited edition, consisting of the preprinted pages 1-149 of the present book, less the colour plates but plus xiv pages of curriculum vitae and long summary in Dutch, and at the end a selection of drawings from the present book, followed by an index. The present book therefore supersedes the thesis.

As for both form and contents this book has been grafted on the seedlings book by D. B u r g e r of 1972. This was brought out by the same publisher and early in 1980 was still in stock (Dfl. 60). Burger's book (reviewed on *pages 2209-2210*) deals with 188 sp. in 132 genera in 51 families; De Vogel's book deals with 150 sp. in 133 genera in 52 families (Gonystylaceae are separate, Leguminosae count for 1). He carefully

avoided duplication with Burger: where genera recur, it is with a different seedling type. He also reached a higher degree of sophistication: descriptions have been somewhat better edited, documentation is more professional through selection of references and citation of specimens (see Appendix below) and better adapted to demand by outlining under each genus the area. This very much indicates the regions to which each item is applicable, since often the seedlings of one genus closely resemble each other — although for instance in Eugenia there are 5 different seedling types, in Linociera and Sterculia 4.

Even more than did Burger, De Vogel obtained his species from the lowland rain forests: trees of various stature as well as lianas (14 genera, to which the habit should have been noted), with sizeable seeds. In 11 stations in Sumatra, Java, Borneo, Celebes and the Moluccas, he copiously gathered seeds, voucher and other herbarium material. Dr. J. D r a n s f i e l d also contributed; the book is in fact based on their collections and some trees in the Hortus Bogoriensis.

The book is a real bargain, if one realizes that for 1 Dutch Guilder the buyer obtains one page of the highly original General Part, and one seedling taxon fully described and figured, in several stages. The argument that this book is too expensive for the country it applies to was met by the Indonesian Council of Sciences (LIPI) which purchased a good number of copies for internal distribution. It was a Leiden-Bogor venture throughout, as is described in the General Part, and also on *pages 2173-2174*.

The originality of the General Part consists in the author's digest of literature in the first place: 190 references are listed, and they cover seedling literature from the beginning, and worldwide. (At Leiden, De Vogel keeps a file of published seedling data, which is well worth of conversion into an annotated index.) He unearthed, and here recounts in a historical review, important work by G. Klebs (1885) and I.T. Vassilczenko (1936-1947). All important classifications of seedling types are summarized, and through an extensive examination of seedling morphology, De Vogel arrives at a new and comprehensive classification of seedlings into 16 types and 9 subtypes. They are described in no particular order, and incorporated into a key; they have been named after a genus, e.g. Macaranga type (number 1, the commonest). It turns out, however, that virtually all (sub)types can be derived from one another, and author proceeds to bring them into a system, on account of developmental features rather than of static morphology. Indeed, the customary subdivisions between epi- and hypogeal, crypto- and phanerocotylar, are here abandoned. Main distinctions are made between cotyledon types, which may be food-storing or haustorial. De Vogel also found that besides these cotyledons, also paracotyledons may play a role, namely when the true cotyledons are almost vestigial, they are soon replaced by the first pair of leaves which look and behave like true cotyledons, being green and leaf-like.

In his system of seedling (sub)types, De Vogel pointed out the 7th or Horsfieldia type as the most primitive; it is noteworthy that this concurs with E.J.H. Corner's vision (Seeds of Dicotyledons 1, ch. 5. 1976) that its family, the Myristicaceae, has also the most primitive seeds. In

a list of families, the about 450 Malesian genera of dicots of which the seedling is known, are referred to (sub)type.

Links with seed structure have, however, not been sought, and this also holds for tree architecture. Certainly in this no man's land interesting explorations can now be made. But within its own limits, the subject has been well-elaborated, along lines which make this book of particular value to the forester: the sections on seedling type and vegetation, and on seedling survival give most interesting observations, and point to promising lines of further enquiry.

All figures in the Special Part are by Moehamad T o h a, whose watercolours in The Mountain Flora of Java (1972) earned him fame the world over. His consummate artistry shines through the work (only some diagrams in the General Part were done by others). There is drama in the emergence of the seedling, for instance in Fig. 6, Terminalia catappa; Fig. 126, Chisocheton pentandrus; Fig. 129, Sandoricum koetjape; or Fig. 142, Helicia serrata. Problems of reduction were elegantly solved by addition of a centimeter scale which always departs from soil level. The colour plates are, in part, a sort of encore: some seedlings were also done in black and white, they are less analytical but splendidly bring out the spectrum of colours seedlings may have. Although the plates do bear numbers, no reference is made to these in the text itself; readers should beware of this.

Altogether, the book is a real gold mine of fact, and the first one to give an overview over the whole realm of seedlings. Production is excellent: another fine outcome of Dutch-Indonesian cooperation.

A p p e n d i x : unidentified species.

Not all seedlings described and depicted have been identified down to species. They can be identified later, through the collection number which has always been cited. Without such identification, these precious data are in danger of neglect. We therefore list these taxa, under family, with collection. Annonaceae: Polyalthia (de Vogel 1603); Celastraceae: Salacia (Dransfield 2538); Dipterocarpaceae: Shorea (Hort. Bogor. VII C 2); Guttiferae: Garcinia (Hort. Bogor. VI C 244); Ebenaceae: Diospyros (de Vogel 2556); Euphorbiaceae: Mallotus (de Vogel 1528); Lauraceae: Cryptocarya (de Vogel 2628); Leguminosae-Papilionaceae: Ormosia (Dransfield 2389); Loganiaceae: Strychnos (de Vogel 2363); Magnoliaceae: Talauma (de Vogel 2197); Meliaceae: Dysoxylum (de Vogel 1028), and one more Dysoxylum (de Vogel 1228); Myristicaceae: Myristica (Hort. Bogor. IV 6 73); Myrtaceae: Tristania (de Vogel 1438); Rubiaceae: Morinda (de Vogel 2488) and Pavetta (de Vogel 1840); Sapotaceae: Planchonella (de Vogel 1376); Vitaceae: Tetrastigma (de Vogel 2199). Through the Index in De Vogel's book they are easily located. — M.J.

Wealth of India. In earlier numbers of the Flora Malesiana Bulletin we have reviewed the volumes of this important work dealing with the economic products of India, in which plants play of course an important role. Unfortunately the earlier two volumes I and II were exhausted. We can now announce that this is overcome and that they have been reprinted and are available through Sales & Distribution Section, Publ. & Inform. Directorate, Hillside Road, New Delhi 12, India.

WU, C.E. (chief editor), Flora Yunnanica. Vol. 1 & 2, 870 p., 192 fig. & 889 p., 221 fig. (1977 & 1979, ed. by the Yunnan Institute of Botany at Kunming, Yunnan, China; available with Guanghwa Company, 7-9 Newport Place, London WC2). £ 8.55.

Various botanists of the Yunnan Institute of Botany at Kunming, Yunnan, are working together on the project of a new comprehensive Flora of that large province of China. It is of particular interest for Malesian botany, because Yunnan is probably botanically the richest province of China, very large and very varied, with many features in common with both lowlands and mountains of tropical Southeast Asia and Malesia.

It is written in Chinese. Families are numbered but not published in numerical sequence; the manuscripts are printed when they become available. All treatments are provided with full descriptions of taxa of all ranks and with keys; full-page, excellent figures illustrate the work. Observing scope and style the entire work is estimated by the chief editor at about 20 volumes. It seems to be well proceeding.

In the first volume the following families are treated: Actinidiaceae, Burseraceae, Buxaceae, Cannabaceae, Cardiopteridaceae, Chloranthaceae, Combretaceae, Davidiaceae, Hamamelidaceae, Icacinaceae, Iteaceae, Labiatae, Meliaceae, Myristicaceae, Myrsinaceae, Nyssaceae, Passifloraceae, Phrymaceae, Phytolaccaceae, Plumbaginaceae, Proteaceae, Rhizophoraceae, Sapindaceae, Sapotaceae, Simaroubaceae, Sargentodoxaceae, Symphorematacеae, and Verbenaceae.

In the second volume the following families are treated: Anacardiaceae, Araceae, Araliaceae, Bignoniaceae, Capparaceae, Clethraceae, Convolvulaceae, Cuscutaceae, Fagaceae, Hydrophyllaceae, Lardizabalaceae, Lobeliaceae, Malvaceae, Melastomataceae, Musaceae, Papaveraceae, Podoaceae, Polemoniaceae, Rafflesiaceae, Solanaceae, Staphyleaceae, and Sterculiaceae.

We admire this colossal effort, regretting not to be able to have the full benefit of the Chinese-written text. The work contains descriptions of a good many new species and infraspecific taxa, new combinations, and even some new genera. From the new combinations one can glean which authors are responsible for which treatments; at the end of volume 2 their names are cited (in Chinese). References are scant, and often only the year of publication is given, obviously in anticipation of a large bibliography to be published in future. Also we get the impression that several manuscripts of the now printed revisions were written and finished several years ago, but not updated with current work and literature. — C.G.G.J.van Steenis.