XII. REVIEWS AND NOTICES

ASHTON,Peter & Mary (ed.), The quaternary era in Malesia, being the Transactions of the Second Aberdeen-Hull Symposium on Malesian Ecology, Aberdeen 1971, 122 pp. (Dept.of Geography, Univ.of Hull, 1972).

A paper to elucidate the late-Tertiary history was delivered by J.Muller. The era itself is the subject of papers by P.S.Ashton, by J.R.Flenley (see Bibliography), and by Lord Medway on the animals. Plenty of maps, pollen diagrams, and references are given; the discussions, long and high-level, have been recorded. The 'Epilogue' gives a fine summary of the Quaternary era, here copied:

"Though this review emphasises how fragmentary our knowledge of the Quaternary history of South-east Asia is, it nevertheless presents what are probably all the essential events of that period which have determined the nature of the biomes that now exists there. These build up what at first appears to be a conflicting picture:

On the one hand Lord Medway, with additional support from Dr. Wells in discussion, has provided indisputable evidence that a significant part of the obligate grassland fauna of the Continental Asiatic Middle Pleistocene Savanna penetrated to Java; the essentially seasonal climate of this habitat must therefore at least once also have straddled the equator through Sundaland during the Pleistocene. Further, Dr. Flenley has shown that significantly lower mean annual temperatures, perhaps as much as 5° C less than at present, obtained in the mountains of New Guinea as recently as c. 12000-8500 years B.P.

Yet it also remains a fact that the lowland Mixed Dipterocarp forest of western Malesia is uniquely diverse. Not only must it have its origin long before the Quaternary period, but the many widespread hill species persisting throughout the region must have evolved before the uplands of Borneo became separated from those of Malaya and Sumatra by the great south-west to north-east trending river valleys that bisect the interpluvial Sundaland land-mass. These valleys are probably at least as old as the Lower Pleistocene, so that extensive rain forests must have persisted in each of these uplands since that time. At present the Mixed Dipterocarp forests are strictly confined to non-seasonal climates, while they, and even the floristically very different and impoverished Semi-evergreen Dipterocarp forests of more seasonal West Java and the Indo-Burmese region, are confined to areas where the lowest mean monthly temperatures are at most 5° C lower than that pertaining today in lowland Malaya or Borneo.

How then has this remarkable vegetation persisted, apparently relatively intact and apparently widespread, through-

out the Pleistocene? How, too, has the extraordinary local endemism of the North-west Borneo lowlands been able to survive and to evolve since Middle Pleistocene times? The periods of lowered temperatures have coincided with periods of lowered sea levels, so that, if the mean annual temperature was no more than 4° lower than present, as seems probable, this paradox would seem more apparent than real; further, it is yet to be established whether lowland temperatures were depressed to the same extent as those in the mountains. But the problem of periodic seasonality remains.

Lord Medway suggests that a heterogeneous patchwork of forest and savanna obtained in Sundaland during periods of continentality. The simplest illustration may be found by comparison with a tropical continent whose present physiography and disposition resembles that of the Sundaland continent of the interpluvials. The northern half of South America, with its eastern coasts receiving the rains of the trade winds off a great ocean, and with the Orimoco and Rio Negro to the east of the Andes much as the great rivers of Sundaland in their valleys east of the Barisan range must have been, makes a remarkably similar comparison (though Sundaland was never as large a continent and was therefore probably never as seasonal). The Guiana Highlands and Andean foothills support luxuriant mixed rain forests in an essentially non-seasonal climate, yet extensive though discontinuous savannas occupy the plains. The continuity of the grassland habitat there is to a large extent achieved not by savanna, but by the seasonally inundated grasslands of the vast floodplains. Such seasonal grasslands, dependent on a seasonal climate in the catchments of the great rivers, could yet have provided a corridor of grassland through Sundaland even were the climate too moist for the maintenance of fire-induced savanna; presumably dry land grasslands, maintained by the browsing activities of the grassland animals themselves would have bordered the marshlands and supported this fauna during the flood season. The Mixed Dipterocarp forest would have remained in the moist foothills of the mountain masses and in the low hills bordering the weather coast of the receded China Sea and Indian Ocean. These swampy grasslands still, indeed persist as isolated refugia in South-east Asia: in the Kaziranga Sanctuary, Assam, the Indian rhinoceros still lives in the grassy marshlands of the Brahmaputra floodplain, while the riverbank dipterocarp Vatica lanceaefolia Bl. (recorded from Middle Pleistocene Java), is now confined to the semi-evergreen forests nearby, surviving relics of the Trinil fauna and flora."

DICKERSON,Roy E., Distribution of life in the Philippines, 322 pp., 64 fig., 42 pl. (Manila, Bureau of Printing, 1928; reprint Bookmark, P.O. Box 1171, Manila), paper US$ 5, cloth US$ 8, excl. postage. For discounts see page 2395.

Like perhaps the general chapters on the (bio)geography of the Philippines in Merrill's Enumeration 4 (1926), this work was born in a series of monthly talks by a number of scientists at the Bureau of Science, Manila, in 1921-23. There were E.D.Merrill the botanist, W.Schultze entomologist, W.D. Smith geologist, R.C.McGregor ornithologist, A.W.C.T.Herre ichthyologist. E.H.Taylor herpetologist, who all contributed from their specialty, as Dickerson himself did on mammals. In connection with this, only the most important literature has been (briefly) cited.

Many of the data and conclusions can also be found in the Enumeration which preceded this book by two years, yet the latter contains so much more (not reckoning the chapters on plant names, history of botanical work, and bibliography found in the Enumeration only), that it is well worth having besides. The main subjects dealt with here and not or sketchily in the Enumeration are: Descriptions of the larger islands, Geological history, Paleoclimate, oceanography here called Hydrology, Main vegetation types, Seed dispersal, and main Animal groups (212 pp. vs. 18 pp.).

Plant-geographical considerations are here limited to relations with Formosa and Celebes (almost verbatim, and with but small changes in the plant lists), while the Enumeration discusses relations with mainland Asia, Borneo, west-Malesia as a whole, Australia and the SW. Pacific. A floristic analysis of the Luzon mountain flora is given here and not in the Enumeration. Merrill made some signed contributions to this book: p. 289, 301.

The fine original typography has been well reproduced, and so have the many maps and other line illustrations; photographs are tolerable, the few colour plates recognizeable. Paper and binding (hardcover anyway) are excellent. I have looked a long time for a book in print on Philippine biogeography; now I have one that seems practically as good as when it was written. — M.J.

EVERIST,S.L., Poisonous Plants of Australia, xvi + 684 pp., 42 fig., 60 black & white photogr., 64 col.photogr. (Angus & Robertson, Sydney, 1974), 8°; clothbound A$ 40.

A most comprehensive work printed in an excellent way. It starts with general introductions on the history and economic importance of poisonous plants in Australia, poisoning being partly due to land use; from evidence of and factors affecting toxicity it appears that in several cases actual constit-

uents are yet unknown; methods of investigation; survey of toxic substances in plants and their chemistry; prevention and treatment.

In section 2 the genera and species are treated, arranged within families (according to Shaw/Willis, 1966), in alphabetical order: seed plants, pteridophytes, fungi, algae and lichens, including native, introduced and cultivated plants. Under each is a brief description, distribution, habitat, notes on toxicity, prevention, treatment, toxic principles, and often reports of case histories.

Many plants are inserted which are known to carry toxic principles but of which no actual cases of poisoning are reported. This section occupies naturally the larger part of the book. It is followed by 3 appendices, all tabulations in alphabetical order of generic and specific names: (i) the distribution of toxic plants in the states of Australia, (ii) toxic plants in Australia with the symptoms and/or lesions, and (iii) the same plant list indicating which toxic substances the plant possesses. One index is given, including both Latin and vernacular names, toxic substances etc.

Although primarily an indispensable work for Australia and Australians, it contains a wealth of information of interest to others.

Two slight remarks to improve the use: it would have been advisable to print on the line behind the name of each species a reference to the figure or photograph and the latter, coloured and black & white, and the pictures, should have been numbered in one series. One can of course find this in the index, but a direct reference is more useful. Also in section 2 the head-line could have been used for printing the family names which would make consultation easier.

Our congratulations to the author for this excellent major work. — van Steenis.

FLETCHER,H.R., A quest of flowers / The plant explorations of Frank Ludlow and George Sherriff / told from their diaries and other occasional writings, xxix + 387 pp., 20 maps, 106 photogr., portr., 7 col.photogr. (Edinburgh Univ.Press, 22 George Square, Edinburgh, U.K., 1975), £ 10 net.

L u d l o w was the scholar, S h e r r i f f the soldier; they met in 1929 and together made six remarkable expeditions in Tibet and Bhutan, collecting mainly plants (c. 21,000 numbers) and birds. They were pioneers of sending living plants by air to Britain, but somehow not many of their introductions succeeded (p. 362). Each expedition is the subject of a whole chapter, with an Interlude 1942-45 by Betty Sherriff describing how the war years were spent in Lhasa, the capital of Tibet. A Historical Introduction by Sir George

Taylor, who for sometime was with them and knew them well, briefly accounts for previous efforts in the same area.

The present book, very well-produced, seems intended to be read by a good fire with a glass of punch, recalling those golden days when courageous Britons went out all over the Empire, for plant hunting in hazardous places. From paging through the book, I got an idea that their booty is now in the British Museum, but could not find an indication about duplicates, although this may be concealed somewhere in the text. In general, it is very hard to look up the facts that botanists want. For instance, I could not find where Ludlow was born and when, only that he died in 1972, at age 86. With Sherriff I was luckier: born 3 May 1898 in Scotland, thanks to an obituary (he died on 19 September 1967) by Ludlow, J.R. Hort.Soc. 93 (1968) 11-19, map, which is very useful as a summary of the present book – where, however, no reference to this obituary was found. The maps give no longitude and latitude, there is no indication of their completeness, nor is there a reference to the original maps used by the two explorers, or an index to localities. With its facts inaccessible except by digging, this book, long-winded as it is, shuts off the past instead of opening it up. On this point, the comparison with Schweinfurth's work is almost too painful. — M.J.

Flora of Taiwan, volume 1 (1975) 12 + 562 pp., 195 pl., 13 photogr. (12 in col.). clothbound US$ 22. To be ordered from Epoch Publishing Company Ltd., P.O. Box 1642, Taipei, Taiwan. If payment accompanies order postage is for publisher; prepayment is required from all individual subscribers.

An ardent wish for this Flora expressed in this Bulletin (pages 1562-67) is fulfilled, as in a folder is announced that 6 volumes are planned to be published in a short period: vol.2 autumn 1975, vol.3 winter 1975/76, vol.4 spring 1976, vol.5 summer 1976, vol.6 autumn 1976, all of c. 500 pages, except volume 6 containing the bibliography and a checklist of Taiwan plants. Obviously texts were ± ready as of each volume the approximate number of printed pages and drawings was announced. Printing was obviously retarded, as at this moment (March 1976) only volume 1 was received.

The lay-out of the work gives all that from a concise local Flora can be expected; also paper, printing, plates leave nothing to be desired. The price for such a large volume is very moderate. The preparation of this work has been sponsored jointly 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 Penn-

sylvania, Dr. T.Koyama, N.Y. Botanical Garden, and Dr. Ch.E. DeVol, Prof. Tang-shui Liu and Prof. Tseng-chieng Huang, all of the National Taiwan University at Taipei. The contributions are signed.

The present volume deals with the Pteridophyta and Gymnosperms.

After the preface follows a brief Introduction of 13 pages on the physiographical features of the island and its vegetation, preceding the Flora proper.

In both phyla there is a key to the families, and within families keys to genera and species. Synonymy is restricted mostly to the Taiwan flora; it would, however, have been appropriate if consistent reference had been given to recent monographs, e.g. to Copeland's work on Hymenophyllaceae, Kramer's revision of Lindsaea, etc.

Descriptions are given of families, genera and species, in about 6-10 lines. Of most genera there is a plate with habit and good details. Distribution is given of each taxon, but unfortunately ecological data are hardly given and no altitudes are mentioned. Rather surprisingly specimens examined are cited.

Whereas it is announced that for the sake of convenience the system followed for the Spermatophytes will be Engler's Syllabus of 1964, it is not clear which fern system is followed; obviously it agrees largely with that of Pichi Sermolli. Generic distinctions are finely knit, all of Ching's split genera from Athyrium, Holttum's fine division of Thelypteridaceae and Copeland's genera of Hymenophyllaceae are adopted. Probably this is also largely done for convenience; it must be admitted that in a few cases some personal comments or notes are given, but they are few and very succinct. For a local Flora one cannot reasonably expect otherwise. It leads however to certain discrepancies. For example, in Ophioglossaceae, Ophioderma is kept separate from Ophioglossum, to accommodate O. pendulum, following Clausen's work, but Lycopodium is kept in the wide sense, with its many segregates as sections. In passing it may be remarked that the key to Ophioderma-Ophioglossum is omitting the essential difference between these two taxa and also is deficient in that certain forms of O. pendulum may be terrestrial (cf. Wieffering's revision of Malesian Ophioglossum in Blumea 12, 1964, unmentioned).

It is true that a local Flora is primarily a means for instruction and mainly for identification, and therefore requires a good specific distinction. In this important point, as far as can be judged, the species concept adopted is generally sound and gives proof that the necessary comparison with related taxa in adjacent countries has been made. This

was especially necessary as previous workers on the Taiwan flora had frequently neglected this basic procedure, which resulted in description of many 'pseudo-endemics'.

The account of the Pteridophyta comprises the distinction of 37 families, 159 genera and 565 species, not including varieties and subspecies. There is a light sprinkling of new combinations.

This large work fills an important gap in the knowledge of East Asiatic Pteridophytes, in addition to the existing works on China, Hainan, Japan, the Philippines, Indo-China, and Malaya. And we want to express our warm appreciation to the authors for compiling it, especially to Dr. DeVol, who has, through the years, in precursory papers in Taiwania strived towards this goal. A valuable asset to East Asiatic botany.

About the Gymnosperms little needs to be said. The set-up is comparable with that on ferns; we would have wished somewhat more ecological data; they have been treated before in the works of Kanehira, Liu, and Li.

We end with the hope that the ambitious plan of publishing the other volumes in a few years will be realized. — E.Hennipman, G.J.de Joncheere, C.G.G.J.van Steenis.

HO,Pham-Hăng, An illustrated Flora of South Vietnam, vol.1 (1970) 1115 pp., fig. 1-2787, vol.2 (1972) 1137 pp., fig. 2788-5272.

This work is reviewed in J.Jap.Bot. 50 (1975) 316. The reviewer stated that he received a copy of Flora (written in Vietnamese) from a friend in Korea. It consists of descriptions, illustrations, and keys to the genera and species of the South Vietnamese plants. The groups of plants recorded in this 'Flora' are: Fungi 48 spp., Lichenes 12 spp., Bryophyta 22 spp., Pteridophyta 122 spp., Gymnosperms 35 spp., and Angiosperms 5135 spp. It is convenient for using together with Lecomte's Flore d'Indo-Chine. — van Steenis.

Iconographia Cormophytorum Sinicorum, vol.3 (1974) 1083 pp., 1460 fig., vol.4 (1975) 932 pp., 1416 fig. (Institutum Botanicum, Academia Sinica, Chao Yang Gate 137, Peking).

Of this important flora series we gave a full account of volumes 1 and 2 in this Bulletin on page 2216. It is a pleasure to see that the two concluding volumes, both on the Sympetalae, Ericaceae to Compositae, so soon followed, bringing the total number of species and figures up to 5414. They have the same merits as the two earlier volumes.

In a number of families keys go only to the genera, e.g. Bignoniaceae, Pedaliaceae, Gesneriaceae, Acanthaceae, or include only an account of species in a few genera, like Rubiaceae. — van Steenis.

JANZEN,D.H., Tropical blackwater rivers, animals, and mast fruiting by the Dipterocarpaceae. Biotropica 6 (1974) 69-103.

Blackwater rivers usually flow from extremely poor soils, e.g. in Bako National Park in Sarawak. On the Rio Negro in South America, Spruce observed a century ago that such waters are mosquito-free. In general, they are poor in life, due to their abundance of phenolic compounds which are toxic to animals; fish in such rivers are often air-breathers. The phenolics are produced as secondary metabolites by the plants in the catchment area. Janzen in this paper works out the idea that under everwet oligotrophic conditions such secondary metabolites have survival value. Plants in such terrain have mostly small, stiff, leaves with a heavy cuticle which decompose very slowly. Inorganic matter thus liberated, has time to be taken up by the roots again, instead of being taken away by the heavy rainfall in the run-off. The toxic substances contained in the foliage and fruits discourage animals to feed on plant matter which is produced with utmost economy and cannot therefore be tolerated to be carried off by animals.

Such areas, in all everwet tropical areas, are taken to be remarkably poor in resident animals, with consequences for pollination and dispersal. Janzen observes that in Bako National Park Casuarina (not a gymnosperm! p. 79) and Dacrydium abound, which are wind-pollinators, that lianas are rare and young flush is seldom seen, as poverty of the soil will not permit such fast growth. There is also an abundance of carnivorous plants and ant-epiphytes; the latter have been suspected by Janzen in an earlier paper to receive nutrients from their hosts. As a result from what seems a directed effort to keep animal populations low, seed dispersal is minimal and regrowth slow, but it seems more necessary to prevent the animals from eating precious leaves and fruits.

From this same need stems, in the author's view, the gregarious (by him called mast) fruiting of dipterocarps. Regular fruit production would encourage seed predation by animals which the ecosystem cannot afford, while a rare mass crop prevents animal population growth. Another device is the production of seeds rich in tannin and other toxic substances.

These lines of enquiry are brought together in order to add an aspect to our outlook on evolution of all tropical forest in everwet climate and under poor edaphic conditions of which special cases are kerangas, peat-swamp, and perhaps even mangrove. "As recently demonstrated in Viet Nam, a single defoliation of mangroves with chemicals is usually lethal to the tree, yet mangroves display some of the highest primary productivity of any forest. It is tempting to postu-

late that the very conspicuous chemical defenses of mangroves are not only to avoid attack by marine animals, but to minimize the possibility of a mangrove being defoliated by herbivores. Frequent defoliation would be almost certainly unavoidable if the leaves in such a low diversity evergreen foliage were highly edible. Their extreme sensitivity to defoliation could well be because the ever-present leaves are crucial in physiologically avoiding salt damage. Incidentally, if tidal flux did not result in frequent leaching and washing of litter out of the system, we would expect mangroves to generate blackwater rivers." (p. 92).

Objections, in addition to those already considered by the author, can certainly me made. That the existence of few-species forests would "falsify the dogma that diversity is mandatory for ecosystem stability in highly equitable climates" (p. 90) cannot be maintained, I think, in such a form: the diversity present at a given site is a result of a long process of adjustment to all kinds of conditions, and in a climax is the maximum possible there and then; disturbance will certainly affect the ecological balance. Not all Strobilanthes mass flowering may come under Janzen's hypothesis, as soil conditions on Mt. Gede, a volcano, where the phenomenon regularly appears (Van Steenis, The Mountain Flora of Java, pl. 1-4) are not known to be poor at all.

However, as a whole, the theory seems sound and ingenious, with many implications. All kinds of botanical and zoological fact are brought forward, and extensively documented by a list of 300 references. The case is still unproven, as Janzen rightly says, inviting verification by experiment, but for the present he explains and relates many remarkable and well-known facts, adding others less known. If his theory is true, a main clue to tropical ecology and evolution will have been found, and a very important one, too, in view of the huge tropical areas of poor soil. Reading the paper fascinated me, and made me hope for more. Address: Dr. Daniel H.Janzen, Zoology Department, University of Michigan, Ann Arbor, Mich. 48104, U.S.A. — M.J.

The Kew Record of Taxonomic Literature, relating to the Vascular Plants, 1971, 394 pp. (H.M.Stationery Office, London, 1974), folio.

A most useful, because complete annual record covering all literature on taxonomy, phytogeography and floristics of Pteridophytes, Gymnosperms and Angiosperms in a wide sense, in an annotated bibliography. Nomenclature, chromosome surveys, chemotaxonomy, anatomy, palynology, embryology, reproductive biology, bibliography, personalia, and botanical institutes are included in so far as they have a bearing on

taxonomy. Arrangements are alphabetical and geographical and use of the top line is adequately made. All taxa, also infraspecific, are fully cited, new ones in bold type. The latter will remain to be collected in Index Kewensis in 5-year supplements.

If the Kew staff will succeed in catching up with the volumes to a situation that we have the Record over one year available at the end of the next year, and if this speed can be kept up, the Kew Record will be an admirable, most useful, substantial aid to taxonomy.

I want to make two remarks. First, it is not clear on which principles genera are arranged under families and there is a lack of cross references. It does not seem that the families accepted by Airy Shaw (in Willis Dict.) are adopted, there are discrepancies, e.g. Martyniaceae, Lophopyxidaceae, Viscaceae, Iteaceae, Guttiferae, Fumariaceae, Illecebraceae, etc. As one can nowadays hardly keep informed about family delimitation (deflation and mostly inflation), it would be pleasant to have a list of families accepted.

Secondly, a minor remark I make upon the inconsistency of use of e.g. the French le, la, du, de la, the German von, the Dutch de, van, van de, van der, etc. before personal names. It would appear practical to leave them out altogether and always start with the name proper, which decision would save many cross-references now made.

Also, in case of double or triple authors, all are referred to the first author's name; why not immediately refer to the number of the entry? — van Steenis.

MEGGERS,Betty J., E.S.AYENSU & W.D.DUCKWORTH (ed.), Tropical forest ecosystems in Africa and South America: A comparative review, viii + 350 pp., 29 cm (Smithsonian Institution, Washington, 1973), US$ 15.

The symposium of the Association for Tropical Biology in 1971 in Ghana had fallen through, but the 25 contributions were considered too good to withhold them from publication, and justly so. Although there are a few of the inevitable generalizations from a small body of facts taken from others and now served under a sweeping comprehensive title, the majority is valuable enough to give this book a warm recommendation to any tropics biologist and anthropologist. Nine papers are devoted to plants, 10 to animals, one to their evolutionary interaction and 5 to man. They make it clear how essential the differences are between temperate and tropics biology and how inadequate the former approach is to understand the latter. The closing paper, by Fosberg, demonstrates this on land-use planning (or lack of it).

Discussions on continental drift, on long distance dispersal, and on certain aspects of ecology make it specifically

important for Malesia as well, since they deal with the chief problem of plant geography: the spread of pantropical groups. Thorne defends long distance dispersal, A.C.Smith sees Malesia as the cradle of angiosperms, Moore derives them from Gondwanaland, so perhaps another symposium is needed for a solution. Delevoryas thinks that when South America separated from Africa in the Jurassic, the world's (Pangea's) flora was still uniform and that only in the Cretaceous the angiosperms began to differentiate, stimulated by interbiotic evolution with animals. To me, this absence of angiosperms in pre-Cretaceous time does not preclude earlier development, in view of the scant amount of primitive elements, however much-publicized, in to-day's vegetations in e.g. Malesia.

No less interesting, also for Malesia, are the many papers dealing with recent biology; outstanding seem to me the one by Moore on palm ecology and geography, and the one by Tomlinson & Gill on tree growth. Interesting facts on litter and fruit production in rain forests are related by Bourlière on p. 286. Those papers that I thought of special interest for this Bulletin have been summarized in the Bibliography, under the authors Ayensu, Baker, Heiser, Johnson & Bowden, Langenheim, Moore, Richards, Sioli, Smith, Thorne, Tomlinson & Gill.

All papers are well-readable and well-illustrated mostly with maps, and often provided with many references. Execution is excellent. The lack of a summary to each paper, especially disappointing in such a heterogeneity of topics, is partly made good by Brenan's comprehensive, careful, and elegant Introduction, which in 8 pages gives a far better idea of the book's significance than here can be attempted. Inexcusable is the publication in a book like this of a new combination, reported under Heiser. But we take this in the bargain which this book certainly is. You can read for days, with pleasure, profit, puzzle and wonder. — M.J.

MEIJER,W., Field guide to trees of West Malesia, 328 pp., incl. 80 fig., 26 photogr., 1 map; offset (University of Kentucky Book Store, Lexington, Ky. 40506; 1974), postfree US$ 2.

Intended to enhance the knowledge of trees with foresters, loggers, conservationists and students, in Malesia, Indonesia and Philippines. It gives an account of Field characters, Collecting, Taxonomic notes on families, Biology of forest trees: size, durability, age of first flowering, seasons, dispersal, habitat; Literature for further study, Families alphabetical with representative species with sketch drawing and brief characterization, Mangrove, Key to some families and genera.

It might serve as a complement to Whitmore's Rain Forests, as its material is essentially taxonomic, aiming to deal with c. 200 genera, and as it bears the clear intention to instruct people who know a minimum of botany, especially in Dipterocarps, which are emphasized. No doubt there is a need for books like this, and we hope that it will find its way and stimulate local people to look at their trees. They can learn much from it (perhaps to step up to Corner's Wayside Trees of Malaya), there is a glossary, the photographs are good, and author citations (p. 3) don't matter at all, since the Kew Index and revision work made them redundant.

Obviously it was compiled in great haste. Information could be better: under Pometia (p. 243) the characteristic venation is not mentioned nor drawn, the note that it is valuable in New Guinea but worthless in Borneo is, however, on page 1. Cycas cyrcinalis instead of circinnalis (p. 49), Sympetelandra (p. 197) instead of Sympetalandra; the domatia of Octomeles (p. 134) are disputable since the glands thus named are not bound to nerve-axils. Koordersiodendron (p. 10) as here 'described' and drawn could be almost any pinnate-leaved tree. This and most other figures give either flowers or fruits, and do not focus enough on vegetative characters. Only with effort can it be seen that Lophopetalum (p. 128) has opposite leaves. I don't know why Bischofia was taken out of Euphorbiaceae, Irvingia out of Simaroubaceae, Ploiarium out of Theaceae, to be listed under faddish new families. Pinus caribaea (p. 51) has not been characterized against P. insularis and P. merkusii, and it would have been good to mention the unability of these species to hold the soil against erosion. Production is nice but in my copy 5 pages are blank. — M.J.

NAKAIKE,T., Enumeratio Pteridophytarum Japonicarum, xiii + 375 pp. (Univ. of Tokyo Press, 1975), price on flap 8000 Yen.

A pure checklist without keys or descriptions, giving the names of species and lower taxa, with first and later references also to illustrations but without indication of quality, Japanese name, and area of distribution which often includes (part of) Malesia. Varieties are fully dealt with, hybrids included. Under the generic names, only the first reference is given, and the type species. Arrangement follows Nakaike's own system. The book looks very well produced, but printing errors in the references are not hard to find.

I made a quick comparison with M.Tagawa's Coloured illustrations of the Japanese Pteridophyta (1959), but the first name in the Index of that book on p. 173, Abacopteris, I failed to find in Nakaike. I then tried for a synonym under A. triphylla, namely Cyclosorus triphyllus, under all Cyclosorus names accepted by Nakaike, but failed again. Only by

sheer knowledge can it be found, under Pronephrium (recently split off from Thelypteris).

Further doubts about the usefulness of this book stem from the absence of any typification of (infra)specific names, which deprives the delimitation of whatever solid basis it may have had, the more since commenting notes are absent; also the lack of an index to (infra)specific names, a group where botanists have so heavily obscured the generic limits by hustling around species from one genus to another, makes the data in this book practically inaccessible. So for the time being I think we must make do with Tagawa's index, although Nakaike gives far more names and references. — M.J.

PAIJMANS,K., Explanatory notes to the vegetation map of Papua New Guinea, 25 pp., 20 pl. + map (Canberra, 1975). Land Research Series no. 35. CSIRO, P.O. Box 1666, Canberra, ACT 2601. Price unknown.

The map (not included in the title but being there all the same) is 1:1,000,000, in four sheets, in colour. Letter-codes will guide the colour-blind. Included are Manus I., the Bismarcks, and Bougainville, excluded the islets in Torres Strait. It was based on air photographs taken 1943-1972, supplemented with ground truth. Accordingly, the vegetation types are mainly distinguished on habit, density, and 'tone'. They are Forest (large- to medium-crowned, idem small-crowned, open forest on plains, littoral = beach forest, swamp forest, medium-crowned lowland hill forest, idem small-crowned, idem large-crowned, lower montane, idem coniferous, idem very small-crowned, montane, dry evergreen), Woodland (seasonal, swamp), Scrub, Savanna, Grassland (dryland, swampy), Mixed Herbaceous vegetation, Pioneer Vegetation, Mangrove, and Garden (i.e. cultivation in past and present). Dots stand for spots of second-growth and small clearings. Dominant species are named in the legend, but "a thin climbing bamboo", plentiful in places in the lower montane forest above 1400 m, is still nameless and may be a new species if it is the same I found sterile on Mt. Bosavi. Names of places and rivers are in dim print; neither altitudes nor contours are given.

The Notes provide clear definitions of all concepts used, and give brief characterizations of all the above 23 vegetation types, with plant names listed according to frequency, and reference made to the fine photographs. As for Plate 16, where tree ferns "typically occupy the relatively well-drained slopes and do not occur on the boggy valley floor and foot slopes", I wonder if the absence is caused by the gathering of cold air during clear calm nights on the flat valley bottom.

How much Paijmans, for all his field experience, depends on the air photographs is evident from, for instance, his

adopted limit of 1400 m. "Lower montane elements first appear in lowland hill forest vegetation at about 900 m or even lower, and gradually gain in importance with increasing altitude. On the basis of ground observations the upper limit of lowland hill forest has been put by many observers at about 1000 m. However, as the air-photo image generally becomes markedly darker-toned and smaller-crowned at about 1400 m, this altitude is taken as the upper boundary of the zone" (p. 6). 'Pioneer vegetation' is admittedly a mixture term for any growth on newly bare land, 'scrub' likewise refers to a dense shrub cover to 6 m high, conditions wet or dry, altitude high or low. Soil and climate conditions are often mentioned in the Notes and sometimes in the Legend, but the big limestone area along the Kikori River, for instance, cannot be recognized as such on the map. The intention "to give the user information on both the various vegetation types and on their ecology and habitats" (p. 5) has on the one hand been realized: the Notes are informative enough and touch lightly upon many ecological aspects. On the other hand, I'd like to say: now let us leave alone these pictures, just tell the reader how to look at a vegetation, make him observe the differences between climax and seres, show the influence of fire and of grazing, how to judge regeneration, all in the same clear concise style in a few introductory pages which, so far as I am aware, are still to be written for Papua New Guinea; also the text in the Encyclopaedia of Papua and New Guinea (see page 2220) is too descriptive, too static, and therefore leaving the reader unaware of the processes affecting vegetations, processes which are all too often destructive, and non-reversible.

But this is just a suggestion for the second edition. Altogether, the balance in the work is good: the outlines are clear, and the map is a pleasure to consult. It makes one forget the magnitude and complexity of the task to map a patchy vegetation cover of so rugged a country, often under clouds, with many points requiring patient investigation and confirmation from field work. I look forward to the larger book on the subject that Mr. Paijmans has in the press. These 'Explanatory Notes' make already a pleasant, and widely useful introduction. — M.J.

PENNINGTON,T.D. & B.T.STYLES, A generic monograph of the Meliaceae. Blumea 22 (1975) 419-540, 18 pl.

This is the result of an effort at the Commonwealth Forestry Institute, Oxford, U.K., that started in 1960. In the General Part F.White describes the background of the work. This is followed by the Taxonomic History, the Morphology (habit, sex difference in inflorescence, shape of calyx and corolla, disk, number of ovules in each locule, style head,

fruit and dehiscence but above all the androecium, give generic characters, whereas aestivation doesn't), the Wood Structure (based on Kribs 1930, here elaborated and notes of caution placed), the Pollen (not much diversity and less valuable to identify genera than the secondary xylem), and Taxonomy outward and inward.

The former sharp distinction between Melioideae and Swietenioideae is obscured by the Madagascar genera Quivisianthe and Capuronianthus, both placed in subfamily rank. Flindersia and Chloroxylon are discussed and left in the Rutaceae. Ptaeroxylon and Cedrelopsis are excluded. Nymannia is fully discussed and included, so is Pterorhachis. Aitonia, formerly split off by Airy Shaw into a family, is brought back. Cedrela and Toona are placed together in a tribe of the Swietenioideae, so are Carapa and Xylocarpus.

The subdivision by Harms in E. & P. ed. 2 (1940) is criticized, since variation is far greater and more complicated than he had supposed. The present treatment has 7 tribes in the Melioideae (new being Aglaieae, Guareeae, Sandoriceae), and 3 tribes in the Swietenioideae. A few pairs of genera are discerned; the remainder consists of a few large genera with a number of small satellites, the large genus generally containing at least one constant feature lacking in its satellites.

The Special Part deals with the 51 genera, giving synonyms, description, germination, chromosomes, pollen, secondary xylem, distribution, type species, remarks upon relationships, and a drawing of flower in longitudinal section. Subdivisions of genera are not considered. An Index to Names is given.

Phylogeny is absent as a subject, and nothing is said on distribution beyond the bare facts. From these I made a geographical breakdown for endemics/non-endemics: Neotropics 5/3, Africa mainland 9/7, Madagascar 6/4, Asia mainland 2/17, Malesia 3/18, Australia 2/8, Pacific 0/5. Field studies on flower and fruit biology are to follow.

The 'analytical key' jumps from fruits to anthers to style head, which makes me wonder how the way to dioecious genera can be found. Fortunately there is a synoptical key at the end (with characters in 39 groups). Missing, however, is a good multi-character synopsis of subfamilies, tribes and genera; the keys under the tribal descriptions cannot now be reached through other keys!

Coming to Malesia, I extracted the genera with the authors' estimated number of species and arranged them according to size: Aglaia 100, Dysoxylum 60, Chisocheton 30, Walsura 7, Toona and Turraea 6, Lansium, Melia, Munronia, Reinwardtiodendron and Sandoricum 5, Aphanamixis and Vavaea 4, Xylocarpus 3, Anthocarapa, Azadirachta, Chukrasia, Cipa-

dessa, Megaphyllaea, Pseudocarapa and Trichilia 2, a total of 22 genera with almost 250 species, out of 550 for the whole family.

Pennington & Styles have done much to bring a Flora Malesiana revision within reach. Much material has been collected, not always good, and there is need to take a closer look into the vegetative characters. Who thinks he is up to the job? — M.J.

PERCIVAL,M. & J.S.WOMERSLEY, Floristics and ecology of the mangrove vegetation of Papua and New Guinea. Papua New Guinea Nat.Herb.Lae, Bot.Bull. 8 (1975) 96 pp., 68 fig. To be ordered from Division of Botany, P.O. Box 314, Lae, Papua New Guinea. Clothbound soft cover US$ 6.50, hard cover US$ 8.50 (including postage).

In the introductory chapters the usual features of Malesian mangrove are concisely summed up: environment, root systems, zonation, succession, and uses. Then a key is given to all mangrove species of flowering plants in Papua New Guinea; under the genera the species are keyed out.

I regret that I must make some critical remarks. The key to the genera is for a great deal only usable if one has fruits or knows whether they are viviparous. An alternative key especially on vegetative characters would have been most desirable and most important for practical use. As it is now, the key is a clumsy effort.

The species assemblage contains some obvious inadequacies. How is it possible that Acanthus ebracteatus is lightheartedly included in Acanthus ilicifolius? In Xylocarpus three species are recognized, the third one being named X. australasicus Ridl. In the latest monograph of the genus (Noamesi, 1958) also three species are distinguished in Malesia, but the third one is named X. mekongensis. Whether these two names are conspecific and identification is correct remains uncertain.

Then there are four species which do not belong to the proper mangroves. Pemphis acidula is characteristic for rocky reef outcrops and never grows in the mangrove mud. Myristica hollrungii and Cerbera floribunda both occur far inland and descend in flood plain forest to coastal aestuaries. The presence of stilt-roots on the former does not indicate that it belongs to the mangrove as stilt-roots occur in many freshwater swamp forest trees. Besides, Cerbera manghas is taken up as a mangrove tree, but this is a species characteristic of sandy and rocky seashores. In this respect it might have been more appropriate to enter Cerbera odollam which also occurs in New Guinea and is characteristic of tidal river banks. None of the Cerberas belongs however to the proper mangrove. An interesting novelty might be the occasional

mention of a small population of a Rhizophora in Port Moresby harbour which would possibly represent R. lamarckii Montr. which is an endemic species of New Caledonia; why has this not been properly checked for this handbook of Papuan mangroves?

All in all I cannot very much admire the accuracy of this booklet. — van Steenis.

PURSEGLOVE,J.W., Tropical crops / Monocotyledons, x + 607 pp., 32 fig. (Longman, London, 1974), in Britain £ 5.50.

Volume 1, Dicotyledons, was briefly reviewed on page 1711. Its two parts are now available in one paperback volume (1974, Longman, in Britain £ 4.95). The Monocots volume is similarly produced. It deals with Agavaceae 6 spp., Alliaceae 7 spp., Araceae 3 spp., Bromeliaceae 1 sp., Cannaceae 1 sp., Cyclanthaceae 1 sp., Dioscoreaceae 1 genus, Gramineae 18 spp., Marantaceae 1 sp., Musaceae 2 spp., Orchidaceae 1 sp., Palmae 3 spp., Pandanaceae 1 genus, Taccaceae 1 sp., Zingiberaceae 3 spp., plus a few additional cultivars, ornamental orchids, and others. Space has been allotted according to importance; Coix has 2 pages and one plate, Musa 38 pages and two plates. The full scheme of treatment is: chromosome numbers; uses; origin and distribution; systematics; cultivars; ecology; structure: roots, stems, leaves, inflorescence, flowers, fruits; pollination, germination, chemical composition, propagation; husbandry: planting, manuring, harvesting and yield, marketing and transport; major diseases; major pests; mineral deficiencies; improvement; production and trade; references. Most of these headings are enlivened with historical and other notes which make the text interesting on virtually every page. There is a fair but not excessive amount of figures. Under each family a brief general introduction is given. At the end we find a general reference list, a conversion table, a glossary, and an alphabetical list of monocots referred to, with common name, use, origin, and page.

Purseglove sticks to the main lines, while love for detail is present throughout. The style lends a special quality to the book. Each sentence is compact, informative, simple in structure, well-constructed and elegant in finish. The author's vocabulary is extensive, the scope of his interest wide. The drawings fit in well: all full-plate, clear with an artistic touch, the details in careful arrangement. These volumes can be read and re-read, just for the pleasure of learning. I now feel sorry that I did not buy the hard-cover edition. — M.J.

SANTAPAU,H. & A.N.HENRY, A Dictionary of the Flowering Plants in India, 198 pp. (Publ.& Inform.Directory C.S.I.R., Hillside Road, New Delhi 110012; 1973, received 6-3-1975), Rps 22, abroad £ 3.50, US$ 9.

The title of this work should have been 'A Dictionary of the Genera of Flowering Plants of India'. It is a useful work with basic reference to the Flora of British India, but with adequate cross-references to generic names fallen into oblivion or newly proposed. Generic names of cultivated plants are included. Each name is assigned to its family and provided with a reference to Fl.Br.Ind. or other sources. The work is restricted to India proper, although the Flora of British India also covered Pakistan, Ceylon, Burma and Malaya. Of each genus the number of species is mentioned and how many occur in India approximately. Under each genus are succinct descriptive notes, often one species or its use is mentioned.

In all 2890 generic names are included (27 Gymnosperms, 677 Monocotyledons, 2186 Dicotyledons) including cultivated ones.

This dictionary was under preparation by the Botanical Survey many years; while the MS was being finalized, Dr. Santapau passed away; the preface is dated December 1972, the official date is 1973.

I have rather critically scanned many names, and find it very accurate, up-to-date, and without printing errors. This makes it a remarkably useful book indeed, with which effort the authors are warmly congratulated.

A final remark: it might have added to the value of this work, at least for professional botanists and plant-geographers, if the generic names had also been enumerated under the families (with those names marked by an asterisk which are exclusively cultivated); such a tabulation would have been handy to have at once a view on the native genera of each family in India. — van Steenis.

SCHWEINFURTH,U. & H.SCHWEINFURTH-MARBY, Exploration in the eastern Himalayas and the river gorge country of southeastern Tibet - Francis (Frank) Kingdon-Ward (1885-1958) - An annotated bibliography with a map of the area of his expeditions, viii + 114 pp., portr., map (Franz Steiner Verlag, P.O. Box 5529, Wiesbaden D6200, Germany; 1975), DM 32.

"An area roughly circumscribed by 89°-102°E, 24°-32°N embraced F. K i n g d o n - W a r d 's world. It enclosed the least known parts of Asia of his days, and also the least accessible and the most difficult ones to travel in from the point of view of topography - for one thing he was usually moving right across the grain of the country" (p. 7). In all, Kingdon-Ward made 22 botanical expeditions (incl. one in Ceylon), collecting 23068 numbers of plants, many of which found

their way in cultivation through the British firms who employed him. He also made many geographical observations, which spurred the authors, both geographers of the South Asia Institute, Heidelberg (page 2342) to compile the present book, which opens up his treasure of data. This is done by providing: summarizing annotations to each item of the no fewer than 25 books and 709 papers (excluding newspaper articles) published by Ward; a regional index to these papers with main latitude/longitude; a subject index to the paper under 16 headings; a map 1:1,000,000 giving all the places in the spelling adopted by Ward, compiled from his field books; and an alphabetical list of these place names with reference to their place on the map. All this is the work of the junior author; the senior author provided a 10-page biographical evaluation, about twice as long as W.T.Stearn's account in Kingdon-Ward's Pilgrimage for Plants of 1960. The bibliography (with list of serials added) makes no claim to completeness, but gives e.g. 22 items for 1940, while Stearn's list gave 2. But it is the annotations and subject index by which the fruits of Kingdon-Ward's work now become available to a very wide circle of researchers. We owe it to this book that the results of his efforts will not recede into history along with his romanticism. The text is in excellent English, clearly laid out. The map in its simplicity is well-executed; no national frontiers have been drawn and it may be difficult to refer a locality to China, India or Burma, but this uncertainty was already Kingdon-Ward's own. In scope and usefulness the book is a model of its kind. — M.J.

SHAW,H.K.Airy, The Euphorbiaceae of Borneo. Kew Bull. Add. ser. IV (1975) 245 pp., 1 map. Published by H.M.Stationery Office, (PM1C) Room C46, Atlantic House, Holburn Viaduct, London EC1P 1BN. £ 10 + 7% for postage.

It is most gratifying that Mr. Shaw has accumulated his immense knowledge of this family, on which he made several dozens of precursors, in a book, which appears to be a boon to Malesian botany. The c. 340 species concern only their occurrence in Borneo but the keys to them are invaluable, and also the synonymy, the notes and the full geographical distribution. The book gives more than Borneo, as it contains also an artificial key to all Malesian genera hitherto known. We are grateful that also keys are given to affiliated families of the Airyshawiales, viz. Stilaginaceae (Antidesma) and Pandaceae (Galearia, Microdesmis). Shaw gave also a tentative scheme for possible natural grouping of the Euphorbiaceous genera. In an appendix he enumerated also all species occurring on limestone. There is one new species. A full index concludes the work. Our sincere congratulations with this effort in producing this most useful book. — van Steenis.

For more hot news about the family Euphorbiaceae, see G.L. WEBSTER, Taxon 24 (Nov. 1975) 593-601, who presents a synopsis of supra-generic taxa, with many new names and combinations, pending a more extensive work, wherein arguments are to be given; here is only a large key to the 5 subfamilies.— Ed.

SPARKS,B.W., Geomorphology, 2nd ed., xxi + 530 pp., many fig. and photogr. (Longman, London, 1972), paperback in Britain £ 4.50.

This discipline, which studies the development of landscapes, started, so to speak from erosion, when late in the 19th century, W.M.Davis recognized a cycle from young level land, through erosion stages, to old level land. Other chapters discuss Weathering; The development of slopes; The nature of a river valley; The development of drainage systems; The effects of rock on relief; Coastal features; Movements of base level; Changes of climate; Landforms in (semi)arid climates; Landforms in the humid tropics (rather brief and sketchy); Landforms in glaciated highlands, and lowlands; Periglacial landforms; Erosion surfaces and their interpretation. Well-readable without many figures; the illustrations are very clear, and although this British textbook pays no special attention to the tropics, it can give excellent help to those who want to learn how to look at a landscape. A geomorphological eye is of great help in work on vegetation, small-scale plant distribution, and conservation. To any field botanist a bargain. — M.J.

STEENIS,C.G.G.J.VAN, c.s., Flora untuk Sekolah di Indonesia, 495 pp., 46 fig., translated at Universitas Gajah Mada (Pradnya Paramita, Jl. Madiun 8, Jakarta Pusat, 1975), Rp. 2500 = ± US$ 6.

This is the Indonesian translation of the Flora voor de Scholen van Indonesië, realized after a long odyssey. Several persons, seeing the value of this work, tried their hands at a translation effort, encouraged by the author, to so little avail that a decade ago he had given up hope. But when Mr. K o e s n a d i Hardjasoemantri, Cultural Attaché of the Indonesian Embassy, The Hague, heard about the matter, things began to move. In August 1975, Dr. Van Steenis received a letter from the publisher announcing the publication of a translation, under indication of format and number of pages. So by then it was, in fact, too late to introduce alterations. And what was not yet known to the author by then, appeared later, namely that the first edition of 1949 had been used instead of the second revised one of 1951. The many corrections which Dr. Van Steenis had made in manuscript for a third edition have of course now also been omitted.

While the work is therefore not as good as it could have been, it comes to fill a gap of long standing in Indonesian education. The concept is excellently fitted for this purpose: this Flora presents a selection of c. 400 of the most common plants, wild and introduced, to be found in the villages all over the country. It gives almost no illustrations of plants, because these would have made matters too easy, since the educational value lies in the examination of a plant and in the perusal of keys and descriptions. From this viewpoint, it is a pity that now an index of vernacular names has been added; from the original work this was omitted for the purpose of compelling the reader to study the structure of the plants.

The execution is clear. Format and type are somewhat larger than in the original, which was 11 by 17 cm and therefore could easily be taken to the field as a pocketbook. That is more difficult with the present format of 21 by 14 cm; it emphasizes the responsibility of Indonesian teachers to take their pupils outdoors. It is not long ago that I was told of a teacher drawing a banana plant on the blackboard, while the living plant could be seen from the classroom window. We hope that this Flora will inspire many people with an interest in plant identification, and will soon have to be reprinted - perhaps also for Malaysia? - from the 2nd edition then, with corrections. We also hope that Mr. Koesnadi's initiative will go further. E.D.Merrill's Plant life of the Pacific World would also make a good choice. — M.J.

TARLING,D.H. & M.P., Continental drift / A study of the earth's moving surface, 142 pp., 43 fig., 4 pl. (Penguin, Pelican Books, 1971), £ 0.40 in U.K.

History of the theory; defining and fitting the continents together; fossil evidence across the Atlantic; Laurasia and Gondwanaland, past climates; paleomagnetism and polar wandering; the ocean floors and the mid-Atlantic ridge; the situation 300, 150, 100, and 50 m. y. ago; the cause of drift: convection currents in the earth's mantle; earthquakes and volcanism in relation to drift. Popular, informative, well-illustrated; the evidence seems conclusive.

WALTER,H. e.a., Klimadiagramm-Karten / der einselnen Kontinente und die ökologische Klimagliederung der Erde, booklet 36 pp. + 9 maps, in case 17 by 24 cm (Gustav Fischer, Stuttgart, 1975), DM 72.

Scale 1:8,000,000, maps not in colour. These maps are an abstract from Walter & Lieth's larger Klimadiagramm-Weltatlas. On each map a number of climate diagrams c. 4 by 4 cm. These give name and altitude of station, number of years on record, average annual temperature, ditto precipitation,

ditto lowest daily mean temperature, ditto absolute minimum, highest daily average and absolute maximum; curve of mean monthly temperature, precipitation, dry season or wet season by month, monthly rainfalls in excess of 100 mm, relative aridity in steppe; months with average temperature below 0, daily and absolute. In the booklet 9 climatic types are very briefly characterized, and an explanation given to each of the maps. The diagrams intend to be ecological, relating precipitation to temperature in a proportion of 20(-30) mm to 10° C, thus distinguishing between relatively arid and relatively humid according to Gaussen. Gradients are not given. The list of references is brief and consists for almost half of Walter's own publications.

Malesia is covered by the map S. Asia, Pacific Islands, and Australia/New Guinea, with altogether c. 110 diagrams, many from Java, few from Borneo, Celebes, west New Guinea. I doubt if botanists working on Malesia will find much new in the maps. The climate studies already at our disposal are more detailed, and our important criterion of the number of consecutive dry days is not here applied. Compare this with the map in Flora of Java 2! The general map with 'ecological classification of the world's climate' as Walter gave it, lists only two types for Malesia, and New Guinea does not occur on it. The accompanying booklet is only in German. The execution is very handsome. — M.J.

WHITMORE,T.C., Tropical rain forests of the Far East, xiii + 282 pp., many illus. (Clarendon Press, Oxford, 1975), £ 12.50 in U.K., bound.

The main contents are: Part I Introduction, ch. 1 Tropical rain forests of the Far East (flora and fauna), 2 Forest structure; Part II Seasonality, ch. 3 Climate, 4 Seasonal cycles in plants and animals; Part III Growth of the forest, ch. 5 Seed dispersal to seedling establishment, 6 Growth of seedlings into trees (gaps in the canopy and their effects), 7 The ecological basis of rain forest silviculture (systems, pioneer trees), 8 Growth rate and forest yields (measures, productivity); Part IV Kinds of forest, ch. 9 Soils (by C.P. Burnham), 10 Dryland rain forests (heath forest and five others), 11 Wetland rain forests (peat-swamp forests and three others), 12 Monsoon forest formations, 13 Animal life (3 pages), 14 Conifers (Agathis, Araucaria, Pinus), 15 Variation within tropical lowland evergreen rain forest (general; in Dipterocarp forest; in the Solomons; causes), 16 Mountain rain forests (zonation, comparisons); Part V Man and the tropical rain forest, ch. 17 ditto (successive civilizations, quantitative impact on the forest), 18 Secondary forest and shifting cultivation (6 pages), 19 Looking ahead (wood plantations, chips, importance of the forest: protection, produc-

tivity, prestige; the need to conserve). References to descriptions of rain forest areas. Bibliography, with reference to chapter. Index of plant names, the genera with family, the species with author. Index to other items. - All references are to paragraphs.

Whitmore began his career by organizing botanical work in the Solomons, a pioneer effort, then worked for 6 years in Malaya, of which he set up the Tree Flora. In both jobs he was a forest botanist. He feels attracted to big, important subjects. He felt the challenge to write a comprehensive book on the main vegetation type of the region of our interest; it is the first such work, which makes its publication in itself a happy event, and worthy of a critical review.

It is natural to compare this book with Richards' 'The Tropical Rain Forest' of 1952, because it is the only previous book on the subject - although covering Africa and the Neotropics as well - and a widely known classic, which justly looms large in Whitmore's book. The book by Richards has c. 200,000 words and no illustrations to speak of, in comparison with the profuse and splendid photographs and figures in Whitmore's, whose text has c. 93,000 words. After Richards' book, much work has been done that is here reviewed. While Richards' presentation still occasionally suffers from a 'temperate' outlook, e.g. in the Raunkiaer classification of life forms, Whitmore's view is entirely tropical. While Richards is the impartial ecologist, Whitmore shows an inclination towards forestry, dealing extensively with 'forest dynamics', i.e. rejuvenation under natural conditions, and is much concerned with utilization. He even seems to expect a yield from secondary forest.

Essentially, the present book is a review of recently published knowledge. Whitmore presents a great amount of it, under addition of his own considerable experience. His bibliography contains 700 items (TCW being the most prolific among those), and the text is full of references toward whole publications, '(Van Steenis 1972)' e.g. standing for the Mountain Flora of Java in its entirety. The record of recent progress is not quite complete, even in English; I missed Van Steenis' account of gregarious growth of Fagaceae (Fl.Males. i 7: 268-270. 1972), Schodde's paper on fauna and vegetation in New Guinea (page 2290), the valuable papers in the UNESCO book on Humid Tropical Asia (page 2392), the New Horizons advertising Forestry in Papua New Guinea (page 2219), Burger's book on Seedlings of 1972 (page 2209), and Janzen's paper on Tropical Blackwater Rivers (see Reviews), all recent but perhaps not too recent for inclusion.

As a result of this concept, the peaks and gaps in recent research show up; it leads Whitmore to point out a number of subjects waiting for investigation, like the secondary forest,

but this does not make the treatment more even. Peaks are the kerangas vegetation (on which E.F.Brunig did much work), the peat swamps (to which J.A.R.Anderson linked his name), and the mountain forests (van Steenis). These are, however, derivatives of the Tropical Lowland Evergreen Rain Forest, the most widely spread and varied type, for which one might buy this title. On this subject 21 pages have been spent, if we include the 'variation within tropical lowland evergreen rain forest' (par.15). Interesting as the text may be, it does not tell us much about the lowland forest types as such, weakly referring to Flora Malesiana 2 in preparation (p. viii). This part of the job would indeed have been difficult, requiring consultation of many scattered sources on Indonesia, many in Dutch, but could not a Dutch collaborator in half a year have prepared a reasonable account? This would have given the chapter on the Forest Formations its nucleus.

Other gaps in the treatment may owe their existence to different reasons. As for the mangrove (½ page), very much is, of course, already known, and no repetition considered necessary. As for the life forms, not much has been published recently, if we disregard Hallé & Oldeman, briefly mentioned. As for the minor forest products, the same thing may have been considered, but in view of their economic importance, some explanation would have been appropriate; now not even W.H.Brown's Minor Products of the Philippine Forests has been mentioned (1920, 1921, repr. 1953). As for the details of a forest inventory survey, these have been deliberately left out, under reference to 6 titles. The emphasis on the ecological basis of forestry gives, of course, great interest to the book. One might then expect a discussion of the problems of succession and regeneration after the various grades of depletion and destruction, resulting from the modern logging after Richards' book of 1952. Yet Whitmore confines himself to regeneration under natural conditions; I don't know why.

The "abundance of genera with an Australian centre of distribution" (p. 135) in the heath-forest seems a bit questionable. While Gahnia, Pittosporum, and Styphelia are indeed Australian-centered, they are well-represented over Malesia and there is no such thing as a disjunction. Cladium is world-wide (see FM i 7: 688). As for Casuarina nobilis, new sp. from N. Borneo, to publish its diagnosis (p. 134) here in a completely non-taxonomic book is bibliographically unfortunate.

Quite a few problems for research are indicated, especially in the depleted and secondary forests, although their "utilization by mankind, whether it be for their products or for the conservation of indigenous plant and animal species" (p. 229) holds an unspecified promise that I distrust. I also distrust the good words Whitmore has to say about shifting

cultivation on p. 231-232; in view of the disasters that have resulted from this system in Malesia and the warnings from competent authorities, a more profound discussion is in order. That "the crops protect the land from excessive leaching" seems a risky statement with sun shining on the open soil speeding up the oxidation of humus. Similarly, where he deals with Pinus I find him too optimistic, as he does not warn against soil erosion in pine forests as Pinus is unable to hold the soil. Besides, Pinus in the Philippines, said by Whitmore to occur "from 900 m elevation downwards" (p. 177) has in fact its main distribution between 900 and 2600 m, being very scarce below 900 m.

At the end, when destruction and conservation are discussed, there is a confusion in which everyone can read what suits him. On the one hand, on p. 237, if 10,000 individuals of a tree species are needed to preserve a population that can sustain itself, huge tracts of land are needed; from Whitmore's figures some calculating results in about 80,000 hectares, for one type of forest in a region. But a little further: "It is unreasonable to expect the nations of the tropical Far East to conserve more than a small proportion of their forested land inviolate as national parks." Paragraph 19.3 'A plan for the future' is no plan at all, giving haphazard information on Indonesia and listing Kinabalu as including lowland forest, making no reference to criteria for reserves, nor to the problems to be overcome. It is high time to solve the confusion by examining the foresters' and the ecologists' concepts of conservation. It will then be seen that most of their aims are in conflict; a reference to page 2361 must here suffice. But couldn't Whitmore have arrived at the idea as well?

The professional forester and botanist will be glad to possess this summary of recent progress in knowledge on the subject, but many people in the region - who perhaps must think longer before spending their money - may ask what to expect further. It must be noted, then, that Whitmore's outlook is that of the expatriate rather than that of the native. Willem Meijer, for instance, in his Indonesian Forests and Land Use Planning (page 2395) has shown a far greater understanding of the enormous problems facing these people in the management of their land. I wonder who, in the region, will have access to the even a tenth of the enormous bibliography so copiously referred to. Such people would have been helped by annotations indicating scope and value of the main publications, in order to know what to hunt for if they wish to know more. But such an inroad has not been provided. Nor has anything been said on the methods of research that could give readers an idea about possibilities open to themselves. I can imagine that an outline of the disciplines which con-

tributed to the presented account would have been useful, for instance, the scope of plant taxonomy, with its many relations to forestry and ecology, its current role, local organisation, and main works relevant to the subject, like e.g. Keng's Orders and Families of Malayan Seed Plants. The chapter on soils is quite pleasant to read, but stands a bit isolated, and may not serve to enlighten the connection of soil and vegetation to a maximum degree. All told, I am afraid that Whitmore will not succeed in opening up the subject to his readers in Malesia. I hope that he proves me wrong.

I am the first to admit that I know far less about the rain forest than does Whitmore. It is perhaps from this lack of knowledge that my disappointment stems with the unevenness of this treatment of a subject that by virtue of its complexity calls for balance. With Richards, I feel a grasp of relations and a gift for coherence that I miss here. Both of Richards' books have a clear line: in The Tropical Rain Forest it is the climax concept, in The Life of The Jungle it is the harmony and self-sufficiency of the rain forest as an ecosystem. Such a line I have been unable to discover in Whitmore's book. But the reader who through Richards has learnt to see the marvellous unity of the rain forests, will welcome Whitmore's rich spectrum of detail and illustration.

The binding should have been better. — M.J.

ZEVEN,A.C. & P.M.ZHUKOVSKY, Dictionary of cultivated plants and their centres of diversity / Excluding ornamentals, forest trees and lower plants, 219 pp., unnumbered maps and figures (PUDOC, P.O. Box 4, Wageningen, Netherlands, 1975), 8°, cloth-bound, Dfl. 45.

The second author has pursued the work of Vavilov in several works published in the U.S.S.R. (1962-1971). The aim of the present work is "to give the reader a quick reference to the centre of diversity of a cultivated plant species"; for some important crops also related wild species are cited. Ornamentals, timber trees and lower plants are not incorporated.

The book consists mainly of two parts, the first an introduction of general remarks on domestication and a discussion on the number and delimitation of the 'centres', and whether they are primary or secondary. The last concept includes also recently made centres, as e.g. for Amygdalus persica and Aleurites fordii the U.S.A. are mentioned as secondary centre. There has been much literature on the centres and maps illustrate various opinions. Dr. A.C.Zeven, who signed the introduction, wrote that "possibly some megacentres still have to be enlarged till at least they cover most of the world's surface", which in my mind gives them a doubtful importance,

especially if one wants to correlate such centres with origins of civilisation. This stems from the fact that domesticated plants are in various categories, and such correlation is naturally bound to the few staple foods only.

The second part of the work is an enumeration of domesticated plants arranged according to the 12 centres of Zhukovsky's work of 1970 and Dr. Zeven enlarged the original number of 700 species to 2300 cultivated plants; they are not necessarily domesticated. Under each centre they are enumerated alphabetically according to families, the latter following Shaw's delimitation (in Willis Dict.), even for Vitidaceae, a name contrary to the Code. Under each species a very brief mention is made where the plant occurs and for what purpose. In all cases known the chromosome number is given, sometimes in great detail (Aegilops, Mentha); it is to me questionable what purpose this has for the general reader.

The assemblage presented I find not very accurate to the aim, and it gives the impression that a fair number of potentially useful plants have been entered which are not cultivated, for example Rhus succedanea and Evonymus japonicus; of these there is of course no end. Maclura pomifera, Hibiscus syriacus and Soleirolia are merely mentioned as ornamentals; Albizia montana and A. sumatrana are mentioned as cultivated as a green manure and shade tree, but if this category is fully included the work is quite incomplete. Why a large number of Eucalypts are mentioned is also unclear, as the bulk is grown for timber. Gomphrena globosa is entered under a curious category of plants without an identified centre, and cited as an ornamental and as a fetish plant, but surely it cannot have been the intention to include all fetish plants in this book?

In general the nomenclature is correct: Lycinum, Styraceae, Stilagninaceae and Pandaceae (all on pages 54 & 56) are probably printing errors, but Pistacia vera is under Phytolaccaceae and Methysticodendron is long recognized as a mere monstrosity of a Brugmansia (cq. Datura).

Dr. Zeven has certainly used several standard works for consultation, but I dearly miss in the bibliography those of Heyne, De Nuttige Planten van Ned.-Indië, Ochse-Bakhuizen van den Brink's Indische Groenten en Vruchtenteelt, De Candolle, Origine des plantes cultivées, and F.von Mueller, Select Extra-tropical Plants.

Though dictionaries always contain a compilation of useful information I feel the present one has several shortcomings in composition. Paper and binding are good and the price is very moderate. — van Steenis.

BARTSTRA,G.J. & W.A.CASPARIE, Modern quaternary research in Southeast Asia / Papers read at the Symposium ... Groningen 16 May 1974 ..., viii + 86 pp., several pl., offset, cloth (Balkema, P.O. Box 1675, Rotterdam, 1975), US$ 7.50, £ 3.25.

Organized in honour of the archaeologist H.R. van Heekeren a few months before his death occurred. Several of the contributions have a bearing on botany and are here listed in the Bibliography: Verstappen's on geomorphology, Hooijer's on fossil and big animals in S.Celebes-Flores-Timor called by him Stegoland, Polak's on peat deposits in Malesia, an English account of her important work, Muller's on pollen in peat and coal (under Anderson & Muller). There is also a critical review by Harris of the work done on the supposedly paleolithic site of Tampak on the Perak River, Malaya, and a good story to read. But all the contributions are interesting and amply documented, although problems remain: the profuse development of dipterocarp forests in Borneo after what must have been quite a climatic setback in very recent times postulated by Verstappen, and the connection between S.Celebes and the Lesser Sunda Islands postulated by Hooijer.

The editors were obviously inexperienced (Malacca for Malaya p.77 line 3; slip on p.10 line 3 from bottom; subaerial planation by the author is considered an important process ... p.24); no names were italicized and there is no index. — M.J.

IUCN, The use of ecological guidelines for development in the Tropical Forest areas of South East Asia / Paper and proceedings of a regional meeting held at Bandung, Indonesia, 29 May to 1 June 1974, 185 pp. (IUCN, 1110 Morges, Switzerland, 1975), US$ 6.

An elaboration of the book by Dasman e.a., Ecological Principles for Economic Development (see page 2380) for Malesia and Thailand, which bears the mark of Dr. D u n c a n P o r r e 's expertise. The 62 participants (listed at the end) met in four sessions; Prof. dr. Otto S o e m a r w o t o contributed much to the organization.

There are 'country reports' from Australia (1 p.), Indonesia (1¼ p.), Malaysia (7 p.), Papua New Guinea (6 p.) which I think the most informative and honest, Philippines (15 p.), Thailand (2½ p.). These are followed by 'background papers'. M.E.D.Poore gives a 2½ page introduction to the theme of the conference, stressing the practical purpose of the meeting. R.G.Downes* of Australia, on Land-use planning (9 p.) gives a well-arranged account of land in general, mapping, decision-making on land-use, and planning, summing up the points to consider. H.A.Nix, also of Australia, on Climate, its elements, classification, and analysis (21 p.) is a bit general; many references are given. F.A.van Baren of Holland on Soils,

on a rather haphazard collection of data, affirms the poverty of many soils under luxuriant forest. In the discussion, A. Dilmy makes a plea for Environmental Impact Assessments of development plans, and Poore emphasizes that options for land use only remain completely open as long as it is under primary vegetation. N.C.Gare* of Australia on the Role of National Parks and Reserves in Economic Development, gives in 10 p. an excellent account of possibilities and problems, and conclusions about management. Idea: why not show short films on the cultures and customs of SE. Asia and Pacific countries on board of aircraft travelling there instead of Hollywood movies? (p.107). J.D.Ovington* of Australia, on proper Forest Management (8½ p.), makes a plea for wood plantations, responsible management of wild forests (in Sabah nearly 70% of the trees left for retention were damaged after moderately heavy selective logging), to consider the variety of measures needed depending on local conditions, and to respect the interests of the local people. E.C.Chapman* on Shifting Cultivation (16 p.) utters a well-argued warning against further expansion of Imperata through misuse of the delicate system. In the discussion, Dilmy asserts that peat-swamp forests should be kept in reserve, especially where the peat is thicker than 4 m. J.H.Koeman* of Holland on Problems Associated with the Use of Agricultural Chemicals (9 p.) explains the criteria to be considered in the exposure phase, kinetic phase, and dynamic phase, and the special hazards in the tropics.

M.E.D.Poore in 14½ p. sums up the conclusions and at the same time introduces the 81 Ecological Guidelines, in sections. It is this part of the book that was separately published as IUCN Occasional Paper no. 10.

A plea is made for ecologists to be involved in the formulation of national objectives and land-use policies from an early stage. The Guidelines are grouped into 7 sections, each with a brief introduction. A: Land-use policy and allocation of land contains Guidelines 1-17, based on forest as the natural vegetation in the whole region, briefly characterizing the changes due to mismanagement. B: Retention of the natural forest as a resource (18-34), sketches the importance of the forests and the value of the biological diversity they contain. C: Transformation of natural forest into field and plantation crops (35-47), calls for caution on the one hand and improvement on the other of farming and livestock management. D: Water resources (48-51) stresses that natural vegetation yields water of higher quality than modified land. E: Management of fisheries in river systems (52-56) warns against undue introduction of exotics. F: Pest control (57-70) points to the dangers that may follow from almost any use of pesticides due to lack of data. G: Infrastructure, engi-

neering works and industry (71-81) calls for learning from the many mistakes already made, and a proper assessment of benefits as well as of social ans financial cost.

This summary speaks for itself. I think that if discussions on ecology, management and conservation are to have any meaning, they should be based on the common knowledge of these texts, which together with Dasmann's Ecological Principles for Economic Development can be regarded as the Corpus Oecologicum Malesianum Urgens. And there is little time to lose (p.160): by 1984 all the accessible virgin forests of W. Malaysia and the Philippines may have been logged, by 2005 all those of Indonesia. — M.J.

An * indicates that the paper might be suitable as a first general introduction to students and other newcomers in the field.

LONGMAN,K.A. & J.JENÍK, Tropical forest and its environment, x + 196 pp., fig. and phot. (Longman, London, 1974). Paperback, in U.K. £ 1.95.

Contents: Some common misconceptions (2 p.); Forest and environment interacting: climate and distribution, soil catenas, man's influence (14 p.); Environment analyzed: light and shade, temperature, humidity, nutrients, wind (25 p.); Forest community: vertical structure, mosaic patterns, features of tropical trees, architecture, loss and replenishment, richness of flora, forest types (32 p.); Physiology of tree growth: bud-break, shoot-elongation, dormancy, leaf growth, senescence and abscission, cambial and root growth, physiological changes with age, flowering, fruits and seeds (40 p.); The future of the tropical forest (3 p.). The rest is plates (30 p.), references (22 p.), and indexes (27 p.).

The many data given are mainly from Africa, but not exclusively, and literature I expected, e.g. by B.Hopkins on Forest and Savanna, or by O.Hedberg on the mountains, was not found. The picture presented is too fragmentary to get near a balanced outlook; it gives a number of interesting facts and I hope that for Africa these are correct. As for Malesia, to reckon Actinidiaceae and Daphniphyllaceae to the families "containing dominent, abundant, or subendemic species of woody plants" (p. 71) seems as great a blunder as to list Asclepiadaceae among "the main groups" of epiphytes in Indo-Malesia (p. 70).

So in diversity and maturity I'd rate this book rather in the secondary forest class. — M.J.