

IX. REVIEWS

ARMSTRONG, J.A., J.M. POWELL & A.J. RICHARDS (eds.), Pollination and Evolution, vii + 108 pp. (1982, Royal Botanic Gardens Sydney). \$A 15.00 plus postage.

This publication is the edited text of nine out of eleven papers read at a symposium on pollination biology during the 13th International Botanical Congress in Sydney, August 1981. The majority of the papers deal with Australian plants and animals. A.J. Beattie discusses the paucity of ant pollination systems in contrast to the abundance in ant dispersal systems. From Vivienne Turner we learn that 25 out of 119 Australian marsupials are known to visit flowers, but only few actually play a role in pollination, mainly in Myrtaceae and Proteaceae. G.J. Keighery discusses bird pollination in Western Australia and D.C. Patton the influence of honeyeaters on flowering strategies of Australian plants. — M.M.J. van Balgooy.

BOR, N.L. & M.B. RAIZADA, Some beautiful Indian climbers and shrubs. Revised second edition, 321 pp., 99 photogr., 31 col.pl., 154 drawings (1982, Bombay Natural History Society). Rs. 100.

The first edition of this book appeared in 1954. It is essentially a reproduction of a series which appeared in the Journal of the Bombay Natural History Society between 1939 and 1948. The second edition is practically a reprint of the first. Although announced as a 'revised edition' I failed to find any changes, except that *Aristolochia elegans* decorates the cover instead of *Ipomoea rubro-caerulea* (= *I. tricolor*) and that the coloured plates are now numbered. It is to be regretted that modern nomenclature is not followed. In a way this is understandable since the book is primarily written for the gardening layman, who generally is better acquainted with older names. But certainly modern names should have been added in brackets, e.g. *Saritea magnifica* after *Bignonia magnifica*, *Pandorea pandorana* after *Tecoma australis* and *Euphorbia pulcherrima* after *Poinsettia pulcherrima*, to name only a few examples.

The book contains descriptions, notes on distribution, gardening and uses of 196 species belonging to 55 genera and 20 families. There are keys to genera in families with more than one genus and keys to species in genera with more than one species. The information given and the ample illustrations of these popular garden plants (the majority of which come from the Neotropics) certainly makes it a valuable asset for plant growers in the (sub)tropics throughout the world. — M.M.J. van Balgooy.

CHEN, F.H. (ed.), New Mirror of Flowers, 107 pp., over 100 col.pl. (1982, Library South China Institute of Botany, Academia Sinica, Guangzhou, Guangdong, China).

A charming booklet with an account of 100 selected cultivated plants in China, introduced and native, inspired by an ancient pendant published in the Qing Dynasty. Most photographs are close-ups and well reproduced. Text both in Chinese and English. Native country indicated. A good incentive for education and admiration of plant life. — C.G.G.J. van Steenis.

FAO, Tropical Forest Resources Assessment Project (in the framework of GEMS), covers the three main regions in four big tomes, all of 1981: one for tropical Asia, one for Latin America, and two for Africa. GEMS is the Global Environmental Monitoring System, a joint program of FAO and UNEP.

We will confine this review to Forest Resources of Tropical Asia, ix + 475 pp., mimeo, paper cover, US\$ 19.40 (Publications Division, FAO, Via delle Terme di Caracalla, 00100 Roma, Italia). It deals with Pakistan, India, Nepal, Bhutan, Bangladesh, Ceylon, Burma, Thailand, Indo-China ("centrally planned tropical Asia"), and the whole of Malesia but not the Solomons or other Pacific islands. For each of the 18 countries (Malaya, Sabah and Sarawak have been treated separately) a Country Brief has been prepared, ranging in length from 8 pages for Brunei to 41 for India; these cover the pages 117-475. The preceding text describes the methodology, and on p. 15-103 synthesizes the data from the Country Briefs, following the same design: General description; Vegetation types; Present situation of the woody vegetation, with areas; Ownership, legal status, and management; Forest utilization; Growing stock (in cubic metres); Plantations; Present trends in deforestation, utilization, and plantation area; Bibliography. The text is interspersed with clarifying remarks and documenting notes. It is the pages 77-105, expounding the Present Trends, Areas by the end of 1985, and Conclusions, that make up the summary, the nucleus of the report. This part anyway, but in fact the whole book, deserves thorough study by everyone who has to do with geography, land use, conservation, development. Within its chosen limits, the text is comprehensive, detailed, informative, and refreshingly frank in places.

With its dense, rather unattractive print (one page containing about 1.4 times as much text as one page of FMBulletin) goes an astonishing amount of fact. Countless tables are packed with figures. Of course, the data are not homogeneous, since the nature of the climax forests differs so much. For instance, NHCfluv - i.e. natural tree hardwood closed non-fallow productive undisturbed unmanaged virgin forest - stands in Borneo for a variety of dense dipterocarp forest types, largely untouched, while in Burma it stands for a variety of rather open deciduous mixed forests with their long history of moderate exploitation and artificial regeneration that cannot be termed 'intensive management' nonetheless. It is not too difficult, however, to unravel such differences; only, there is simply too much fact even to attempt here a digest or a summary of the whole. See also page 3910 in this Bulletin.

The study has already been hailed as 'the most authoritative estimate', and 'the precursor of a whole generation of tropical forest surveys'. It does indeed far surpass previous works by Persson (1974) and Sommer (1976) owing to the systematic use of LANDSAT remote sensing, and a massive input of manpower. Forest areas have been estimated in units of 1000 ha = 10 km². Not all figures are, of course, recent, the oldest ones dating from about 1960. Official and FAO sources furnished nearly all the data, but although many maps must have been seen by the compilers, no reference to maps has been made. Altitude is seldom given explicit consideration; it is simply taken that above a certain limit the forests are not 'productive'. Old secondary or long ago-exploited forest is just listed as

undisturbed. Here we touch on the scope of the study as a tricky matter. Within this scope: nothing but praise. A feat in forestry fact compilation. A deep concern about deforestation, and an excellent insight in its causes, from one country to another. Hope for the future is responsibly formulated. Plantation forests make up an important dimension of the study, with notes about success and planned extension. Nature reserves have not been forgotten. The long parade of figures, clarifications, trends and summaries cannot conceal, however – and does not want to conceal – that it all crystallizes around one sole criterium: the production of wood for industrial purposes.

"The undisturbed forests predominate in Irian Jaya with a standing volume of 6,335 million m³" (p. 66) is an example in point. A careful distinction has been made between accessible and inaccessible forest land throughout the study. So this is the standing stock of Irian Jaya? Traditionally, the lands in New Guinea are owned by the tribes. The country is steep in many places, and the erosion problems alone that would result from harvesting are well beyond imagination.

Incredible as it seems, the study has virtually nothing to say about the non-timber values of virgin tropical forest: stabilization of streamflow, of soil, and of local climate; genetic resource; source of knowledge; matrix of evolution. Occasionally, it has something to say on minor forest products (p. 60-61, 187, 222): rattans, resins, latex, medicinal plants, which to such a large extent support the traditional way of life in this part of the world, and what it has to say, has no consequences in the reasoning or the calculations. The FAO approach, as it finds its expression in figures, thus amounts to the view on nature "as a mere quarry for exploitation" as E.F. Schumacher noted in Small is Beautiful.

Such is the treacherous ambiguity of the study. Its declared long-term objective is "to assist the world community to formulate appropriate measures to avoid the potentially disastrous effects of the trends in the depletion and degradation of the tropical forest cover" (p. 2), while on the other hand it publishes estimates of growing stock in millions of cubic metres as if harvesting this capital would not bring about just more of these disastrous effects.

What I want to say is that these FAO estimates are plainly not rooted in reality. Whoever ventures one step outside the path of their tunnel vision on 'standing volume' (VOB), will blunder into social and environmental problems, and can only add to these problems. A report like The Forestry Situation in Indonesia (see p. 3020-3024) gives a shocking review of the disruptions in the ten years after the opening up the forests to foreign loggers.

I can imagine that the inhabitants of rain forest countries will be loathe to see their environmental capital held out for sale on the international timber market, as much as I would hate to see my house and possessions announced for auction. What an immense responsibility is bestowed on them by this study! Quantities of loggable wood are calculated that supposedly can be extracted from their 'productive' forests, endangering their country with the whole sad spectrum of bad environmental effects which in this book have only been casually mentioned. What an effort

awaits them to resist the unwise men in their countries and the clever men in the international timber trade, who want it all harvested without delay!

This study, the most advanced ever, in coverage and detail, is at the same time thoroughly antiquated in its narrow focus, typical of a waning period of technical giants and ethical dwarfs. It stands as a road-sign towards plunder, while also providing some means for outlining a well-founded land-use policy and, as a base-line for monitoring changes, the possibility to implement that policy. But it fails to set forth a vision on which to build such a policy, and through this failure seems likely to dupe the eager, the trustful, the uninformed, the poor, the generations of the next century. — M. Jacobs.

Flora of Australia. Australian Government Printing Service, Canberra. Orders to AGPS Mail Order Sales, P.O. Box 84, Canberra A.C.T. 2600, Australia.

Three volumes of this new flora, appearing under the auspices of the Bureau of Flora and Fauna, with A.S. George as executive editor, have now been published. Forty-eight volumes are scheduled, covering the Pteridophytes, Gymnosperms, and Angiosperms. Whereas Bentham's masterwork *Flora Australiensis* in 7 volumes (1863-1878) contained 8125 species, the present flora is expected to treat about 20,000 indigenous and naturalized vascular plant species.

The three volumes published will be reviewed separately. The reviewers want to congratulate the editorial team and the authors and they feel impressed by the excellent quality of the start.

Volume 1, Introduction. 1981, vi + 200 pp., illus., soft cover A\$ 9.50, hard cover A\$ 12.50.

The volume contains chapters by various authors. A.S. George presents the background of this new flora project, "its long gestation and difficult birth" (it took 20 years of preparation). Credit is justly given to George Bentham who almost single-handedly completed *Flora Australiensis*. An annotated bibliography of the most significant systematic publications on Australian plants concludes the chapter. I missed int. al. Domin, *Beiträge zur Flora und Pflanzengeographie Australiens* in *Bibl. Bot.* 20 & 22 (1915-1929) and Specht & Mountford, *Records of the American-Australian Scientific expedition to Arnhem Land* (1958).

B.A. Barlow discusses origin and evolution of the Australian flora. The old idea, going back to Hooker's classical introductory essay to the *Flora of Tasmania* (1860) and a century later supported by Burbidge, is to look upon the Australian flora as consisting of three elements: a highly endemic autochthonous flora of mostly xeromorphic character followed by later invasions of tropical Indomalayan (in the North) and temperate subantarctic (in the Southeast) floras. The modern idea based on plate tectonics is to look upon the Australian flora as derived from a Gondwanean stock. Remnants of the original flora in least modified form persist in the NE. and SE., whereas the characteristic scleromorphic flora is seen as an adaptive response to nutrient deficiency under increasing aridity.

The reconstruction of plate movements allows a first contact between the Australian and Sundaland plates in the Miocene, but one wonders about the role in plant distribution of the island archs shown on fig. 15 (p. 47) before they foundered. They surely must have had a flora.

A. Kanis gives an introduction to the system of classification used in the new flora. Comparisons are made between various current systems and arguments for the ultimate adoption of Cronquist's classification. This is shown on the inside of the frontflap at the same time showing the outline of the entire flora:

- Vol. 2 - 38 Magnoliopsida (Dicotyledons)
- Vol. 39 - 47 Liliopsida (Monocotyledons)
- Vol. 48 Gymnospermae and Pteridophyta

The key to the families of flowering plants by H.T. Clifford consists mostly of simple one-question leads, which made me feel rather apprehensive. I happened to have some unidentified material from Australia. Dr. Veldkamp, who conducted a course in taxonomy asked his students to identify the material with the key and in most cases it proved to work well.

The book is concluded with a useful glossary of terms compiled by Miss McCusker, with illustrations of leaf shapes and flower structures. — M.M.J. van Balgooy.

Volume 8. 1982, 420 pp., illus. incl. 16 col. fotogr., 446 maps, soft cover A\$ 29, hard cover A\$ 34.

This volume contains the families in Cronquist's system Lecythidales to Batales, 19 in all (+ Cochlospermaceae under Bixaceae), the largest as to number of species being Droseraceae, Cruciferae, Frankeniaceae, Capparaceae and Cucurbitaceae, by 16 authors.

There is an enormous increase in species as compared with Bentham's century-old account, the most baffling in Frankenia of which Bentham had 7 species; now there are 47. Viola grew from 4 to 8, Drosera from 41 to 54, Gyrostemonaceae from 9 to 17, Capparaceae from 18 to 27, Cucurbitaceae from 9 genera with 11 species to 13 genera with 31 species (and an additional 3 genera and 7 species naturalized). The largest increase is in Cruciferae of which Bentham had 15 genera and 50 species, now 19 genera and 91 species, with in addition 33 genera with 70 species naturalized.

Averagely one comes to an increase in species (258, Bentham for the same groups 131) of 100%, according to this volume, and irrespective of the introduced element. As to genera the increase is from 33 to 40. The increase is of course largely due to the extensive exploration in the past 100 years, and in part probably to a narrower species concept than Bentham employed. These figures show how necessary it was to plan a new Flora of Australia.

Printing and illustrations are excellent. The price is moderate.

In the introduction the editors note that some families are treated afresh, while others are more compilations; and that further research is needed, as e.g. in Cucurbitaceae, where several species recognized are indicated by letter, but have as yet no epithet. Critical notes and

novelties are given in an Appendix: 2 new genera, 17 new species, many new infraspecific taxa, and many new combinations.

I was amused to learn from the Introduction that "The volume illustrates very well one of the tenets underlying the Flora of Australia project — to follow a particular system of classification (the Cronquist system) and to ensure that all families are treated ..." Though I have certainly respect for the system adopted, it is well-known that there are more systems and some which I equally respect. The main issue is: what is the use of a system for the user? Does he care whether *Drosera* is in volume 8 or 9 or 27? And what will this system be 50 years from now? No doubt phylogeneticists will go on shuffling with their ideas and new factual data will come in. Also the dogma of a system does not ensure that all families are treated, because some taxa are still in the wrong family, or genus, of which I know at least three instances for the Australian flora. In the preface of the next volume the editors might be somewhat more precise and cautious about their wording of the proper aim of the Flora. — C.G.G.J. van Steenis.

Volume 29. 1982, 208 pp., illus. incl. 32 col. photogr., 207 maps, soft cover A\$ 22, hard cover A\$ 25.

This volume contains the family Solanaceae, treated by R.W. Purdie, D.E. Symon and L. Haegi.

The tendency in this flora is clearly to be concise, but the execution is cleverly designed to give within this restriction essential information to identify a plant, to check its characters with a description (10-16 lines generally), to know where it is found and what is its habitat. Identification is achieved by an indented key to subfamilies and tribes, another key leading to generic names, and within each genus to the species; leads are usually one line, but clear. There is a welcome tendency to make use of vegetative characters if possible, enhancing practical use. References to the species are limited to the original description, both for the adopted name and the synonyms. Why there is no consistent reference to Bentham's Flora is unclear to me.

All names in all ranks are typified. Under each species there is a line devoted to references of published illustrations. Under the genus one often finds references to published monographs or other important precursory papers or revisions. There is also consistently an explanation of the derivation of the generic name as a singular extravagance.

Under the species, there is besides the description, and the data on distribution and ecology (mostly 2-4 lines) a record of selected or illustrative specimens, the mention of which appears to me of rather doubtful value for the user. Occasionally there are also brief entries on uses or toxicity of species and sometimes there are notes on variability with bearing on taxonomy. After the species description the chromosome number is mentioned when known, and sometimes vernacular names are mentioned. There is a reference to a map of distribution; though small (15 to a page) these maps are clear and form a welcome addition.

In this volume the excellent figures relate to details of flowers and

fruit; there are no habit figures, except in the beautiful colour photographs.

The volume ends with a list of symbols, abbreviations and contractions and an index to Latin and vernacular names.

Australian Solanaceae, native and introduced, count together 24 genera and 199 species, Solanum with 117 species being by far the largest. — C.G.G.J. van Steenis.

FUNDTER, J.M., Names for dipterocarp timbers from Asia, 251 pp., map (1982, Pudoc, Box 4, Wageningen). Offset typescript, cloth, Dfl. 80.

Contains over 6000 timber and tree names not only from Asia, but from Malesia including New Guinea; 123 districts in the whole region are indicated on p. 250-251. List 1 refers vernacular and trade names to botanical names (checked with Ashton's Flora Malesiana manuscript). List 2 gives species, scientific names with vernacular names, density, durability class and distribution. List 3 gives botanical synonyms referred to their proper name. References c. 350. The book seems very useful. The typework has been well-done, errors are very few. The paper is fine. Author is a wood anatomist at Hinkeloord, Box 442, Wageningen, The Netherlands. — M. Jacobs.

HARA, H., A revision of Caprifoliaceae of Japan with reference to allied plants in other districts and the Adoxaceae, 336 pp., 74 fig. (partly maps), 55 + 4 (col.) pl. (photogr.). Ginkgoana no. 5 (1983, Academia Scient. Book Inc., Daido Bldg., 2-39-6 Hongo, Bunkyo-ku, Tokyo). US\$ 60.

Professor Hara's latest work is a very detailed monograph of a family which centres in East Asia, 8 genera with 55 species, out of a total of 14 genera with c. 450 species. In Japan Lonicera, Weigela and Viburnum are the largest genera. Hara discusses the delimitation of the family, using the newest data from palynology, cytology and phytochemistry; his conclusion approaches that of Cronquist, leaving Adoxaceae as a closely affiliated separate family with 2 genera in China. The genus Abelia is split into two. A key to all genera of the family is provided. Great attention is given to variability of the species, cytotypes being arranged as formas. In Weigela hybridisation and introgression are found. The intricate synonymy of infraspecific taxa is unraveled and all collections examined during three decades of work have been cited. For Viburnum an attempt is made towards a genealogical diagram reflecting the interrelationships of the sections and subsections derived from an evergreen subtropical prototype. The correlated information in this monograph is a substantial addition to the understanding of the family. The excellently reproduced plates, among which many close-ups and SEM-photographs of pollen grains, are most instructive. — C.G.G.J. van Steenis.

HENNIPMAN, E. & M.C. ROOS, A monograph of the fern genus Platycerium (Polypodiaceae), 126 pp., 31 fig., 12 pl. Verhand. Kon. Ned. Akad. Wetensch. afd. Natuurk. II, vol. 80 (1982, North-Holland Publ. Co., Amsterdam, Oxford, New York). Paper, Dfl. 75.

This monograph of the well-known Staghorn ferns covers roughly the

same ground as an earlier series of papers by Joe Hoshizaki (see *Biotropica* 4, 1972, 93-117). 15 species are recognized (4 of Hoshizaki's 18 species have been reduced to infraspecific categories), of which 5 occur in Malesia and 3 in neighbouring regions. All species are extensively treated with full synonymy, line drawings, distribution maps and notes. In the descriptions much attention is given to the rhizome scales and the shape and position of the fronds, in the key mainly macroscopical frond characters are used. The key is accordingly only applicable to living plants and to very completely collected herbarium material; unfortunately such collections are scarce, as is also noted by the authors on p. 118. Inclusion of some microscopical characters might have made the identification of incomplete material at least partly possible. Two short chapters are devoted to the collecting of *Platycerium*s and the material recommended for further collecting, these two chapters should be read attentively before each field trip.

A large part of the book is taken up by a detailed analysis of the phylogeny of the genus according to Hennigian methods. The results of this analysis differ drastically from the phylogenetic scheme given by Hoshizaki, who used the only marginally different Groundplan-divergence method devised by Wagner. Partly this difference is due to the different sets of characters used, partly to different interpretations of the same characters. It is highly instructive to see how widely different transformation schemes can be constructed from essentially the same data. In determining the direction of their transformation series Hennipman and Roos rely heavily on the application of the so-called out-group criterion. Unfortunately, they contradict themselves several times here, e.g. the polarity for character no. 3 is determined by intuition on p. 14, whereas on p. 37 the out-group criterion is claimed to have been used; the polarity of characters 4, 5 & 6 is determined by out-group comparison (with the sister-genus *Pyrrosia*) on p. 14, whereas on p. 37 so-called "functional out-groups" within *Platycerium* are said to have been used; and there are several such inconsistencies.

With the cladogram as a base, a comparison is also made between various possibilities to explain the present distribution by way of counting the number of events (dispersal or vicariance) necessary to arrive at the present geographic pattern. Several hypotheses turn out to be equally parsimonious, and the conclusion that possibly Africa is the centre of origin of the genus remains tentative. In keeping open the possibility of a relatively early origin of the genus the authors at least agree with Hoshizaki, although this is based on different considerations.

The relatively minor inconsistencies mentioned above do hardly distract from the merit of this book. Apart from a useful account of the genus it is also a stimulating example of the application of a — for obscure reasons — still somewhat controversial methodology.

The execution is fine. There are few errors (most notably the interchanges of the geographic designations of several species pairs on p. 54), the drawings are instructive, and there are several pages with very beautiful photographs. — P. Hovenkamp.

HODD, T. & P. HODD, Grasses of Western India, 167 + (2) pp., 6 + (68) fig. (1982, Bombay Natural History Society, Hornbill House, Shadid Bhagat Singh Road, Bombay 400 023, India). Rs. 50.

A somewhat grandiose title for a nice little booklet, in which 72 species of grasses of the Gir Forest Reserve, identified by the late Dr. Bor, are described and depicted. Of interest are the brief notes on the Reserve: history, topography, geology and soils, climate, forest types, their distribution and abundance, and the impact of man (5,000) and cattle (17,000-45,000, depending on the season). Due to overgrazing, browsing, wood gathering and the official aim of monocultures of teak or *Acacia arabica* the forest is gradually retreating, depleted, and will ultimately be destroyed. It is therefore fitting and useful for future naturalists to have this treatment of secondary grasses, interesting as they may be. A possible first for India is the most useful key based on vegetative characters. The drawings are reasonably clear, but it would have been nice to know which species they represented, e.g. fig. 6.3 is *Coix lacryma-jobi* apparently absent in the area, which is surprising (no *Imperata*, either?). For each species a herbarium specimen has been photographed, but a sharper focus, better lighting and higher resolution should have been used to give more than the silhouette now usually shown, although it is still helpful. Vegetative (no generative) characters, flowering period and ecology are briefly noted, but no Gujarati names, although they were promised on p. 26. The book is well-executed with few misprints (*Hackelochloa granulata* and *H. granularis*, correct, are separately listed in the index!). A worthwhile aid for non-specialists in tropical Indian grasses. — J.F. Veldkamp.

HOLZNER, W., M.J.A. WERGER & I. IKUSIMA (eds.), Man's impact on Vegetation, xii + 370 pp., many illus., large 8°. *Geobotany* 5 (1983, W. Junk, Publishers, The Hague). Dfl. 225.

The main purpose of this excellently produced work, dedicated to Prof. Makoto Numata, nestor of Japanese ecologists, on the occasion of his 65th birthday, Nov. 1982 is to bring together, from all parts of the world, clear information on man's impact on our green world, which factual material may promote scientific nature conservation. More than 30 specialists contributed. The book is divided into two parts, the first part containing general chapters on productivity, decrease of species diversity, effects of pollution on land and in water, and effects of fire, the second part containing man's impact in various vegetation zones of the earth. The examples are largely derived from boreal, temperate and warm-temperate parts of the northern hemisphere, where, indeed, the largest concentrations of people are found. The only exceptions are the chapters by M.J.A. Werger on the grasslands and savannahs of tropical Africa, natural and man-made, while D.M. Moore in treating the impact of man on island vegetation also included its effects on the southern hemisphere and tropical islands. Land-use by man has been frequently disastrous and it is the task of biologists to get the governments concerned about this, as there seems to be no halt to the multiplication of the human protoplasm, which

necessitates the more intense use of nature's resources, threatening even the most remote corners of the earth, the antarctic, the depths of the oceans and the lofty mountains. The future looks bleak and the only way to do anything about it is contained in an ancient Chinese saying, the device of the book: "If you plan for one year, plant rice, if you plan for ten, plant trees, if you plan for one hundred years, educate mankind". Popularize, and Educate, both laymen and, in particular, politicians. Let us hope that this work will contribute material for this worthy purpose. — C.G.G.J. van Steenis.

Indonesian forestry abstracts. Dutch literature until about 1960, xviii + 658 pp., 18 photogr. (1982, Pudoc, Box 4, Wageningen, The Netherlands). Cloth Dfl. 200. Spine 30½ cm, weight 2290 gram.

Financed by Dutch Overseas Aid, a team of 13 Dutch and Indonesian abstracters laboured for three years, co-ordinated by C.P. van Goor (De Dorschkamp, Box 23, Wageningen), with Junus Kartasubrata on the Indonesian side.* They digested the entire production (on paper) of the Dutch colonial forestry effort. The backbone of this is, of course, the journal *Tectona*, but 92 other periodicals have been listed. Vast amounts of unpublished reports have been included. The whole lot is to be microfiched for use in Indonesia.

Items are in alphabetical order under a multitude of headings according to the Oxford Decimal Classification. As the headings are printed in the same type as the titles they are difficult to distinguish. The original Dutch titles have been given, followed by their English translation in bold type. Maps are mentioned only in passing, and without data, which means that a source of great value with regard to the history of forest lands, land use planning, and management, is still to be opened up. Sometimes a book review is included but not the book itself, like Van Steenis' important Maleische Vegetatieschetsen (558). Some items are announced, incorrectly, as unpublished: Lam's Verslag van den 1sten secretaris was printed in *Ned. Ind. Ver. Natuurbesch. Verslag over 1920-1922*, p. 7-27 + 2 phot. (1923), see item 153. Item 4935, an excerpt of Lam's diary of his trip to the Moluccas, should have been replaced by the comprehensive paper in *Blumea* 5: 93-256 of 1942. Van Steenis' Homo destruens (1729) was published by Noordhoff-Kolff in 1954: 24 pages. A report by W. Meijer on the forest of Cibodas was included (552), but not his paper on the subject printed in *Acta Botanica Neerlandica* 8: 277-291, 3 fig. (1959). Papers published in parts have been separately catalogued, a rather unusual practice.

The long series of summaries of Annual Reports of the Forest Service, and those of countless tour reports and descriptions of forest lands are often first-rate achievements. They enable us, with little effort, to piece together the forest history of many parts of Indonesia (helped by the indexes), and the history of forestry as a human activity itself,

* An editor as such is not mentioned. It seems practical to refer to it as an anonymous book, with the number of the abstract: *Indon. For. Abstr.* n. XXX (1982).

highly determined by economic and political forces of the time. Contrary to the British in Malaya and the Americans in the Philippines, the Dutch in Indonesia had to spread themselves thin, and they were confronted with an astounding variety of physiography, ecosystems, and population, which had to be reconnoitred. They concentrated on the teak plantations in Java, while in the Outer Provinces much effort was put into exploration, surveying, and regulating use. Silvicultural systems comparable to those in Malaya were not developed; there are, for instance, but 5 items on girdling (1086-1090).

Not much has been done, however, to include here works which summarize and explain this diversity. Klein's standard work on west-New Guinea is not found, nor the *Encyclopaedie van Nederlandsch-Indië*, or Honig & Verdoorn's *Science and Scientists in the Netherlands Indies*, and there is not much on geology and geomorphology, either. This does not matter much, however, as the recent Conservation Literature on Indonesia. Selected Annotated Bibliography by Jacobs & De Boo discusses all these and other works and also, of course, those on conservation, not a strong subject in the present book. Botany is another weak area. Since neither the *Bulletin du Jardin Botanique de Buitenzorg* nor its successor *Reinwardtia* were included, we miss D.F. van Slooten's papers on Dipterocarpaceae and several exploration reports. 'Flora Malaysiana' is mentioned as an afterthought on p. viii, and so we miss Van Steenis' useful taxonomic bibliography and synthesis on mangrove both in volume I, 5. Koorders' Atlas, an eminently practical aid to identification of trees (212) is provided with just 2 lines of annotation. Van Steenis' Flora voor de Scholen van Indonesië (247) hardly qualifies as a work of relevance to forestry.

Number 334 is the same as 349; number 140 is the same as 525, under different headings, of course, but such cases are rare. The English is on the whole remarkably good and fluent. The glossary could have been more extensive; only towards the end of the work was my curiosity satisfied about the word panglong (5999: Chinese wood exploitation enterprises) along the coast of eastern Sumatra. The *f* sign for Dutch guilder is not explained, nor is the unit sm (2902 reveals it as a stapel meter, which is 450 kg of teak firewood). Overall accuracy is good, however, although 1102 and 1184 are one number wrong in the Author Index (to 1101 and 1183).

Since the words handbook, manual, teaching, and textbook do not occur in the Subject Index, it is impossible to directly locate such items.

While plenty of papers deal with subjects like Minor Forest Products, certain subjects seem to be under-represented, apparently because they were not studied. There is hardly anything on colonization and settlement – although transmigration dates from about 1905, very little on agroforestry (see 857), not very much on bamboo, or on rehabilitation of wasteland. It is, however, difficult to get to the subjects actually. The List of Contents on p. xvi-xviii is confined to the main subjects. Education, for instance (listed under heading 945.3) is not to be found there, only category 94 is, 'Other methods to implement forest policy'. It can be found in the Subject Index, but Storms (421.1) can not.

The strength of the work clearly lies in the carefully made, often

extensive, and highly informative summaries. Intended to bring out essentials and value, some of them can almost be called essays. This emphasis and elaboration lends to the book a genuine encyclopaedic quality. The completeness for which it strives is, of course, as much an asset as a liability. It is hard to see the relevance to modern forestry of a comment of 1915 on the question whether the Forestry Service was moving in the right direction (2289), discussions on gutta percha held about 1900 (p. 350-352), or the dangers of circular saws as viewed in 1894 (1456), and there is very little we can do with the heated exchanges about the reorganization on the Service in the mid-1920's. This wide scope stamps the work as a historical sourcebook; I shall come back to this point.

Within this scope there is nevertheless a strange imbalance: many most important works have been very sparsely annotated, while others enjoy a disproportionate amount of space. The thesis by A. Thorenaar on bark characters (3040), an outstanding work of 207 pages with meticulous descriptions and many photographs, gets 12 lines. An 800-page manuscript on early forest history of Java (3753) gets 9 lines. The splendid book on pests and diseases by Kalshoven, which offers a fine introduction into agricultural zoology in the bargain (1640-1) is dismissed in 9 lines. A 280-page book on the soils of Java and Sumatra by the great Mohr (15) gets 4 lines. Yet a 26-page report on wood marketing in Britain and South Africa (1919) gets 60 lines, a 44-page report on forest regeneration in Bangka and Belitung (614) gets 105 lines. A 20-page report on Pulau Laut of 1920 (4835) by an unknown author gets 41 lines.

The other main area of weakness is a lack of foolproof accessibility. Chapter 9, 'National Aspects of Forestry', is a dustbin, containing 40% of all items. For the Forest District Walikukun, Lever made two extensive management plans, a stricter one (2098), listed under 624, 'Methods of management planning', and a final one (2175) listed under 628, 'Actual working plans'. So far so good, but under the same heading, the stricter one has again been entered (2177) with a somewhat different abstract. I think a case like this demonstrates the impossibility to classify properly all these entries. Item 2574, a management plan every inch, has been misplaced under 682, 'Private forest administration'. Nobody will look for a paper on theft of teak bark (1537) under 'Forest injuries and protection'. Jelutung is a base for chewing gum and sure enough, 1307 is classified as a gum crop - but jelutung is actually a latex crop. Annual reports are listed in several groups: 2381-2418 deal mostly with the Forestry Service after 1900, in brief; 4066-4109 cover the same ground but more extensively; 4380-4401 deal with forestry during the 19th century; 4478-4488 report on west-New Guinea in the years 1950-1962. Among silviculture, we suddenly come across a paper on a legal subject (634).

Under the 'larger' heading, the number of cross-references is too great to be helpful. And if there is a correspondence between items, as in the case of additions, corrections, and comments, in the majority of cases there is only a reference under the later paper to the earlier one, no advantage having been taken of the hindsight: paper 3280 is criticized in paper 179, but this is not mentioned in 3280. Only by exception has a reference to a comment been made, like under 2334 to 2231.

Another barrier is a lack of indications where sites are located. Consistent naming of province would have helped. Now I looked in vain for the location of the Forest District Walikukun (2098), finally to learn that the name was changed (2453) into Forest District Ngawi, which rang a bell: East Java N of Madiun. In the Subject Index, Walikukun can be found under Management Plans (p. 643), but not the reference to the name change. Sometimes I was puzzled where a tour was made, among nothing but obscure names, like in 1180, until in this case the Gaultier Mts pointed to Irian Jaya. The indexes do give help, but brain waves are sometimes needed: I looked in vain in the Subject Index for djati, jati, and teak, only to discover it all in the Species Index under Tectona grandis, 1886 references ... to items which as often as not contained the word Tectona grandis.

These three points: the multitude of abstracts unselected, the poor treatment accorded many important works, and the unsolved classification problems with limited guidance to this labyrinth of information, makes Indonesian Forestry Abstracts a challenge to cope with. It will probably become a manual itself (and deservedly so), which many readers will jump on as their source of wisdom, not bothering too much about the actual publications — except, we hope, the textbooks.

With this firm foundation laid, two more books are needed, one to look back and one to look ahead. By the former, I mean: a handsome digest of all this knowledge, the history of forestry in Indonesia which is yet to be written and which could, in a running account studded with significant facts, open up the labyrinth. It should sketch the enormous diversity of Indonesia, dwell a bit on the historical context as it unfolded, and introduce some biographical data, too, so that we better get to know Beversluis, Endert, de Haan, ten Oever, te Wechel, and those many others who left their mark.

The book to look ahead should result from a distillation of precisely such knowledge and experience as to produce (in the words of Soedjarwo) "adequate tools for guiding, controlling and stimulating this development of Indonesian forestry in such a way that everlasting benefit will be achieved for people and country." This effort will entail some botany, much conservation, all knowledge acquired after the closing date of these Abstracts, in various tropical countries, and new perspectives opened up in soil science and ecology. This should not be impossible, witness, for instance, the remarkable overview by George N. Baur, The ecological basis of rain forest management (1964, Forestry Commission of New South Wales, Sydney).

Indonesian Forestry Abstracts is a platform, a foundation which has 'almost everything' for further construction. A two-fold effort along the lines just indicated, accompanied by a large-scale transfer of knowledge and training in the forest, is now needed to make it function.—M. Jacobs.

KEAST, A. (ed.), Ecological Biogeography of Australia, 2182 pp., many illus., relief map, in 3 volumes, boxed. Monogr. Biol. 41 (1981, W. Junk Publ., The Hague; ISBN 90-6193-092-8). Clothbound, US\$ 495, Dfl. 950.

The progress in biogeographical knowledge of Australia, especially the new developments in the field of plate tectonics, necessitated a re-

appraisal of the situation only 20 odd years after publication of Crocker & Christian's 'Ecology and Biogeography of Australia' (1959). The present work consists of three volumes. Volume 1 contains two parts: 1) The development of the Australian environment (7 chapters), 2) The flora of Australia (20 ch.). Volume 2 contains part 3) The terrestrial invertebrates (10 ch.), part 4) Biogeography of inland fresh water (9 ch.), part 5) Biogeography of poikilothermic vertebrates (5 ch.); and Volume 3 contains part 6) Biogeography of homeothermic vertebrates (9 ch.), part 7) Origins and ecology of aboriginal man (7 ch.), and part 8) Integration (2 ch.). There are a subject index and a systematic index.

In this review only a few of the chapters, mainly in volume 1, with a bearing on Malesian botany will be discussed. A review of Webb & Tracey's chapter on Australian rainforests (p. 605-694) was written by Jacobs in Fl. Males. Bull. 35 (1982) 3799.

The chapters by Crook & Powell, Johnson & Veevers treat the geological history of Australia since the break-up of Gondwanaland 125 m.y. ago. The various events are described and shown in reconstruction maps. Australia is shown in late Eocene (38 m.y. ago) between 30° and 60°S but the outer Melanesian arcs as far N. as 5°S (p. 9) well into the Tropics. Reconstructions of past events are marred by the fact that there is often no consensus upon timing (p. 12). Thus we read on p. 54 (Galloway & Kemp) that elevation of the Eastern Highlands only started in Miocene, and on p. 112 (Nix) that it commenced in Mesozoic.

The climate was warmer in Palaeocene Australia than expected from its southern latitude. There is no evidence for an icecap on Antarctica (Kemp, p. 34). This relatively warm climate persisted well into the Miocene and the inland must have been moist (p. 36).

The present day Australian flora is mainly derived from a Gondwana stock (Beadle, p. 413). Warm temperate to tropical rainforest must have been widespread, until increasing aridity caused retreat accompanied by extinctions (Christophel, p. 377, Martin, p. 391). Present day vegetation types are discussed by Specht. His tables give a good idea of floristic diversity. Of special interest is the closed tropical and subtropical forest (p. 174-181), now restricted to the Northeast, which must be looked upon as a remnant of the original Gondwana stock and not just a depauperate Indo-Malesian vegetation type (Webb & Tracey, p. 607).

Deep weathering of the soil has been going on since Cretaceous. By Miocene time the continental platform was covered with a lateritic mantle, mostly very poor in mineral nutrients (Nix, p. 103). This, together with increasing aridity, gave rise to the flora that is now considered typical Australian.

The role of fire in the evolution of Australian organisms is discussed by Recher & Christensen (p. 135). There are marked adaptations for survival (amongst others lignotubers), many species require fire for successful reproduction.

Several authors follow the history of certain taxa in Australia: Page & Clifford the Conifers and Ferns (p. 471); Clifford & Simon the Grasses (p. 507); Pryor & Johnson Eucalyptus, the genus most of all associated with Australia (p. 499); and Barlow the Mistletoes (p. 555). The discus-

sion of Johnson & Briggs of three typical southern families centering in Australia, Restionaceae, Myrtaceae and Proteaceae is at the same time a study in the history of scleromorphy.

This work is of high standard and will be much consulted by students of biogeography of the southern hemisphere for a long time to come. Execution and binding are good, as usual with Junk. Yet I found a rather unexpected number of printing errors. In a work of this kind written by so many authors and probably at various times it is inevitable to find repetitions and even inconsistencies. The greatest disadvantage, however, is the price which will keep 'Ecological Biogeography of Australia' out of the hands of most individuals, not associated with a large institute. — M.M.J. van Balgooy.

MAY, B. & P. MOMAL, Forest for food. Report prepared for the transmigration area development project East Kalimantan (June 1981) 67 pp. mimeographed, appendices, tables.

A background report for the U.S./Indonesian Man and Biosphere (MAB/Unesco) project 'Interactions between People and Forests in East Kalimantan'. The report by Dr. May, teamleader, and Dr. Momal, program coordinator, gives a well-worded, substantial survey of the various forest products in the forests of East Kalimantan, their value, uses, modes of maintenance and status in the original vegetation, together with information on how they should be accommodated in the home-gardens of the immigrants, which species should be encouraged, etc. Information is given about the various forest types and their relation to soil types. The report also indicates how forest can be managed for game production. The idea of the project is to come to a supporting scientific organisation for the transmigration project and settlement tied up with experimental trials in the field, especially for fruit trees, while it is realized that local forest reserves, as source areas, should be established. In short, all sorts of facets to canalize efforts towards a successful and harmonious colonisation, and to prevent a wild-west situation by these very substantial changes of land-use. — C.G.G.J. van Steenis.

PRADHAN, U.C., Indian orchids: Guide to identification and culture. Vol. I, (viii) + viii + 189 pp., 55 col. fotogr., 2 pl., many text fig. (1976), Vol. II, (viii) + iv + (xxii) + 558 pp., 107 col. fotogr., 1 pl., many text fig. (1979) (U.C. Pradhan, Rishi Road, Kalimpong 734301, India). Cloth, US\$ 18 & US\$ 35.

The first volume offers a short preface, acknowledgements, a glossary, an introduction, a chapter on orchid culture, a key to tribes, subtribes and genera, keys to the species, descriptions, and illustrations, a source list of the drawings, an appendix with accepted names, synonyms and available chromosome numbers and an index. The second volume is a continuation of the first, and offers a preface, keys to the species, descriptions and illustrations, an appendix with accepted names, synonyms and available chromosome numbers, an appendix describing orchid habitats in India, an index to both volumes including the synonyms, a supplement to Vol. I, a supplement to Vol. II, an index to the supplements, a source list of the

drawings, a bibliography to the chromosome numbers cited, a bibliography to taxonomical literature, and a list of errata.

A concise chapter is devoted to orchid culture; with each species an indication is added by means of Roman figures, often also for potting media by a capital letter, both referring to that chapter. The main portion of the work consists of keys for identification, descriptions and illustrations. In the key to the tribes, subtribes and genera only the genera are keyed out, taxa of higher level are diagnosed by a short description; no reference to page number is given. In the descriptive part descriptions of genera and sections are in general wanting. Keys to sections (if given) and species are present, either or not combined; either or not a page reference is given. Each species is provided with a short description, flowering time is indicated, and distribution and altitude are given: detailed for India, general for the entire area.

Rather simple line drawings are provided for most of the species, of varying quality, in almost all cases copied from earlier literature. Usually these show the habit of a plant, a flower, and often also some details. The colour photographs in the first volume are of a meagre quality, those in the second volume slightly better.

Some sections, several species and quite some varieties are described new; these are often not validated in the text but in the supplements. Many new combinations are given.

As stated in both prefaces, this work is not more than 'a preliminary effort' for a 'future perfect or nearly perfect representation of the orchids of India'. A large amount of work has to be spent to bring it to a high scientific standard; it serves no purpose to indicate all inconsistencies. Of more interest is it to know whether the main goal, i.e. providing work with which orchids can be named, has been attained. When trying to identify a few boxes of unidentified orchids from the collections of the Rijksherbarium all complete material could be named. Users with a fair amount of knowledge of orchids will find this work suitable for identification of a surprisingly high percentage of Indian orchids. — E.F. de Vogel.

SCHLECHTER, R., The Orchidaceae of German New Guinea (incorporating the Figure Atlas to the above), (x) + 1180 pp., 389 page-size plates, 2 folding maps (1982, The Australian Orchid Foundation, Melbourne). Editor: D.F. Blaxell. Translation of the German text by the late R.S. Rogers, H.J. Katz and J.T. Simmons. Original title: *Die Orchidaceen von Deutsch-Neu-Guinea (& Figuren-Atlas)*. Boards, leather-bound copies available on request. Order from Australian Orchid Foundation, 107 Roberts Street, Essendon, Victoria 3040, Australia. A\$ 150.

The voluminous basic reference on New Guinean orchids by Rudolf Schlechter, *Die Orchidaceen von Deutsch-Neu-Guinea*, has been translated into English. This will delight all persons interested in orchids from that area who are not fluent in the German language. The translation aims at deliberately retaining "the quaint Schlechterian style as faithfully as possible without sacrificing accuracy of observation and botanical description". And indeed, the translators succeeded adequately in all in-

stances I checked. Obvious mistakes were pinpointed, and corrected by editorial comments; misspellings are corrected in general without comments. The many Latin descriptions have not been translated.

In one major aspect the lay-out of the translation differs from that of the original work. Schlechter first published the text volume (1914), after his death the plates appeared in print (1928). Consequently, in the text there are no references to the figures, and unfortunately no index was given to the figures in the plate volume. This makes finding the illustration corresponding with a description a rather tedious job. In the present translation the plates are incorporated in the text part; each 'Group' (subtribe in the modern conception) is followed by the matching plates. The handwritten names below the illustrations are replaced by printed ones, and figure numbers are omitted.

Seven appendices are added. These are useful additions, especially for persons who are not professional botanists. These are:

1. Authors and their abbreviations as used by Schlechter.
2. Collecting localities in German New Guinea and the German Solomon Islands, with grid reference, co-ordinates, map reference, and recent names.
3. Geographical names outside German New Guinea and the German Solomon Islands, with indication of locality or recent names.
4. Itineraries of Schlechter's travels in German New Guinea and the German Solomon Islands.
5. Serial publications with abbreviations as used by Schlechter.
6. Non-serial publications with abbreviations as used by Schlechter.
7. Schlechter's collection numbers for Orchidaceae of German New Guinea.

Three maps are given on two folding sheets. Two show collecting localities in Kaiser Wilhelmsland and the Bismarck Archipelago, presenting Schlechter's localities and the currently used names. The third map is a reprint of the map of 'Neu-Guinea und der Bismarck-Archipel' from Stielers Hand-Atlas, 9. Aufl. (1902).

The translators and editors are to be congratulated for having finished this tremendous task. The quality of print and plates is in general very good, and the book is well bound. In a very few instances some plates do not reach the standard of the other reproductions, like those on p. 110 and on p. 144; on the last map several names are almost illegible. Placing the matching plates directly after each 'Group' facilitates to some extent consultation of a wanted illustration. With the larger ones, however, like Dendrobiinae and Bulbophyllinae one has to turn to the index for the page number; a direct reference in the text to the page number of the illustration would have saved the regular user much time.

Translation of a book on orchids for the English speaking public is in all probability not only intended to serve professional botanists, but also aims at the interested amateur. In this respect it is regrettable that the Latin descriptions of the species are not translated into English as well. Keys to the species were not given by Schlechter, and the only means of identifying the plants is now the illustrations, or the user has to turn to the Latin descriptions. Anyhow, unfulfilled wishes

always remain. The book is a solid 7 cm thick, 2.2 kg heavy valuable source of orchid information now made available to the English speaking public, giving information on 1420 taxa, of which Schlechter described 1185 new. — E.F. de Vogel.

Survai Tinjau di Propinsi Kalimantan Tengah. Reconnaissance survey in Central Kalimantan. Phase I/Maps, 14 maps (1981, Indonesia-ORSTOM Transmigration project), 58 by 40 cm.

The region on which the study focuses is c. 300 by 120 km, stretching in a SW-NE direction in the dryland forest area N of Sampit; in the headwaters of the rivers Seruyan, Mentaya, Kaingan, and Kahayan, but on several maps the entire province is shown. Most interesting are a general rainfall map of all of Indonesian Borneo; a map of rivers with rapids, habitations, and main logging roads; population and income from jelutung, rattan, etc.; areas under shifting cultivation (throughout, along the rivers); soils; 1:250,000, and land suitabilities for a number of crops. Execution is fine, several maps in colour.

Circulation is limited, try with Dr. E. Torquebiau, BIOTROP, Box 17, Bogor, Indonesia. — M. Jacobs.

TRACEY, J.G., The vegetation of the Humid Tropical Region of North Queensland, 124 pp., 45 fig., 15 pl. (photogr.) (1982, C.S.I.R.O., Melbourne).

This paper is the first full description of the largest continuous area of rainforest in Queensland, roughly from 15° (Cooktown) to 19° S.L. (Ingham). It summarises the data gathered for many years by the author and Dr. L.J. Webb. The area ranges in altitude from sealevel to 1600 m and has a wide range of soil types. Together with the high rainfall (up to over 4000 mm annually, this allows for a variety of vegetation types some of which are as complex and rich in species as in Malesia. The description is based on aerial photographs coupled with extensive ground control. Each type is described as to structure, illustrated with profile diagrams, floristic composition, elucidated by lists of the most common species of canopy, ground layer, epiphytes etc. and a discussion of the variability and distribution of each type. Together with the photographs a good picture is obtained of this unusual part of the Australian vegetation. The high scientific importance of the Queensland rainforest has been stressed before. Despite a significant proportion of endemic taxa the forest shows distinct links with rainforest in Malesia, particularly New Guinea and also with New Caledonia, Lord Howe I., etc., reflecting its long history. Over 40% of the Queensland rainforest has already been cleared. It is to be hoped that whatever is left is carefully preserved. — M.M.J. van Balgooy.

WEISCKE, A.S., Struktur und Funktionen in Waldökosystemen: Strukturvergleich zwischen kerangas und caatinga. Thesis, Hamburg (1982) 83 pp. mimeographed, maps, graphs.

The area of kerangas was in Sabal Forest Reserve, Sarawak, that of the caatinga in the upper course of the Rio Negro in Brazil. Data on the

Sabal Forest Reserve were obtained by the promotor, Professor E.F. Brünig in 1963, who planned it to be a permanent ecological research area. Both areas are ecologically comparable: lowland, nutrient-deficient acid pod-sols, 3500-4000 mm precipitation, everwet save for short dry spells. The caatinga area was analysed by rather sophisticated means; the aim of the study was to see whether this was applicable for the kerangas; both areas covered c. 20 ha, which were subdivided into 500 squares of 20 by 20 m, in which all trees over 10 cm dbh had been noted; together 16,575 trees. Higher trees 8,682 (278 species), lower trees 7,893 (309 species); all species below 1% of the total. The most common species of the higher trees is *Calophyllum sclerophyllum*, in the lower *Hopea vacciniifolia*; in both the dipterocarps are the most common family forming c. 20% of the stands. In the caatinga were some 10 'associations', but in Sabal the matter was more complicated; this is explained by the fact that in the caatinga soil types were more clearly delimited and occupied wider spaces, and furthermore far less species were concerned. — C.G.G.J. van Steenis.

WERNER, W.L., Die Höhen- und Nebelwälder auf Ceylon (Sri Lanka), 226 pp., 58 photogr., 2 vegetation maps, 7 profiles (1982, Thesis, Ruprecht Karls Universität, Heidelberg).

An excellent account of the mountain forest vegetation of Ceylon and the various factors which influence its composition. Introductory chapters on geology, geography, and physiography and in particular on the climatic conditions: temperature, precipitation, wind and frost. Comparison of the mountain zones with those elsewhere in the tropical mountains. Physiognomy of trees at various altitudes, and undergrowth. Regional analysis of the forests at various stations in detail with components and dominants. Delimitation of the everwet rainforest against the seasonally dry zone. In the 8th chapter ample data on the interference by man through cultivation, cattle, hunting, and cutting forest and subsequent secondary vegetation types, of which the 'grass plains' or patanas are vividly discussed. One chapter deals with the nature reserves.

It is the intention that this work will — with a few suppressions — be printed in the series 'Tropische und Subtropische Pflanzenwelt' (ed. Rauh) by the Academy of Sciences, Mainz, in 1983/4. A register of plant names will be added in that edition. — C.G.G.J. van Steenis.