

VI. MISCELLANEOUS INFORMATIONa) Research and Publications (continued from page 3575)

Apocynaceae wanted — pickled. Mary E. F a l l e n, Systematische Botanik, Zollikerstrasse 107, CH-8008 Zürich, Switzerland, who has done considerable morphological work on development of the reproductive organs in Apocynaceae, has been frustrated in her many efforts to obtain suitable material of Lepinia and Lepiniopsis. Ample information on both can be found in Pacific Plant Areas 3, Blumea Suppl. 5 (1966) 112-113, with map

and description. The very oddly shaped fruit of *Lepinia* (W. Pacific) has been depicted in *Blumea* 11 (1962) 302, Van Steenis's paper on the Land Bridge Theory. The one of *Lepiniopsis* (E. Malesia) seems to be buoyant. Also material of *Anechites* (Central America) is needed; it may be closely related to *Condylocarpon*.

Any stages of flowers can be used, from tiny green buds at initiation up through anthesis, as well as fruiting stages. They should be pickled in FAA. Expenses of handling and postage will gladly be refunded. Vials with the liquid can be provided. Thanks on her behalf!

Endemic Flora of the Malay Peninsula. This project is being carried out by Dr. F. S. P. Ng and Mr. Iow Chong Moi, and will involve listing and briefly describing all the endemic species that belong to the tree genera that have been revised under the Tree Flora of Malaya Project.

In the 82 families so far revised, the total number of species belonging to tree genera total 2,396. Of these, 654 species (27.3%) are endemic to the Peninsula. Of the endemics 339 species are rated as endangered species because they are rare (fewer than 5 specimens collected) or highly localised (endemic to 1 or 2 Malayan states only). The first edition of the Endemic Flora is expected to be published at the end of 1982.

The Proceedings of the Second International Round Table Conference on Dipterocarps held at Kepong in mid-1980 (summarized on pages 3588-3594) were published as Volume 44 (2 & 3) of the *Malaysian Forester*, pages 319-424. The price is US\$ 7.50. Order from the Business Manager, Forest Research Institute, Kepong, Selangor, Malaysia.

Indonesian Forestry Abstracts; Dutch literature until about 1960. Published by Pudoc, Box 4, Wageningen, The Netherlands in 1982, 700 p., price Dfl. 200, abroad. To make Dutch literature on Indonesian forestry and forestry research accessible for the new generation of Indonesian foresters, the Dutch State Forest Service and the Indonesian State Forest Corporation Perum Perhutani decided to make an inventory of all available data and information in the Dutch literature concerned. The co-operation resulted in a compilation of 6026 abstracts in English. Most of the abstracts refer to books (standard works) and articles published in periodicals. Besides this published information, the inventories, which were compiled in the Netherlands as well as in Indonesia, also revealed a great number of unpublished reports such as periodic, travel, and conference reports which have also been included in this compilation. Detailed subject, species and author indexes make the information accessible. This book gives a valuable source of information for all interested in forestry in Indonesia.

The book by M. J a c o b s & T. J. J. d e B o o, Conservation Literature on Indonesia / Selected Annotated Bibliography, xi + 276 p. has gone to the printer and is appearing in August 1982. Cardboard cover. Price in the Netherlands Dfl. 35, abroad US\$ 17, incl. postage. Published by the Rijksherbarium, Box 9514, Leiden, The Netherlands. The following summary is in the style of the work itself.

In c. 850 entries, alphabetically arranged, a wide field is covered of

subjects that might be relevant for conservation practice. The main sections of the subject index are (with number of sub-sections): General works, 8; Geography, 11; Plant species, 12; Soil cover, 13; Animals, 7; Mammals, 11; Birds, 4; Reptiles and Amphibians, 8; Fishes, 6; Invertebrates, 9; Marine systems, 7; People, 8; Degradation, 8; Institutions, individuals, 8; Conservation, 18; Sumatra, 8; Java, 9; Lesser Sunda Islands, 9; Borneo, 8; Sulawesi, 7; Moluccas, 5; Irian Jaya, 10; Malaya; Philippines; Papua New Guinea; Australia (none subdivided).

Coverage runs from c. 1900 to c. 1979. Both pure and applied science are included, with some emphasis on expert overviews, lessons from the past, and wise utilization of resources. Dutch, English, French, German, and Indonesian literature is included, both books and articles, with rather extensive annotations on contents and value, in English. Occasional bibliographic notes are given. Other indexes deal with important catchwords and place names, personal names, and scientific names of genera and species.

For anyone with an interest in the natural history of Indonesia and the various aspects of conservation, a useful inroad work.

Man And Biosphere, better known as MAB, is a UNESCO program that operates in the broad and fragmentarily charted borderlands between the extremes of protection and management. On its 10th anniversary, M. B a t t i s s e gave a good concise overview in *Parks* vol. 6 no. 1 (1981) 7-11. He defines MAB as an international programme of concerted scientific cooperation among countries, directed towards the quest for practical solutions of the concrete problems of management of land resources and human community systems. It covers 14 major research themes: tropical forests, temperate and mediterranean forest landscapes, grazing lands, mountain and tundra areas, freshwater and coastal systems, urban systems, conservation of genetic material, effects of pollutants and engineering works, perception of environmental quality. More than 900 projects are under way, involving research, training, and demonstration, and 193 so-called Biosphere Reserves have been established in 50 countries. Aim is to develop ways of communication about the environment between the countries in a certain region, between the main tropical regions, and between Northern and Southern countries, to accumulate experience so that a more scientific basis of management of resources can be established. In our region, pilot projects have been set up in S. China (Dinghu Mountains), Thailand (Sakaerat), Malaya (Pasoh-Tasek Bera), Indonesia (Lempake in E. Borneo, Upang Delta in Sumatra), the Philippines (Agno River in Luzon, Puerto Galera in Mindoro), E. New Guinea (Gogol), and Australia (North Queensland). Impact is envisaged through dissemination of knowledge, and geared towards "the applicability of the knowledge acquired to the realities of environmental management", to involve planners and decision-makers.

Another article on MAB in *Parks* (vol. 6 no. 4: 1-6. 1982) is less fortunate: enjoyment as a broad reason for conservation "also embodies the belief that humanity has a moral duty to protect nature", which reflects a hedonistic bias; and "there has been very little contribution from

science in planning what, where, and how to conserve", which demonstrates ignorance anyway for the Malesian area. But indeed, we should realize that the concept of conservation is in this context understood as 'wise utilization of resources ad infinitum', and that among the whole range of ecosystems involved, the tropical rain forests take an exceptional position in being the most species-rich, most fragile, and least renewable of all, on the poorest soils, and therefore the most risky to manage. So in this case, protection and 'conservation' may lead to very different results.

A special issue of the journal *Ambio* (vol. 10 no. 2-3, 1981) was devoted to the various aspects of the MAB-program; no one interested should miss its 100 pages with fine illustrations and clear summaries. It can be ordered from AMBIO, Box 50005, Stockholm, Sweden, perhaps as a 'free specimen copy'. Besides a paper by H. C. Brookfield on land use in Fiji, especially Lakeba (p. 59-67), there is one by Kuswata Kartawinata e.a. on The impact of man on a tropical forest in Indonesia (p. 115-119, illus.), namely the MAB area at Lempake, 12 km NE of Samarinda. A transmigration area of 100 sq.km, at 40-80 m altitude, carved out in primary forest after logging, its population swelled from c. 907 persons in 1970 to 5078 in 1978. Effects of logging were studied, regeneration after clearing with and without burning, composition, nutrient cycling, and farming potential. In the logging camps, only 12% of the jobs created were filled by local people, and local foods accounted for a mere 5% of camp expenditures on consumable goods. Many other interesting facts are provided.

A 2-year research project has now been proposed to study Shifting cultivation and patch dynamics in an upland forest, to be led by Dr. Andrew P. (Pete) Vayda, Human Ecology, Rutgers University, New Brunswick, N.J. 08903, U.S.A. As a site has been chosen the 50-household village Sai Barang in the Apo Kayan, at c. 02°N near the Sarawak border. Shifting cultivation has been practiced for centuries in this remote area, where population is dwindling rather than growing, hence there is a mosaic of secondary growth in various stages, at altitudes of 400-2000 m. While most of the work will focus on forest structure and composition in these patches, ecology of animals and humans is to be studied to understand their role in this dynamism. So will be the knowledge of the forest that the villagers possess. Work may result in better ideas about the possibilities and limits of buffer zone management in rain forest regions. The project, of which the background has been explained in A. P. Vayda e.a., Interactions between people and forests in East Kalimantan, *Impact* 30 (1980) 179-190, will be carried out in close cooperation with Indonesian scientists of the Herbarium Bogoriense and others.

Pollen in peat, New Guinea. Dr. Geoff Hope (Biogeography, ANU, Box 4, Canberra, ACT 2600, Australia) completed his stratigraphic and forest survey work at Kosipe, 2000 m in the Wharton Ranges. He has collected several peat cores from a large swamp extending back to 35,000 years at Kosipe, and will compare the vegetation history from these with pollen contained in an archaeological section nearby which is 26,000 years

old. He also has post-glacial sections from Neon Basin (2,900 m) and Mt Albert Edward (3,640 m). All sections show a marked decrease in *Nothofagus* about 10,000 years ago. He is putting together a list of collections from the Wharton Range about 1500 m and will be grateful for any data; biogeographers can only wrestle with the incomplete and often tentatively identified records in the hope of extracting hypotheses about distributions and development. While appreciating the objections and lack of interest by taxonomists in this process, it is likely that the explanation of some patterns in individual groups may be helped by analyses of general distributions and vegetation histories. In searching Lae, the absence of substantial collections below 1500 m in the Owen Stanley Ranges was particularly striking, as road access is now very good from north and south.

Jeremy Russell-Smith (Geography, ANU, ditto) completed eight months at Kakadu National Park and eastern Arnhem Land, Northern Australia in studying rainforest — monsoon forest distributions. He is making careful floristic lists and flowering-fruiting studies. He will return later in 1982-83 to spend a full twelve months, funded by a grant from Australian National Parks, and including helicopter time during the rain season to maintain observations on remote forest patches. He is supervised by Geoff Hope (ANU) and Len Webb (Griffith).

Gathering-hunting-fishing in Sarawak was studied by S. C. Chin (KLU) at Long Selatong, Baram River. Gathering provides about 10-25% of the food (based on the frequency of consumption during the three daily meals) other than the starch staples. These figures exclude the fruits (which are snacks) which may be very important sources of food when in season. Similarly fishing provides 16-33% of the food (excluding the starch staple). Hunting, 16-22% (excluding the starch staple).

Gathering/hunting/fishing together provides 47.6-64.4% of the food (excluding rice). Domesticated plants and animals 33.3-40.6%. Items purchased from shops form less than 10% (usually 2-5%). Forest destruction would have a serious impact on the traditional patterns of resource utilization. Also large trees for boat building will be very scarce or non-existent after loggers have gone through the area. Technically most of the forests around a longhouse (though some are held under customary tenure) belong to the government. Often these areas are included in concessions. Thus conflict between loggers and villages become inevitable (already there are cases elsewhere in Sarawak).

The villagers also depend on tengkawang or illipe nuts as a bonus crop at irregular times. In February-March 1980, the 16 households (save one) collected some 10,553 kg, for which they earned Mal\$ 17,450. Of these households, 11 cultivated these trees (all *Shorea macrophylla*) and are interested in planting more — if loggers do not cut them.

Popular books on Hong Kong plants, sponsored by The Urban Council, were published by the Government Printer, Java Road, Hong Kong. They are c. 90-110 pages each, with the upper half of each page occupied by colour photographs, the lower half by text. Usually, there is one species on a page, exotics are included. They are quite nice. I saw the following, priced at HK\$ 10-15:

Hong Kong orchids, by G. d'Almada Barretto & J.L. Young Saya, 108 p. (1980).

Hong Kong shrubs, end ed., by Tang Hune-Cheung, 113 p. (1976).

Hong Kong freshwater plants, by I.J. Hodgkiss, 89 p. (1978). Includes also swamp plants.

Hong Kong trees, vol. 2, by S.L. Thrower (Department of Botany, Univ. of Hong Kong), 117 p. (1977). Deals with 97 sp. out of c. 300.

Hong Kong herbs and vines, rev. ed. by S.L. Thrower (1976) 114 p.

The Tree Flora of Malaya, edited by F. S. P. Ng at KEP, is making good headway: the final volume 4 is expected from the press in 1985. Completed have been the Actinidiaceae, Anacardiaceae, Compositae, Crypteroniaceae, Melastomataceae, Opiliaceae, Tetrameristaceae. Under study are the Lauraceae (by K.M. Kochummen), Meliaceae (by D.J. Mabberley & C.M. Pannell), Rubiaceae (by K.M. Wong), Sapindaceae (by S.K. Yap).

Fossil pollen records of extant angiosperms is the title of a paper by Dr. J. Muller of the Rijksherbarium in Bot. Rev. 47 (1981) 1-142, 3 fig. + 2 tab. (order from New York Botanical Garden, Bronx, N.Y. 10458, U.S.A., \$ 8.75 in the U.S., \$ 9.50 abroad incl. postage). With c. 350 references, this updates author's Palynological evidence on early differentiation of angiosperms (Biol. Rev. 45: 417-450. 1970).

Records are critically examined, with 'rejected' and 'pending' cases. Only the families are indexed. Long discussions are devoted to Betulaceae, Casuarinaceae, Caesalpiniaceae (slightly older than Mimosaceae, much older than Papilionaceae), Euphorbiaceae, Fagaceae, Juglandaceae, Palmae, Proteaceae, Ulmaceae, and Chloranthaceae, the oldest group, appearing 110 million years ago almost simultaneously in America, Africa, Europe, and slightly later in Australia.

Aquifoliaceae, Gunneraceae, Ulmaceae came 90 mn. y. ago; Nothofagus 80 mn. y. ago in Australia, soon also in New Zealand and Argentina. The main period of diversification was in the Uppermost Cretaceous, 65-69 mn. y. ago, at all taxonomic levels; families diversified most in Eocene and Miocene (p. 116). In the Conclusions (p. 114-122) six 'floral phases' are distinguished; during the Turonian (88-95 mn. y.) came probably the ecological breakthrough over gymnosperms and ferns.

Families are tabulated, by group in the Takhtajan system, and by period. No clear correlation of first appearance and system is evident. Monocots (unspecified) came at the same time as dicots; woody groups somewhat preceded herbaceous ones.

While recent evidence made some earliest records still earlier, Muller does not expect big changes in the pattern. What he does expect is a detailing of past distribution patterns, when more localities will be examined, and correlation with macrofossils, particularly fruits and seeds. He continues to survey the field, and will be glad to receive information.

The Palawan Expedition / Stage II, ix + 139 p., 46 fig., 17 maps, edited by M. Bruce (1981; Area, 363A Pitt Street, Sydney 2000, Australia), in a sequel to the report mentioned on page 3581. Area stands for Associated Research Exploration & Aid.

This is the result of another round of field work, and the text, densely typed, is much more substantial, with good suggestions for further reading. Emphasis is again on caves, reefs, and animals (p. 114-116 are devoted to vegetation). Some features, however, make this report widely valuable: a) the descriptions of Palawan and adjacent isles, in 10 'environmental reports', b) the sound amount of reading accounted for, c) the practical notes on equipment, field work, and accessibility, d) the spirit of joint venture in the cooperation with Philippine authorities and people, with elaboration on areas of mutual interest, e) the emphasis on tourism. H.E. McClure contributed an authoritative list of birds (p. 91-96), 192 species; Palawan lies on an important migration track.

A group of enthusiasts picked out a promising island for an integrated effort into exploration and conservation; this coherent and informative account, well-edited, may serve as a model and an incentive for others. Hope for the islands has been planted. A final report has been announced.

New Perspectives in Wood Anatomy, edited by P. Baas, and published by Martinus Nijhoff/W.Junk Publishers, The Hague, The Netherlands (1982, vi + 252 p.). This volume reviews new developments and future priorities in the diverse fields of pure and applied wood structural research. It deals with the functioning of wood in water conduction in the living tree; with cell wall hydrolysis in tracheary elements evidencing the importance of wood as conductive tissue; with the early development of cambium and its precursors; with morphogenetic factors in wood formation and differentiation; with genetic variation and manipulation of wood properties; with an ultrastructural explanation of creep responses of timber in service; with the application of statistics and computing in wood anatomy and identification; and with xylem evolution and systematic and ecological wood anatomy. The new perspectives in these fields are viewed against the background of the history of wood anatomy as an integrated science. Most contributions originate from the 50th anniversary symposia of the International Association of Wood Anatomists during the 13th International Botanical Congress in Sydney, August 1981. One paper highlights the early history of IAWA. To be ordered from: Kluwer Academic Publishers Group, Distribution Centre, Box 322, Dordrecht, The Netherlands, or: Kluwer Boston Inc., 190 Old Derby Street, Hingham MA 02043, U.S.A. Price: Cloth Dfl. 130 or US\$ 54.

A 4th list of additions to the Flora of British India occurs in Records Bot. Survey India 21(2) of 1981. An Annotated Bibliography of Taxonomic Botany of Peninsular India 1959-1978, 201 pages, was published in 1981 by the Botanical Survey of India. Of the Flora of India a 7th fascicle of 23 pages was published, with some Liliaceae.

Of the well-known Manual of Bryology (1932), edited and published by F. Verdoorn, a new edition is being prepared under editorship of Dr. Rudolph S c h u s t e r of Massachusetts University.

On Dutch collectors in Thailand, Mr. R. G e e s i n k (L) compiled a paper, for sometime publication, in e.g. the Flora of Thailand.

Biology of Malayan woody climbers. At Kepong, a special project on lianas was initiated in 1981. This includes studies on the taxonomy, ecology and management of climbers. The principal investigators are Mr. Wong Khoon Meng, Mr. K.M. Kochummen and Dr. S. Appanah. Of special interest will be the assessment of bark and stem characters for field identification. At present there is no field guide for the identification of woody climbers.

The project was started because of conflicting opinions over the necessity, economics, and efficacy of climber-cutting as a silvicultural operation. On the negative side, climbers, by binding trees together, apparently increase logging damage because big trees on being felled, may drag down other trees to which they are strongly bound by climbers. In regenerating forests, climbers may also overwhelm young trees. On the positive side, climbers may help in canopy closure and suppression of other light-demanding weeds by shading them out. A complicating issue is that many climbers can apparently multiply vegetatively from pieces broken off or lying along the ground. In addition many of the seedlings on the forest floor belong to climber species. Hence there is a fear that without some control, climbers will dominate after logging.

The project was assisted by Dr. F.E. Putz who was in F.R.I. for six months in 1981. Dr. Putz has now left to take up a professorship in the University of Florida. Before coming to F.R.I. Dr. Putz had completed an ecological study of lianas in Panama, Central America.

Dr. F. R. F o s b e r g (US) is finishing the Geographical Checklist of Micronesian Plants—Dicotyledons published in 1979, Pteridophyta in press, Monocotyledons hopefully finished this winter. Work is in progress on part 5 of the Flora of Micronesia, also on taxonomic and floristic problems on Polynesia, and on the Marquesan flora.

Flora of Thailand. DANIDA, the Danish International Development Agency, gave 300,000 Baht for printing of 3 legumes instalments.

Tree Flora of Malaya Vol. 1. The publisher of the Tree Flora of Malaya, Longman Malaysia, has indicated its willingness to produce a paperback reprint (with updated Introduction and corrected Index) of Volume 1. This volume has been out of print for many years. The reprint may be available at the end of 1982 or possibly early 1983. The price is likely to be about 40 Malaysian dollars (roughly US\$ 20). Enquiries and orders should be placed with Longman Malaysia, Wisma Damansara, Jalan Semantan, Kuala Lumpur.

The Flore du Cambodge, du Laos et du Viêt-Nam, edited at P, is making progress. The following families are near completion or being made ready for the press: by H. W. E. v a n B r u g g e n, the Aponogetonaceae; by P. D y P h o w, N.V. Thuan and R. Geesink, various genera of the Papilionaceae; by B. H a n s e n, the Xyridaceae; by T. K o y a m a, the Smilacaceae; by K. L a r s e n, the Centrolepidaceae, Flagellariaceae, Hanguanaceae, Lowiaceae, Philydraceae, Restionaceae; by B. C. S t o n e, the Pandanaceae; by V u Van Cuong, the Potamogetonaceae, Ruppiaceae, Sparganiaceae; by T. Y a m a z a k i, the Scrophulariaceae.

Today & Tomorrow, 24-B/5 Original Road, Karol Bagh, New Delhi 110005, India, publish many new works on Indian botany, as well as reprinting classics, like Annals of the Royal Botanic Garden, Calcutta, Records of the Botanical Survey of India, Roxburgh's Flora Indica (Carey ed.), J.D. Hooker's Himalayan Journals, J.F. Royle's Illustrations of the Himalaya. A catalogue is sent on request.

The Summit Flora of Gunung Ulu Kali, Pahang, Malaysia by B. C. Stone, forming part 1 of vol. 26 of the Federation Museums' Journal (Kuala Lumpur) was published in Dec. 1981 but held over to allow an erratum sheet to be printed and inserted. Distribution will be in Jan.-Feb. 1982. The flora concerns the summit zone (5000-5800 ft approx.), a magnificent elfin-forest and sphagnum community seriously threatened by expansion of the huge hotel and gambling complex sited there some years ago. Over 460 species of vascular plants are so far recorded. There is a short ecological chapter by E.G. Leigh Jr and R.O. Lawton. There are keys and a number of illustrations both in black-and-white and in colour. Those wishing to acquire a copy may write to Dr. Stone, Botany, University of Malaya, Kuala Lumpur 22-11, Malaysia.

New Guinea dipterocarp forest. The family Dipterocarpaceae is represented by only three genera and some 15 species in New Guinea. A detailed study has been made of the ecology of Anisoptera thurifera var. polyandra and where possible comparison made with Hopea iriana forests. Forty  $\frac{1}{2}$  ha plots have been established in the Morobe Province in forests dominated by Anisoptera, and relationships to soils and topography studied. Anisoptera (and Hopea) form pure stands in secondary situations. All New Guinea species have extensive annual flowering and annual seed production. Four permanent 1 ha plots established in dipterocarp forests in 1972 in the Buso area near Lae. All trees have been measured each year. This project will hopefully continue for at least another four years. Data from these studies are being prepared for publication in 1983 by R. J o h n s, University of Technology, Lae, Papua New Guinea.

At LAE, various work on (eastern) New Guinea is in progress, directed towards the production of manuals and flora treatments. J. C r o f t is working on tree families for forest workers. E. E. H e n t y is collecting information on bamboos. Kipira D a m a s has produced a treatment on the Gnetaceae, Osia G i d e o n on the Portulacaceae, and work on Spermaceae and related genera (Rubiaceae) is in progress. Karl K e r e n g a is working up the Onagraceae.

Plants of Kairiru I. (off Wewak, E. New Guinea) are the subject of a checklist prepared by Bro. O. William B o r r e l l, for many years a teacher there. The LAE-Herbarium may assist in the publication.

At LAE, R. J. J o h n s & A. H a y are producing a Students' Guide to Monocotyledons, accounts of families, down to generic level. Part 1 contains 8 families, the Araceae being the largest. Johns is also engaged on Myrtaceae of New Guinea, with notes published in Klinkii, the journal of the Forestry Society.



The sectored key was devised by R. J. J o h n s (LAE), and published in Austral. J. Ecol. 3 (1978) 403-409, 4 fig. It is a set of synoptical keys in pictorial form. In this case, to identify 168 genera of rain forest trees of E. New Guinea, there are four: A. Trees with exudate and with simple or compound leaves, B. Trees without exudate and with compound leaves, C. Trees without exudate and with simple leaves, opposite or whorled, D. Trees without exudate and with simple leaves, alternate or spiral. The genera are listed with reference to each key; in each key, further characters are given. One of the set has been reproduced here. Not having worked with it, one cannot pronounce a judgement. It seems worth trying. See also Swarupanandan in the Bibliography.

In the Andaman & Nicobar Islands, the Botanical Survey at Port Blair is making a systematic enumeration of the flora. Pteridophytes, gymnosperms and monocots will be ready for publication in 1982.

A Handbook to the flora of South-eastern Queensland by T. D. S t a n - l e y & E. M. R o s s (BRI) is progressing. Volume 1 (half the dicot families) is with the printer and expected soon. Volume 2 (the other half) is near completion. Volume 3 (monocots) is complete for 45%.

With retirement of Mrs. B. A. L e b l e r, work on Wild flowers of S.E. Queensland has ceased, but volume 2 is being printed.

Pyrrrolizidines and Danaine butterflies is the subject under study by John E d g a r, Animal Health, CSIRO, Box 1, Parkville, Vic. 3052, Australia. He found that both sexes store these alkaloids in their bodies; the males of 4 sp. secrete derivatives of them on their hair pencils, as pheromones. The butterflies derive the substances from Messerschmidia argentea (Boraginaceae) and Parsonsia spiralis (Apocynaceae). A paper on it is in the press.

Mme Anne-Marie S é m a h (Laboratoire de Préhistoire, Museum National d'Histoire Naturelle, Paris) is studying Quaternary fossil pollen from the human fossil bearing deposits in Central Java. To collect samples she visited the area in 1979 for 5 and in 1981 for 6 weeks and spent some time at the famous Pithecanthropus site near Trinil. Many other localities have now yielded fossils and her purpose is to reconstruct the vegetation of this period, for which she is cooperating with ITB Bandung. A first paper by F. & A.-M. Sémah et al. entitled 'New data about the age and environment of Homo erectus in Java' will be published in 1982, in the 'Journal d'Anthropologie', while a paper on 'First comments about a Sangiran pollen diagram' will appear in 'Modern Quaternary Research in Southeast Asia'. Mrs. Sémah intends to take a Ph.D. on the subject.

Aristolochiaceae, host plants of exotic butterflies. The female of Ornithoptera alexandrae has the largest wingspan of any butterfly: 18-21 (-24) cm; a forewing may measure almost 13 cm. The larvae grow to 12 cm in length; they carry many protrusions on the back. R. S t r a a t m a n (Box 255, Kuranda, N. Queensland 4872, Australia) reported on its biology in J. Lepidopt. Soc. 25 (1971) 58-64, 12 fig. It occupies a relatively small area in E. New Guinea. The larvae feed on Aristolochia schlechteri,

and take some 130 days to develop from egg to pupa. The same author made observations in the Solomons on O. priamus and O. victoriae, both feeding on A. tagela. He reported in the same journal 23 (1969) 69-76, 6 fig., "After locating its host which appears to be done by scent, the female butterfly encircles it and frequently touches leaves and stems with her outstretched legs. Inspection completed, she may then lay from one to several eggs. .... It was frequently observed that the females of O. priamus seldom oviposit on the hostplant itself. Eggs were generally laid on twigs and stems of trees and shrubs growing in the vicinity of the host-plant, sometimes on dead sticks or even on stones on the ground" (p. 73).

Since all Ornithoptera ('birdwing') butterflies in their larval stage feed on species of Aristolochia, this may be an example of co-evolution. Indeed, P. R. E h r l i c h & P. H. R a v e n mentioned this and related cases in a general paper in Evolution 18 (1964) 586-608. The Papilionid tribe Troidini with 8 genera feed mostly on Aristolochiaceae, and both have their greatest diversity in the Indo-Malesian region.

Straatman already made observations in the period 1947-1954 in NE. Sumatra, mainly at the estates Laut Tador and Gadong Biara. He found that larvae of Atrophaneura, Trogonoptera and Troides feed on species of Apama, Thottea (now combined under the latter) and Aristolochia (Tijds. Entomologie 104: 31-40, 8 fig. + pl. 6. 1961); of some of these plants material is in the Rijksherbarium, where Dr. Ding H o u has been revising the family for Flora Malesiana. So the entomologists turned to him for identification of leaves or sometimes better material. He put me on the track of the present story, including several publications. Dr. Rienk de Jong of the Leiden Natural History Museum kindly showed me some books and price lists.

It may well be possible to 'grow' at least some species at home. Of the Aristolochia - as all A.'s in Malesia, a climber - on which Trogonoptera brookii fed, wrote Straatman, "rootstocks were taken from the forest and replanted in a private garden. After a few months the plants had developed a luxurious growth of young shoots from the previously bare stem. This new growth attracted many females from the nearby forest and it was possible to observe the oviposition and the subsequent development of the larvae at close range." (p. 37). Unfortunately, a search undertaken in these places to retrieve the Aristolochia was fruitless: the plants were no longer there and all the nearby forest had been destroyed.

Three major works deal with the butterflies. B. D ' A b r e r a, Birdwing butterflies of the world (1975, Melbourne; also in the Country Life Series) gives 30 sp., 120 subsp. of Troides, Ornithoptera, and Trogonoptera, most of them in Malesia, with colour photographs and notes on food plants.

S. I g a r a s h i [Papilionidae and their early stages], 2 vol. (1979, Kodansha; Tokyo) is a sumptuous book entirely in Japanese, with colour plates of all stages, range maps (many Malesian) and discussion. The part on the food plants, 102 plates with b/w photographs, has been bound and distributed separately, under the title Food plants of Papilionidae. It carries no explanatory text, just the plant name (sometimes misspelt), place of origin, and butterfly which feeds on it. Specimens

have not been cited. The whole world is covered. We list the families with number of species dealt with and items from Malasia:

Annonaceae (5 species): Polyalthia longifolia from Java, pl. 85, sterile; Apocynaceae (1); Aristolochiaceae (27): Aristolochia crassinervia from Papua New Guinea, pl. 23, sterile, A. gaudichaudii from Moluccas, Batjan, pl. 26 p.p., A. philippinensis from Philippines, pl. 16, A. pithecurus from Papua New Guinea, pl. 24, fr., A. sp. (not schlechteri) from Papua New Guinea, pl. 22, sterile, A. sp. from Palawan, pl. 26 p.p. and 27; Crassulaceae (2); Hernandiaceae (2): Hernandia peltata from New Britain, pl. 100, sterile; Lauraceae (11): Cinnamomum iners from Singapore, pl. 90, Litsea glutinosa from Philippines, pl. 94 p.p., sterile, L. irianensis from Papua New Guinea, pl. 95; Magnoliaceae (5): Michelia champaca from Singapore, pl. 77; Monimiaceae (1); Papaveraceae (5); Rutaceae (39): Atalantia spinosa from Malaya, pl. 72, sterile, Evodia celebica from Celebes, pl. 49, sterile, E. latifolia from Papua New Guinea, pl. 55, 56, sterile, E. pilulifera from Papua New Guinea, pl. 54, sterile, E. roxburghiana from Malaya, pl. 53, fr., Luvunga scandens from Malaya, pl. 57, sterile, Micromelum minutum from Celebes, pl. 59, Triphasia trifolia from Philippines, pl. 67, Zanthoxylum avicennae from Halmahera, pl. 43, fr.; Thymelaeaceae (1); Umbelliferae (3); Verbenaceae (1): Vitex trifoliata from Papua New Guinea, pl. 76, sterile; Zygophyllaceae (1).

J. H a u g u m & A. M. L o w, A monograph of the birdwing butterflies, vol. 1. Ornithoptera (1978-1979, dates in part 3; Scandinavian Science Press, Klampenborg, Denmark) consists of 3 parts. This is a well-accessible work, with nice introduction (p. 12-39), but tells little about food plants. These we find, however, in Notes on the Aristolochia of the Papuan region with particular reference to the larval foodplants of the Ornithoptera, by J. H a u g u m, in The Lepidoptera Group of 1968 Newsletter 2 (August 1981) 171-178. This is a mimeographed issue. It lists the 9 birdwing butterflies species with Aristolochia species and remarks; food plants of the two main butterfly subspecies, the 8 A. species recorded as hosts (viz. A. crassinervia, deltantha, gaudichaudii, nomandul, pithecurus, praevenosa, schlechteri, tagala), and the 10 others not known to host Ornithoptera larvae.

Beautiful, rare birdwing butterflies are collector's items of old. Lundquist (1953, quoted by Haugum & Low) wrote how an Indonesian collector in New Guinea, after having caught a female birdwing, tied it to a long thread of silk, "leaving it free to flutter around in a limited space, the thread tied to a low branch within reach of the net. This was to attract the high-flying, and fast, males and to lure them down to within reach." The pupae are conspicuous and highly specific; they are often collected for hatching. Troides species were offered about 1977 for US\$ 2.00-8.00, an Atrophaneura priapus for \$ 25.00, Papilio species ranged from \$ 0.30-80.00. In recent years, prices have gone rather down than up. Forests have been opened up, collectors swarmed out, markets became saturated. Very showy, rare species are still fetching stiff prices. At least in Papua New Guinea they enjoy protection. Yet it seems doubtful that collecting alone would threaten a species. It is destruction of habitat that presents the real danger.

b) Herbaria, Gardens, Organizations (continued from page 3577)

On a new Herbarium in Kinabalu National Park, Sabah, Mrs. B.S. Parris Croxall communicated some news. "It is a very new venture and is at present being organized with great enthusiasm (and effect) by the Park ecologist, Peter Walpole. The function of the herbarium is to build up a reference collection of the Park's flora for consultation by visiting botanists and the resident ecological staff. It is at present housed in a dehumidified room and all specimens are poisoned. Next year it moves to better quarters (also to be dehumidified) in the Park's new headquarters building. When I wrote to the Parks board for permission to collect in the Park I offered to leave them a duplicate set of material in an herbarium of their choice but specifically mentioned SAN; the first that I heard of the formation of the Kinabalu National Park herbarium was on receipt of a collecting permit when I arrived in Kota Kinabalu, which stipulated that I collect two specimens of each species, one to be left in the Park herbarium before departure." Currently in charge is Ms. Anthea P h i l l i p p s.

The FI-Herbarium, Museo Botanico, Via La Pira 4, 50121 Firenze, Italy, let it be known that lending facilities had to be cut back. Beccari materials (coming in their B-category) can be lent only to recognized institutions, preferably in Europe, and in moderate quantity. Types may be lent, as an exception, to the K-Herbarium. Photographs of specimens may be supplied. It seems best to go there in person, if possible. Telephone 055-28 44 11. Director is Professor Guido Moggi.

The Herbarium of the University of Florida (FLAS) announced the appointment of Dr. Norris H. W i l l i a m s as Keeper of the Herbarium and Curator of Vascular Plants on 1 July 1981. Concurrent with Dr. Williams' intrustment, FLAS has become an administrative unit of the Florida State Museum. The address is now: Vascular Plant Herbarium, 209 Rolfs Hall, University of Florida, Gainesville, FL 32611, U.S.A.

A collection of wild species of Musa is being assembled in the Lae Botanic Garden; Osia G i d e o n is in charge of them. The same is done for wild Citrus and relatives, by K. D a m a s.

During 1981, the Missouri Botanical Garden (Box 299, St. Louis, MO 63166, U.S.A.) began publishing a monthly Herbarium News, as a quick way of communication. Subscription is US\$ 5 a year in North America, US\$ 7 abroad.

The Herbarium Pacificum (BISH) is undergoing one of its biggest renovations since its inception. A large grant from the National Science Foundation has made possible the purchase of 252 new herbarium cabinets and a mobile module system on rails, to make a system that will have nearly 30% more storage space than in the past.

The Herbarium at Manokwari, West Irian, which was originally administered by the Department of Forestry, has now come under the Faculty of Agriculture of the Universitas Cenderawasih.

The 165th anniversary of Kebun Raya Indonesia, the Bogor Botanic Gardens, on 18 May 1982, was celebrated with the opening of an Ethnobotanical Museum in the bottom floor of the Herbarium building, where the considerable collections that have been amassed over the years, with many recent accessions, are now on public display. At a seminar on that same day, the Minister of Science and Technology was one of the speakers.

The Purwodadi Botanical Garden in East Java, established in 1941, is a subsidiary of the Bogor Garden, in a seasonal climate, 85 ha in area, at 300 m altitude. In 1980 it contained 1586 species, 442 of them orchids, and 102 ferns. R. E. N a s u t i o n wrote a brief article on it, in Indonesian, in Bul. Kebun Raya 4 (Dec. 1979) 105-108.

Index Herbariorum (part I, The Herbaria of the world) 7th ed., compiled by P. K. H o l m g r e n e.a., 452 p., cloth (1981) costs US\$ 58. Institutional members of IAPT receive a free copy, personal members can have it at US\$ 46.50, order from Bohn, Box 23, Deventer, The Netherlands.

Geographical arrangement of the Herbaria, and a list of Herbarium Abbreviations have this time been included.

Index Xylariorum. Institutional wood collections of the world. 2, by W. L. S t e r n, Taxon 27 (1978) 233-269, the second edition of a 1957 directory, never been mentioned in this Bulletin, makes a useful addition. Dr. Stern's new address: Botany, University of Florida, Gainesville, Fla. 32611, U.S.A.

Loans from the TI-Herbarium can be requested through the Director, Herbarium, Department of Botany, Faculty of Science, University of Tokyo, Tokyo 113, Japan. For the TOFO-Herbarium, of the Faculty of Agriculture, the rest of the address is the same.

The Arnold Arboretum now is reported to have 1,112,633 specimens which, together with the herbarium of the Botanical Museum, the Farlow and the Gray Herbarium, makes c. 4,250,000 specimens. Dr. Peter F. Stevens is in charge of overseeing them. Periodical disinfection is there, too, done now by deep freezing. Part of the collection is now being reorganized and placed into 12 new 'compactor rooms': banks of herbarium cabinets on wheels, allowing considerable saving in room space. One bank was made insect-proof through installation of gaskets; this works well.

A chemosystematics laboratory has been donated to the Arnold Arboretum by an anonymous benefactor. Initially it is intended that research will be conducted in collaboration with Drs. G. Cooper-Driver and T. Swain. It is also likely that a professor of root biology, whose appointment is imminent, and whose laboratory will be in the same building, will share some of the facilities.

The Herbarium at Fukuoka (FU), with the materials of R. K a n e h i r a from New Guinea and Micronesia, Director Hiroya H a y a s a k i, has decided not to lend any material any more. However, photographs of types can be requested.

The CAL-Herbarium received 622 negatives of 1484 type specimens made at Kew.

Malaysian National Arboretum. A national arboretum is to be developed, on orders from the Prime Minister, in Kuala Lumpur, near the University of Malaya. It will cover 263 ha of hilly and lowland country. This will be a multi-million dollar project with the aim of bringing together in one place living specimens of all Malaysian species for display, conservation, research and education. Of greatest significance to the botany of the region is the fact that this top-priority project will generate a new exploration drive linked to the collection of seeds for the arboretum, in all parts of Malaysia, during the decade of the 80's. This will in turn lead to expansion of herbaria, reinvigoration of taxonomic research, and possibly the training of a new generation of field-oriented Malaysian botanists. The arboretum will also provide a place for ex-situ conservation of critically endangered species that now barely persist in remnant lowland forests. In-situ conservation efforts will continue to be pursued vigorously, but it is viewed as an additional safeguard to have an arboretum where seeds of endangered species can be collected and grown into mature plants as well.

New herbarium for Kepong. A new 4-storey block is being constructed which will house the biological disciplines in the Forest Research Institute, viz., Botany, Plant Physiology (which includes seed technology), Pathology and Entomology. The herbarium is allotted 1½ floors to relieve the present congestion. Overall, the new block will house not only the herbarium but also the seed store, fungus collection and insect collection of the Institute. The building is expected to be ready for occupation at the end of 1982.

A note for visitors to Kepong. Two categories of visitors may encounter difficulties, (1) visitors from Communist countries and from countries with which Malaysia does not have diplomatic relations (e.g. South Africa and Israel), (2) visitors who intend to carry out research in Malaysia. The second category of visitors need to obtain clearance from the Prime Minister's Department, and to apply on forms obtainable from Malaysian embassies abroad. Clearance may take 6 months or longer, and a local sponsoring institution is normally required.

Visitors to the Forest Research Institute, Kepong, Selangor, Malaysia, should write first and well in advance to the Director, stating the purpose and duration of the visit. The FRI will refer the matter to higher authorities where applicable.

The CSIRO Regional Station, Box 273, Atherton, Qld 4883, Australia, set up in 1975, has now a Herbarium (QRS) of 60,000, under the care of B. P. M. H y l a n d. Although managed locally, it is regarded as part of the Herbarium Australiense (CANB). As main occupation is with the Queensland rain forests, where 29 permanent ½ ha plots have been established. An arboretum, established on the grounds at 760 m, contains c. 400 species from rain forests and 100 from open eucalypt communities. One of its purposes is to assess the horticultural value of the native flora.

Research on forestry and wildlife is also conducted.

University of Malaya Herbarium. Under the curation of S. C. C h i n in 1981 the Herbarium KLU has now reached approximately 33,000 registered accessions. The room housing the main collection is becoming seriously crowded. Luckily space adjacent (now a parking lot) exists and by departmental suggestion plans are to be made for an extension which would double the space now existing. No time has yet been set for this but the prospects seem good. During the year duplicates have been received from various institutions including the South China Botanical Institute, with which an exchange program was set up; Carleton University, Canada; the University of Massachusetts; SAR; SAN; L (Sumatran collections of the De Wildes); and several others.

UKMB (on *page 3576* listed as UKM) is the Index Herbariorum abbreviation for the Herbarium of Universiti Kebangsaan Malaysia in Bangi, Selangor, with Dr. Abdul L a t i f f Mohamed as Curator. Established in 1970, it now counts 12,000 accessions. Duplicates are available for exchange or distribution.

On account of its 125th anniversary, the Madras Herbarium (MH), founded in 1853, the Botanical Survey of India, southern circle, Coimbatore, published a 47-page souvenir booklet (1978) with some photographs, a report by N. C. N a i r on the function of the Circle, an address by A. R a m a c h a n d r a n, and abstracts of a symposium on floristic studies in Peninsular India.

During the year, emphasis was made on the collection of living plants for the Botanical Research Centre, Semengoh, Sarawak. More than 450 species of plants were collected. There were unsuccessful transplants, most of them epiphytic orchids and orchids from the limestone habitat. To-date more than 350 orchids could not survive in the Botanical Centre. Mr. Thomas R o t h, a GVS volunteer, joined the Department in June 1981 to assist the Senior Forest Botanist in the development of the Centre.

Rijksherbarium, Leiden. The 80th birthday of Emeritus Director Dr. C. G. G. J. v a n S t e e n i s (see *page 3537*) was celebrated four days after the actual event, on 3 November 1981, in the coffee room. At the express request of the young octogenarian it was a true in-house affair, but well-attended. In his speech, Van Steenis said not to have qualms about these man-hours lost to science. When he retired in 1972, it was discovered that he had 120 holidays to dispose of; this seemed a good occasion to do so. He confessed that in 1950 he expected to have produced ten Flora Malesiana volumes by 1970, next year there will be eight on the shelf. This was, however, partly his own fault by making them as thick as they are. If in 1946 he had known it all, perhaps he would have done things the same way. When recently he paged through his thesis of 1927, with the bold 'propositions', he found them all confirmed, "or anyway, I am still in complete agreement with them". Now married for 54 years, he praised his wife's clear judgement. Through joint effort, a great work is being accomplished. He hoped to be part of the well-oiled Herbarium clockwork for another while, then ended his speech with a doggerel poem.

He was serenaded by the 'hay choir' conducted by Jaap Mennema, in

which the best voices of the institute are united. For the benefit of Dutch readers, here is the text: 1) Van Steenis Rex Herbarii / Ruim negen jaar geleden / Vertolkten wij Uw levenslied / Nu zingen wij van 't heden. Gij zijt nog steeds niet met pensioen / dat is werk en niet voor poen / Gij hebt de rust gemeden. - 2) U schreef een boek van groot formaat / Van beken die snel vlieten / En planten die daarbij gebaat / Zich noemen rheofyten / Veel ervan leren deed U niet / Want zelf werd U geen buigend riet / Toch bent U te genieten. - 3) Heel veel geluk zij onze wens / En voorspoed op Uw paden / Dat geldt U, als bijzonder mens / En ook Uw lieve gade / Heb dank voor al Uw gratis werk / En stel daaraan geen paal of perk / Dat komt ons zeer te stade!

A sketch was presented on rhyme: the goddess Flora (personified by Marnell van Zoelen) complaining of Van Steenis's insistent overtures to draw her into his patio ludens. Hurricanes of laughter.

The Director, of course, spoke appreciating words (he likes his pensioners to have a hobby), but otherwise formalities were restricted in favour of drinking and conversation. It made Kees & Rietje a very happy couple, strengthening the good atmosphere of the institute, and provided an excellent preparation for the one-day symposium on 20 November.

#### c) Symposia, Congresses, Societies, Meetings

*(continued from page 3578)*

An International Association of Pteridologists was established on 24 August 1981 at Sydney. President became Prof. R. E. H o l t t u m, who gave a lecture on 'The continuing need for more monographic studies of ferns'; it will be published in Taxon. Chairman is Mr. A. C. J e r m y (BMNH), Secretary is Prof. E. H e n n i p m a n, Systematische Plantkunde, Box 80 102, Utrecht, The Netherlands. Subscription is free for members of the IAPT, non-members pay US\$ 5.00. The Association will publish a Bulletin of Pteridology in Taxon, twice a year, to start in November 1982. Among the first activities were two fern excursions, to Queensland and to eastern New Guinea.

The Tenth Annual Meeting of the Association of Systematics Collections was held in Honolulu from 22-27 May, 1982. These meeting included two one-day Symposia: 1) A Forum on the Status, Problems, Functions, and Services of Systematic Resources of the Pacific Region, and 2) Biogeography of the Tropical Pacific.

A seminar on 'Island Biology' was held in the new herbarium building at Port Blair on 10 and 12 November 1981. A few scientists and professors of Universities delivered special lectures on Biology. Sixteen scientific papers concerning Andaman & Nicobar Islands were read in the seminar, covering Botany, Zoology, Agriculture and Forestry. An exhibition, displaying the interesting aspects of the flora of the islands and highlighting the activities of Botanical Survey of India in these islands, was also organized during the same period. Many films of biological interest, especially on Conservation of Nature, were also screened. Contact Dr. N.P. Balakrishnan, Botanical Survey, Haddo Port Blair, Andaman Is., 744 102 India.

Research on the taxonomy, ecology, utilization and silviculture of bamboos and rattans in Malaysia is being co-ordinated by a newly formed committee comprising of representatives from the F.R.I., M.I.D.A. (Malaysian Industrial Development Authority), U.P.M. (University of Agriculture), and the Malaysian Handicraft Board. Dr. S a l l e h Mohd. Nor, Director of F.R.I. Kepong, is Chairman of the Committee. Mr. W o n g Khoon Meng of F.R.I. is Secretary, and engaged on taxonomic studies on bamboos.

BOS is the Dutch word for forest. It is also the acronym for the newly established foundation for Dutch Forestry Development Cooperation. Centered at Hinkeloord, Foulkesweg 64, Wageningen, the Netherlands, it is a society of foresters-in-the-wide-sense. Chairman is Prof. R. A. A.

O l d e m a n. It was in fact started by five almost-graduates in tropical forestry of the Agricultural Faculty. Aims are

- to encourage project planners to draw on experience of tropical foresters,
- to advise Dutch overseas development policy making,
- to keep in touch with similar organizations elsewhere,
- to locate and keep track of tropical foresters, mainly Dutch, but also others.

A newsletter (number 1 from November 1981, 34 pages, 2 from April 1982, 51 pages) gives items in Dutch and often also in English. Membership and subscription have been set at Dfl. 35, but preferably Dfl. 50 annually; students may pay Dfl. 25. Bank account number is 539 024 414.

Subjects include Impressions of the Second Meeting of Experts on Tropical Forests in Rome, Strengthening forestry in Indonesia, Fuelwood and charcoal, and accessions in the Wageningen forestry library.

Foundation Global Forest Fund is a remarkable creation started by a small group of Dutchmen, most of them former JC's. The letters stand for Junior Chamber, to which professional people under 40 can belong, if they wish to do something in society with an idealistic value. Many of them are outstanding organizers with good contacts. The movement has some 650,000 members in 85 countries, they are found in many sectors of business and administration, sometimes in influential posts or on their way to such posts.

This group of Dutch Jaycess set up the Global Forest Fund on 4 June 1981 at Haarlem; chairman is Mr. R. Snoeker, Box 141, Overveen, The Netherlands. They attracted an Advisory Council of 11 experts in forestry and the various fields related with it. They thought it a good thing to raise or channel public awareness and concern about the world's forests, with an eye on the future. If the JC membership could be made enthusiastic and better informed, they thought, this could not fail to make itself felt in all the many places where decisions are made with regard to forest land use. Thus the line awareness-expertise-government could be strengthened in many ways, to the benefit of the man/forest relationship, which indeed is in great need of regulation and improvement.

The first task was, to win over the Netherlands Jaycees, then the European organization, then the World organization, to agree on this

theme as their main field of attention for the time being. On the national level, the decision was soon made. The European Conference of the JCI International at Rotterdam in June 1982 was entirely dedicated to the global forest problem. And on the 37th World Congress in Seoul in November 1982 a full day has been earmarked for it.

When thus the matter has been brought under attention of the world Jaycee membership, awareness is to be strengthened. To that purpose, a Global Forest Game has been designed, a kind of monopoly with assets like fresh water, well-working irrigation projects, forest plantations, and with liabilities like desertification, crude logging, and soil erosion. It can be played by teams in large halls. In mid-1983, a World Forest Strategy is to be published, for presentation to a group of world leaders within the Global Forest World Council. And during Christmas 1983 a television marathon is to be devoted to trees and forests, followed by world-wide tree planting activities by non-governmental organizations in 1985.

The Fund does not intend to carry out projects itself, but might (co-) finance suitable projects and programs, if the money can be raised. The speed and efficiency with which the Fund operates, and the interest it has already generated in high places, in less than one year, for a cause like this, are heart-warming. Contacts have developed in all directions, competition thus being avoided. In our region, it is noteworthy that already Jaycees in India and Indonesia have expressed their willingness to create a Global Forest Unit in their country.

An elementary, attractive-looking brochure of 44 pages can be requested at the above address.

The 15th Pacific Science Congress will be held in Dunedin, New Zealand, 1-11 February 1983. The theme is Conservation, Development, and Utilization of the Resources of the Pacific. There will be 14 sections. It is organized by the Pacific Science Association, Box 17801, Honolulu, Hawaii 96817, U.S.A., of which membership costs US\$ 25. The Association has several publications to offer at a discount price, mainly related to previous congresses.

A Regional workshop on Sustainable Clean Water Supply in developing Asia and the Pacific will be held on 29 November-5 December 1982 at Kuala Lumpur. Contact the International Society for Limnology, Zoology, University of Malaya, Kuala Lumpur 22-11, Malaysia. Subscription is Mal\$ 100. Papers will be published.

The International Aroid Society began publishing Aroideana in 1978. It is a good-looking quarterly, reminiscent of Principes. Subscription: US\$ 12 annually; address: Box 43-1853 South Miami, Fla. 33143, U.S.A. In March 1980 the Society held a first international symposium, at the Marie Selby Botanical Gardens in Sarasota, Florida. Of 15 papers a brief account is given in Aroideana 3 (1980) 69-71. In our field of interest come an account of Typhonium by D.H. Nicolson, one of Theriophonum from S. India by M. Sivadasan, notes on the Lasioideae by S. Mayo from Kew, on Schismatoglottis and related genera by J. Bogner, Munich, on classification of Colocasioideae by M. Madison of Selby.

A well-attended Symposium on The Tropical Rain Forest was held at Leeds in April 1982. Sessions were devoted to Ecological processes in the upper canopy, Decomposition and nutrient cycling, Plant/Animal interactions, Diversity and its conservation, Resource management - future prospects. It was an excellent affair. The Proceedings will be published by Blackwell's as one of the Symposia volumes of the British Ecological Society. Contact Dr. A.C. Chadwick, Zoology, University, Leeds LS2 9JT, England.

The Centre of Asian Studies, University of Hong Kong (contact Dr. Edward K. Y. Chen), will hold a conference on The palaeoenvironment of East Asia from the mid-Tertiary, in December 1982, on an interdisciplinary basis.

A 2-day Symposium on medicinal plants / classification, conservation and related research was held at Singapore in November 1980, under auspices of the Committee on Science and Technology in Developing Countries and the Asian Network for Biological Sciences. Nine lectures were given and are intended to be published. Contact Dr. A.N. Rao, Botany, University, Bukit Timah Road, Singapore 1025.

d) Conservation (continued from page 3587)

Two general books on forest problems. F. M e r g e n (ed.), International symposium on Tropical Forests / Utilization and conservation / Ecological, sociopolitical and economic problems and potentials, 199 p. (1981, Forestry, Yale University, 205 Prospect Street, New Haven, CT 06511, U.S.A.). Printed, paper, \$ 6.95 + 1 for postage. A good exercise for a conservationist. If he has found suitable arguments to answer these hard-line economists, he can stand up to any opponent. Here, for instance, speaks Robert E. E v e n s o n, Professor of Economics at Yale: "Of course, if cutting creates soil erosion, which affects the future productivity of the land, this should be taken into account. But again, if forest lands produce little or nothing to improve the real income and welfare of the masses of poor people in a tropical country, even their conversion to a severely eroded state does not represent a loss" (p. 132). He goes on to say that the question whether a forest is worth more than the price a private logging contractor would pay for them is "a political judgment which should be made by the people who pay the costs." It is, of course, the customary trick of first converting everything into money value, and to hold this out as a capital to be consumed; E.F. Schumacher, himself an economist, has answered this sort of people in Small is Beautiful (1964).

The 17 essays mostly address the question: what to do about the rural poor in tropical forest countries? One examines 10 World Bank projects (results mostly questionable), another the results of the ITCI=Weyerhaeuser plantations in East Kalimantan (disappointing), several deal with cost-benefit considerations (the more ecology is ignored, the more optimistic the tone); it was agreed that slash-and-burn agriculture must be

controlled. The one by J. E w e l, Environmental implications of tropical forest utilization (p. 157-167), criticizes the myths of the red desert and of the bad effects on the atmosphere, then formulates 7 hard questions which land-use planners have to face: 1) Is it a habitat for indigenous people whose life style is dependent upon its preservation? 2) Is its biota catalogued? 3) Is it the habitat of endangered species? 4) Does it contain species of restricted ranges and potential economic importance? 5) Is it the last remaining example of a community? 6) Would manipulation have a detrimental effect on neighbouring ecosystems? 7) Is the proposed change irreversible? Ewel concludes: "The case for the preservation of substantial tracts of tropical forests - forests that, almost without exception, occupy land that cannot support permanent agriculture without massive infusions of fossil fuel derivatives - is a good one. ... The ecological impacts of tropical forest utilization are real. Exploitation can adversely affect wildlife, the residual vegetation, the local micro-climate, soil microorganisms, soil organic matter, and the nutrient capital of the site" (p. 165). As a whole, the book reflects a confusion in tropical forestry; the absence of any discussion of the population problem, already disastrous in some countries, where the main national product is poor people, makes the situation no clearer.

V. H. S u t l i v e e.a. (ed.), Where have all the flowers gone? / Deforestation in the Third World, xi + 278 p. Studies in Third World Societies 13 (1980), issued by Anthropology, College of William and Mary, Williamsburg, Va. 23185, U.S.A. Mimeo, \$ 10. Next in this series will be Blowing in the wind / Deforestation and long-range implications. Both issues together \$ 17.50. Production is good. N. M y e r s, Deforestation in the tropics: who gains, who loses? (p. 1-21, with 59 references) discusses the three main agents of destruction: logging, forest farming, and cattle ranching (the last in Tropical America), with ecological backlashes in rich and poor countries. An eloquent blend of facts and reasoning. For Amazonia, three essays examine social effects of deforestation, shifting cultivation, and soil resources; the last one, by S. B. H e c h t (p. 61-108, with 99 references), being particularly informative. For Africa, the diminishing forest assets of Ghana are examined and, more extensively, the (more hopeful) situation in Gabon.

P. S. A s h t o n, Forest conditions in the tropics of Asia and the Far East (p. 169-179) sketches the history of deforestation for each of the main parts in a highly interesting overview, distinguishing between lowlands and hills. He holds it that the so-called moist deciduous forests of India, Indo-China and Java are in fact old secondary succession stages (p. 172). A tree like the durian may be a relic from a lowland forest flora now vanished (p. 170). G. S i n g h, Destroying Malaysian forests (p. 181-190), gives figures for Malaya, Sarawak, and Sabah. He examines factors contributing to deforestation: dispensing political favours, state authorities overruling federal ones, policy making giving in to quick profits, high timber demand from Japan, lack of accountability and blissful ignorance. He advocates to set up a small perfectly independent Forestry Monitoring Group, to make its findings public, and sup-

ports please 1) to define boundaries of the permanent forest estate, 2) to freeze new applications for logging, 3) to restrict timber exports, 4) to conserve at least 2% of all forest types in reserves, 5) to set up a national mechanism to monitor ecological effects of deforestation. Author belongs to the Environment Protection Society of Malaysia.

The paper by K. K a r t a w i n a t a, The environmental consequences of tree removal from the forest in Indonesia (p. 191-214, references 99), gives a fine digest, which nicely complements author's State of Knowledge report of 1974 (see *pages 2872-2873*). It also appeared in a volume edited by S.G. Boyce of 1979, which resulted from a symposium in East Lansing, Mich.

R. G o o d l a n d, Indonesia's environmental progress in economic development (p. 215-276, references 258) provides interesting material like names of people, agencies, and projects; it discusses transmigration, agriculture, pollution, problems of sea and coast, energy, population diversity, education, legislation. For the width of coverage, it is a pity that the parts on flora and fauna are weak. The paper was presented at the conference 'Ecological issues in contemporary Indonesia' at Berkeley in 1980. Information I sent to the organizers at their request apparently was not utilized.

First report on the global status of mangrove ecosystems, by P. S a e n g e r e.a. (Mangrove Working Group, Box 498, Toowong, Qld. 4066, Australia) is an extremely useful overview, directed to practical purposes, yet very informative, with a few species named, sorts of utilization, aspects of destruction, management, agencies to administer mangrove, recommendations for 17 categories of interested parties, research needs. Many case studies and local examples are given.

An impressive mangrove program is developing under the aegis of UNESCO, Division of Marine Sciences, 7 Place de Fontenoy, Paris 75700, France. They have a list of 21 available or forthcoming titles.

Slides with text about rain forest, in an 'audiovisual pack', were issued by B.P. Educational Service, Box 5, Wetherby, West Yorkshire LS23 7EH England, at £ 9.60 + postage; educational agencies can have a 40% discount. Most of the 32 slides are from Sarawak. They show the main rain forest types, their functioning, and man's influence. All have been well-chosen, and are of good composition, some are a bit yellowish. The 15 minutes' text, spoken on tape by Dr. A.C. Jermy of the British Museum (NH), is printed in the accompanying booklet of 26 pages; it is clear and informative. Eight pages of 'teacher's notes', and 19 ideas for school expeditions in tropical forests are also given, and a few works named for further study. The subject is well-covered, and treated instructively for the 12-18 age group.

National Conservation Plan for Indonesia is the title of a series of 8 reports, result of the UNDP/FAO National Parks Development Project INS/78/061, of which Dr. John M c K i n n o n (PPA, Box 133, Bogor) is the chief adviser. The preceding project's terminal report was discussed on *pages 3411-3414*. The present 'master plan' will contain two general re-

ports (1 and 8), and 6 special ones, for Sumatra, Java and Bali, Lesser Sundas, Kalimantan, Sulawesi, Moluccas and Irian. Volume 5, on Kalimantan, c. 90 p. + 5 maps (Field Report 17; Bogor 1981), was the first to appear. It contains chapters 25 on the whole island, 26 on West, 27 on Central, 28 on South (rather SE), and 29 on East Kalimantan, each with brief description, conservation significance, proposed reserves with essential data each in  $\frac{1}{2}$  page, conclusions and recommendations, habitat types with area and how much to be conserved (expressed in  $\times 1000$  ha), also potential and justification. The factor altitude has been given the deserved attention.

While sometimes inaccurate (Mt. Kinabalu 4101 m, actually 4175 m) or falsely accurate (34% of all plant species declared endemic, a figure unknown to any botanist) and assigning conservation values according to a somewhat mysterious method, the report outlines an impressive and probably adequate network of reserves, some already existing, many proposed, and large trans-national ones are projected along the Sarawak border. For West K. there are 14, together 12,110 sq.km or 8% of the land area, for Central K. also 14, with 13,363 sq.km or 9%, for South K. 16, with 1760 sq.km or 5%, for East K. 23, with 24,030 sq.km or 12%. Logging, however, poses a threat to many valuable proposals. It is suggested that the large oil revenues now being reaped from the Kutai Reserve be used to pay compensation to timber companies in case plans overlap. As Kutai contains the last blocks of flat lowland dipterocarp forest in East K., it remains in other respects of value, and research is to be encouraged.

Of high interest are the 1:1 million maps added: the Original Habitat Types of Kalimantan, 11 in number, apparently based on a geological map, and the maps with the forest left in each province, based on landsat. They may contain the best available information, but I have no means to judge their accuracy.

It will be a giant but worthy task to get all these areas declared as reserves, and to fend off two big dangers: transmigration (subsidized schemes to land Javanese on generally poor soils), and sawmills (many more projected, which will endanger the nearby forests, reserved or not).

New faces in PPA-positions, the Indonesian Directorate of Conservation. Ir. H. Lukito Daryadi, after about two years as Director, took up a position in another branch of the Forestry Service, and was succeeded by Ir. Wartono K a d r i. His new subdirectors are Ir. H a r s o n o for conservation planning, and Ir. Kardjono K a d a r s i n for nature reserves; the other ones are Drs. Ismu Sutantu S u w e l o for species conservation, Drs. Effendy A. S u m a r d j a for National Parks, and Ir. Herman S u w a r d i for Tourism. Head of administration is Mr. A. Hafiz S.H. "As these new hands accept the heavy responsibility for the protection of Indonesia's unique and rich biotic heritage," writes Conservation Indonesia of March 1981 on p. 9, where photographs of them all have been printed, "we express our hope that the new Director and his staff will be able to effect their policies not only in the Bogor Headquarters but also in the field, where the real job of conservation takes place."

Malaya. A series of information sheets on Taman Negara N.P. were issued about 1978 by the Department of Wildlife and National Parks, Bldg. K 20, Government Offices, Jl. Duta, Kuala Lumpur. Each pamphlet deals with one subject, viz. number 1 Costs and Directions, 2 Slides, 3 River Trips, 4 Wildlife Observation, 5 Jungle trekking, 6 Fishing, 7 not seen, 8 The tropical rain forest. There are also 'Trail Guides', at least 6 of them.

Western New Guinea: a plan in progress. Dr. Ron P e t o c z, WWF Project, Box 525, Jayapura, Irian Jaya, Indonesia, is working on what presumably will be Volume 7 of the Conservation Master plan. In the course of correspondence with the Rijksherbarium, he sent two 1:2,000,000 maps. The one map with 7 elementary vegetation types ('Original Habitat Types of Irian Jaya'), is not the last word, but more detailed than anything so far. The other depicts the reserves established and proposed, 36 items totalling c. 64,569 sq.km. A judgement on the adequacy of the network can be given only on the basis of the final text of the Master Plan. We also have a concession map, 1:2,500,000, dated April 1980. It shows that the islands of Misool, Salawati, Waigeo, Biak, and Japen have largely been issued for logging, so have been large tracts around Sorong, Fakfak, SE of the Bomberai Peninsula, around the Cendrawasih Bay, and a wide strip on the left side of the Mamberamo River.

There is a splendid and detailed Environmental Survey of Lord Howe Island, edited by H.F. R e c h e r & S. S. C l a r k, viii + 86 p., phot., 42 fig. + 2 maps (one vegetation map in colour) (1974; Australian Museum; Sydney), and a more popular book edited by Nancy S m i t h, Lord Howe Island, 41 p., illus. (1977, ditto).

Tanjung Puting, in S. Borneo across the 112° meridian, is the recent name for the Kotawaringin Reserve (1000 sq.km, 1936) and the Sampit Reserve (2050 sq.km, 1937) combined. In 1938, another 300 sq.km were added, but meanwhile, various incursions have been made to log ramin, *Gonystylus bancanus* (Thymel.). These logs are easily attacked by fungi which give the wood a bluish colour, for which it is treated with very poisonous chemicals. Ulin, *Eusideroxylon zwageri* (Lauraceae), is also harvested; and jelutong, *Dyera costulata* (Apocyn.) latex is tapped in a very destructive style. *Sindora* trees (Caesalp.) are tapped for their red exudate which can be used for lighting.

It is the only reserved tract of swamp forest in Indonesian Borneo. The highest point is perhaps 30 m above sea level; small rivers, part of them tidal, move the blackish water out. The vegetation is for 10-20% secondary. Dryland forests with dipterocarps (of a relatively poor sort for Borneo) occupy 40-50%; 5-10% is covered with kerangas on white sands, or with its degraded stage, padang. The rest is occupied by coastal fringes, and several types of mixed swamp forests which are very rich and varied. Remarkable are the pure stands of *Shorea belangeran* along the many rivers. In the wet season they are in 2-3 m of water, in the dry season the bark gets scorched from the burning of undergrowth by fishermen, but apparently they can stand this (p. 10, 11). Access is by boat.

There is a good population of proboscis monkey and orang-utan; the latter has been studied since 1971 by Drs. Biruté Galdikas & R. Brindamour, in an area of 35 sq.km. Many plant species were collected by them, kept in their Camp Leaky, but intended for distribution to Bogor and Leiden. This is noted on p. 32 of the Management plan for Tanjung Puting Nature Reserve / Central Kalimantan / Indonesia, v + over 70 pages, with maps and phot., based on the work by P.F. Cockburn & E. Sumardja (c. 1981, presumably Bogor; World Wildlife Fund Project 1523). The plan gives a general description, recommendations for further development as a reserve, indications of boundaries, and the text of the various decrees.

Morowali Nature Reserve / A plan for conservation, 67 p., 9 fig., 23 phot. (1980, a World Wildlife Fund report, presumably issued at Bogor), compiled by Andrew L a u r i e.

In Celebes, at the base of the E. peninsula on the S. side at Tomori Bay, opposite Kolonodale, lies this reserve with Mt. Morowali (2280 m) in the centre; NE. of it lies Mt. Tokala (2630 m), NNW. of it lies Mt. Kato-pasa (2835 m), SSW. of it are two small lakes. There is basic and ultra-basic intrusive rock and limestone. The main stream, Morowali River, has a wide rocky bed. The climate is wet and slightly seasonal (map on p. 16). Mentioned are tree inventories in  $\frac{1}{4}$  ha plots. The alluvial forests are dominated by *Calophyllum soulattri*, and contain 30-35 tree sp. per plot, rarely exceeding 30 m. The hill forests contain c. 50 sp. attaining 25-35 m. Mossy forest begins at various altitudes above 1600 m. The fauna is discussed more extensively, with species lists; many birds occur.

I could not find a size indicated, and in fact a change of boundaries is proposed from the original ones (p. 9) to establish three buffer zones (p. 47). If thus adopted, the nucleus will be some 60 by 20 km. The vegetation is largely intact, although 4000 Wana shifting cultivators and 1200 coastal villagers live within the present boundaries. Rattan and damar are collected, although trade seems on the wane. It is proposed to move cautiously, with respect for the people's traditional life style; hopefully they can be resettled in a few years, as far as necessary.

The area was explored by Operation Drake from January to April 1980, led by Andrew W. M i t c h e l l, who wrote a nice popular book on the whole enterprise of which this was one portion, Operation Drake / Voyage of discovery (Severn House, 144-146 New Bond Street, London W1Y 9FB, England; £ 12.00). A 1:100,000 map of the reserve was announced, and also on p. 61-62 a list of 36 titles of forthcoming reports on details. Contact Dr. A.W. Mitchell, 43 Hamble Street, London SW6.

Barisan Selatan Game Reserve is the newly proposed name for the long narrow tract formerly known as Sumatra Selatan I. It occupies the Semangko Peninsula in the very SW., and stretches c. 200 km to the N., just W. of Lake Ranau. A Management plan 1982-1987, iv + 48 p. + 5 maps (1981 Bogor, FO/INS78/061, Field Report 21), based on work of R. De Wulf and others, gives some information on this poorly known area, 3568 sq.km in size, of which 45% lies below 500 m, 34% at 500-1000 m, 17% at 1000-1500 m, 3% higher, to 1964 m.

With Way Kambas (formerly S.S.II) reported to be in bad condition,

Barisan Selatan seems to be the large lowland rain forest area that is nearest to Jakarta. Encroachment has plagued the reserve from its establishment in 1935, and the boundaries are indented in many places. Much good forest is reported to have been left, however, and the plan recommends firmly to keep it.

Botanists will fully agree with this plan. Strange as it may seem, being so close to Bogor, S. Sumatra is still very badly known. The main exploration effort was made by Van Steenis who in 1929 botanized around Lake Ranau, i.e. above 540 m. He wrote an important paper (Bull. Jard. Bot. Buit. iii 12: 1-56. 1933), which extensively compared the plant geography of S. Sumatra with that of W. Java. Jacobs (Reinwardtia 8: 348-349, 1972) found the lowlands E. of the reserve interesting and rich in novelties. It would indeed be rewarding to make a large-scale collecting effort and another comparison with Java, of which we now have such fine data.

There is a 1:200,000 geological map of the region, made in the 1930's, accompanied by a text (Geologische Kaart van Sumatra; Dienst van den Mijnbouw van Nederlandsch-Indië). General descriptions were given by Rappard & Hoogerwerf in Nature Protection in the Netherlands Indies (1938) 49-52, illus., and by Verstappen (A geomorphological reconnaissance of Sumatra, p. 23-29. 1973). Rappard (Trop. Natuur 25: 90-95, 108-113, 17 phot., 2 maps. 1936) described the changes caused by the big earthquake of 1933. Rappard (Tectona 30: 897-916. 1937) also reported on damar collecting near Krue. Meijer (Indonesian forests and land use planning. 1975) gives interesting notes and satellite pictures. In fact, Barisan Selatan seems ideally situated for inventory and ecological work, particularly to study regeneration long after various patterns of destruction.

Kerinci-Seblat National Park, a tract of 330 by 20-80 km, between Padang and Bengkulu with the Kerinci Valley as an enclave more or less in the middle, has been proposed. It is envisaged as a counterpart in the southern half of Sumatra to the G. Leuser Reserves in the North. The area is some 10,000 sq.km, most of it is montane, but the biological importance of the lowlands (with *Amorphophallus* and *Rafflesia*) is now becoming fully appreciated, and considerable portions of such forests, above 200 m, have been included in the proposal. It is the catchment area of the big rivers Batang Hari (to Jambi) and Musi (to Palembang), and it harbours good populations of elephant, rhino, tapir, and tiger, and many sorts of smaller animals.

At present, it is an agglomeration of 16 'forest units', outlined on a 1:1,000,000 map, with different status and problems. Parts were already declared reserve in 1935. Others can hopefully be added without great difficulties. If realized in the proposed form, especially on the low eastern side, the Park will be of outstanding biological value, with scenic attractions like Kerinci Peak and the nearby G. Tujuh crater lake at 2000 m. Whatever is left of the Danau Bento, one of the highest swamp areas of Malesia (1400 m), deserves careful protection.

The forest situation in Sarawak. Much can be learnt from a report by Frank H. W a d s w o r t h, Hill forest silviculture in Sarawak, vii + 40 p., sketch map (1981, Forest Department, Kuching) to FAO: Field Document 13 of FO:MAL/76/008. Sarawak is about 72% forested, with 68,500 sq.km of commercial forest land. At the present rate and style of logging, this will be exhausted in 20-22 years. Shifting cultivation by 1969 had affected 24,000 sq.km, by 1978 this was 28,540 sq.km, an annual increase of 500. This would do away with all the Hill Dipterocarp forest in 43 years. If shifting cultivation could be controlled and the forests better utilized, the resource may last 30-34 years.

Of the total land area of 123,000 sq.km about 8% is suitable for agriculture, 14% is marginal for it, 78% being unsuitable would be kept best under forest. The publicly controlled reserves, protected forests, communal forests, and national parks aggregate 32,500 sq.km = 25% of the land area. Nature reserves cover only 7600 sq.km. Five forest types are distinguished: mangrove (2% of the forest area), peat swamp forests (I suppose this includes freshwater swamp forests; 16%), kerangas (4%), hill dipterocarp forests (62%), and above 750 m the montane forests (16%). Lowland dipterocarp forest has apparently been added to the hills. Logging yields 40-60 cu.m/ha; in 1978, some 6,270,000 cu.m were taken, more than 90% of it disposed of in log form. Local consumption is c. 600,000 cu.m a year; export volume rose from 2,700,000 cu.m in 1969 to 5,600,000 in 1978. Public revenues from timber totalled Mal\$ 34,500,000 in 1978, 14.4% of all government revenue. Production from the forest employs 30,000-40,000 workers, 65% of them engaged in logging, 35% in processing. Of the public revenues from forest resources only 12% is being invested in future crops. Of the total harvested value this investment is a mere 1%.

Of the commercial forest lands, 14,500 sq.km is swampy, 54,000 hilly. Part of the latter area is too steep or too high for logging. It will be reduced also by shifting cultivation to an unknown extent, and by excisions in connection with hydro-electric dams. Energy demand may be 5-fold by the year 2000, and some 50 promising dam sites have already been located in Sarawak. The Pelagus Rapids site, in the Rejang River, would require water from 20,000 sq.km of uplands; the 12 largest prospective dams would need a total catchment area of nearly 57,000 sq.km; such areas will have to be protected. The need has been expressed to reserve 10% of each type of forest; this would mean 6000 sq.km of hill dipterocarp forest. It is well-realized (p. 12) that for species preservation lowland is needed. "Accordingly a selection of natural reserves needs to be made on an ecological rather than an economic basis and before logging has progressed to a point that few options remain."

All future expansion of forestry activities must therefore be sought within those limits. To maintain production, thoughts turn toward silvicultural measures like liberation thinning, which seem highly suitable in logged-over forests (see following item). Population growth may become a problem: the present rate is 2.7%. From 1.27 million in 1980 there will be 2.16 million by 2000 and 2.82 million by 2010. Various expectations may be unjustified, owing to shifting cultivation, crude methods of fel-

ling, misuse of mangrove, and parsimonious investment; author's personal comments on p. 39-40 are sobering enough.

Liberation thinning, a tool in conservation? A report by Ian D. Hutchinson, Liberation thinning / A tool in the management of mixed dipterocarp forest in Sarawak, vi + 28 p. (1980, FAO Kuching), Field Document 5 of FO:MAL/76/008, describes the method extensively. By poison-girdling those trees are removed that restrain the growth of a selected or 'reserved' tree. For each of the latter, c. 3 others are killed, i.e. 15-20% of the mean total number of trees per ha. The method seems particularly suitable in logged-over forest, to promote development of a second crop.

Claimed to be "less traumatic than other silvicultural systems" (p. 6), it does not seek to eliminate undesirable species or any particular (group of) species. Hutchinson defends that species diversity is thus protected. This is, however, unproven and also unlikely. The desirable trees (listed on p. 20-21) are saved, others are eliminated. If these belong to the many rare, scattered species (like the 37% which were only once found in Poore's Jengka plot in Malaya of 23 ha), their population are diminished, and easily may sink below the critical level needed for survival.

From conservationists' quarters, recently ideas have been circulated to apply liberation thinning in reserves, to promote fruit trees from which apes and other big mammals might benefit. The same objection here applies. Delicate population balances are disturbed which must result in an eventual decrease of species. Moreover, will the soil allow it? A larger fruit crop is generated, resulting in more animal biomass per hectare which is, however, not properly recycled: when a large animal dies, decomposition is sudden and spot-wise. The 'leak' in the mineral cycle may have further had effects on the balances in the forest ecosystem, particularly in species-rich forests on poor soils.

The Sinharaja Forest is the only extensive patch of lowland rain forest left in Ceylon, in the densely populated SW. part. Between 1972 and 1977 a major logging operation by Canadians - terminated when it was found unprofitable - did away with a considerable portion. Public opinion was stirred, however. Its undisturbed nucleus of c. 56 sq.km contains an estimated 60% of Ceylon's endemic flora and fauna, even 18 of the 21 endemic species of birds.

The reserve, now considered for the World Heritage List, is protected by gates on the few roads of access. It contains no habitation, has never been subjected to shifting cultivation, and is rarely entered except in the logged-over western part. Several N-S foot trails traverse it, but they are seldom used. It is administered by the Forest Department under the Ministry of Lands. Contact Drs. Gunatilleke, Botany, University of Peradeniya, Sri Lanka; their paper on the floristic composition is in Mal. Forester 44 (1981) 386-396.

National Park in Seram. The proposals for Way Nual and Way Nua (page 3230) have been worked out to Proposed Manusela National Park / Management plan 1982-1987, c. 65 p. + 5 maps + 7 phot., by F. S m i e t &

T. S i a l l a g a n (FO/INS/78/061/Field Report 15; Bogor, 1981).

The idea is a V-shaped park of 1800 sq.km across the island, avoiding the plain SW. of Wahai but including the Wae Mual Plain to the SE., and the NW-SE-running Merkele Ridge with G. Pinaia (3027 m). Parallel with it runs the Manusela valley (bottom at 700 m), an enclave where accommodation is to be built. A strip of 60 sq.km of lowland forest has been badly disturbed (human influence reaches up to 600 m), but 90% of the area is unaffected; map 3 sketches the vegetation, 7 types. Logging for which some 20 km of road were made in the park could be stopped by PPA in 1980 and the company, Brata Jaya Utama, is now operating outside the boundaries. Human population is gradually moving out, and management problems do not seem serious for the first 5-15 years, when 'development' may come to threaten the Park, but long-term viability seems likely.

The whole region is poorly known - some species lists are given in the report - and with its splendid transect of virtually unbroken virgin vegetation from the coast to the summit with its known richness of cold-loving plant species, has much to attract scientists. The Rijksherbarium botanists, who some years ago saw their expedition plan frustrated, will remain on the lookout.

Reserves in Bacan, Halmahera, Morotai. The Moluccas report mentioned on pages 3586-3587 has been followed by the Survey report of feasibility study and proposals for conservation areas in Maluku Utara, by A. C. S m i e t (no longer there) and others, c. 60 p., maps (FO/INS/78/061, Field Report 22; Bogor 1981) in English and Indonesian.

It calls for reservation in Bacan of G. Sibela (2110 m), 150 sq.km, from the lowland (where some logging has been done up to 400-500 m, causing quite some erosion) up. Huge trees are reported of Canarium, Octomeles, Pterocarpus, and Shorea. Montane forest occurs at 500-1500 m. The summit consists of a long undulating ridge, under elfin forest. The reserve makes a most valuable catchment area.

In Halmahera, Wasile reserve is proposed in the NE. part, 850 sq.km, up from 100 m to 1312 m. The country is rather varied, with 27 endemic bird forms, and some 1000 nomads, the Tugutil, who maintain their traditional way of life in the forested mountains. This reserve, too, will have great value as catchment for the transmigration projects near the coast. Around it, logging is in preparation.

In Morotai, logging is already well in progress; the Padma Nera firm has a base camp 23 km inland at 500 m, and in violation of the rules is harvesting Agathis from 600-900 m. This is "very destructive to the forest and we encountered plenty signs of severe erosion". Some good forest is still present, however, with abundant bird life. The proposed reserve includes G. Sabatai (1090 m) from c. 150 up, 450 sq.km, excluding population, and logged-over forest. This, too, has a vital function as protection forest.

Lists of birds and other taxa are given in the report.

Terania Creek logging (see pages 3585-3586) to proceed? Mr. Don Day, Minister for Agriculture in New South Wales, was identified in the book Rainforest Habitat edited by John Messer, on p. 40 (1981) as a major

protagonist for destruction of the Border Ranges rain forest just North of Terania Creek, and of Terania Creek itself. On a tour of coastal areas with the Minister for Mineral Resources, he pushed for further beach-mining operations in (proposed) parks in the North. "Day stood at the edge of the mining operation at Jerusalem Creek and waved his arm across the surrounding untouched wildflower swamps: 'It's all bloody rubbish', he said, 'ninety per cent of it and not worth a single job.' He can be happy for the moment. On 23 March 1982 the Rainforest Information Centre, 22 Terania Street, Lismore, NSW 2480, Australia, sent out this message:

"The inquiry into the proposed logging of Terania Creek recently delivered its verdict -- that logging be permitted to proceed. The 83-year old judge noted that '... It is difficult to tell if one is in virgin country or simply revegetated areas.' However, determination to save all N.S.W. rainforests from further destruction is growing from strength to strength. The Government has appointed a committee, chaired by the Premier, to develop an overall rainforest policy for the State. It seems unlikely that any action will be taken to try to log Terania until this policy has been formulated and released."

IUCN is establishing a task force on Conservation of Traditional Life Styles. This will pay attention to hunter-gatherers and less primitive tribes inside and outside protected areas. Contact Dr. Thomas Schultze-Westrum, 16 Stanley Gardens, London W11, England.

Way Kambas Game Reserve /Management Plan 1980/1-1984/5, 78 p., 4 pl. + appendices + 10 maps (1979, PPA, Box 133, Bogor, Indonesia). FO/INS/78/061, Field Report 5, stencilled.

A roughly triangular area c. 1235 sq.km in SE. Sumatra's Lampung Province, along a 65 km coastline. Most of it was low-altitude dryland forest, of which now  $\frac{1}{4}$  were logged in 1968-1974, with permission of the Provincial Forest Department, and 2500 families are now sitting illegally inside the reserve. Many animals are still there, and it may be feasible to retain the reserve. The text gives no botanical matter.

Gunong Mulu National Park in N. Sarawak continues to focus interest, although activities in the Park itself have been reported to have slowed down. The Management Plan is expected in print in the course of 1982.

Also in print is a Supplement to the Sarawak Museum Journal containing 11 chapters on the biology and physical geography of the Park. A sequel volume will contain an annotated checklist of all the flowering plants and a mini-Flora of the ferns. There will be other chapters on the different zoological biota.