VI. MISCELLANEOUS INFORMATION

a) Research and Publications *(continued from page 3399)*

Sinar Pasoh is the name of an annual Newsletter of the research centre in Pasoh Forest, Malaya (see *pages 3394-3395*). Number 2 (February 1980) has 30 pages. It describes facilities, work done, with a useful literature list (total by now 110 items) and invites research plans. Contact Mohd. G h a r a l i, PPPPasoh, Simpang Pertang, Negri Sembilan, Malaysia. The newsletter itself is distributed free of charge by the Director, Forest Research Institute, Kepong, Selangor, Malaysia.

Mangrove Mapping is a joint project with Queensland Fisheries Service, to be carried out by R. D o w l i n g and J. A. E l s o l (BRI). Currently a technical bulletin it is being prepared to go with maps of the mangroves of Moreton Bay which have already been printed. A paper on the mangroves of Princess Charlotte Bay was presented at the Mangrove Symposium in Port Moresby by J.A. Elsol and P. Saenger.

The descriptions and maps of the mangrove vegetation from Round Hill Head to Tannum Sands (Central Queensland) has recently been released as a chapter in Queensland Fisheries Service Research Bulletin No. 2, available from Q.F.S., P.O. Box 36, North Quay, Brisbane.

Dune Vegetation Surveys for Beach Erosion Investigation Reports, by T.J. M c D o n a l d, G. N. B a t i a n o f f and J. A. E l s o l (BRI), cover the coastal strip 1-2 km in from the sea and includes dunes and other landforms, in Queensland. Botany Branch Technical Bulletin No. 6 entitled 'Capricorn Coast Sand Sune and Headland Vegetation' by G.N. Batianoff & T.J. McDonald was released during 1980 and covers the Livingstone Shire Investigation. Work should be completed on the Mulgrave Shire (based on Cairns) and the Sunshine Coast (north of Brisbane) coastal vegetation surveying and mapping projects during 1981.

Vegetation Mapping of Queensland (1:1,000,000). Work on the far northern sheet of this series, north of latitude 16°S was commenced during 1980, by J. C l a r k s o n (BRI). Photo-interpretation and field work are proceeding. The project will take several years to complete.

Moreton Region Vegetation Map Series (1:100,000). The four Queensland coastal maps and explanatory booklets by W. J. F. McDonald, J. A. Elsol & R. Dowling (BRI), Murwillumbah, Beenleigh, Brisbane and Caloundra have now been released. A summary report for the four areas and which discusses various aspects of non-urban land suitability and flora reserve suitability is now being prepared. Chapters on conservation and species of note are also included in the summary report.

Flora Inventory — Cook Pastoral District. This on-going project is providing valuable collections of north Queensland plants for the BRI-Herbarium. Mr. J. R. Clarkson is concentrating on the flora of Cape York Peninsula north of 16°S latitude. Several duplicates of each number have been collected for exchange with other herbaria both in Australia and Overseas. His work complements the activities of Botanists stationed at the C.S.I.R.O. Forest Research Station at Atherton whose Herbarium (QRS) has many of his duplicates.

It is well known that the rich flora of the Great Nicobar Island in the Andaman and Nicobar archipelago is akin to the flora of Malaysia and Indonesia. These islands are recently subjected to human settlement. Although the number of them is less now, there is probability of increase and hence deeper encroach into the rich forests of this island. Hence the Andaman and Nicobar Circle of Botanical Survey of India has taken up a project, to study the impact of human settlement in this island, under Man And Biosphere Project. The project will study the ecosystem and flora of this island in order to provide data for declaring the northern part of the island as Biosphere Reserve to conserve the rich vegetation of this part with high endemics and interesting species. The project is expected to be completed by 1982. Contact Dr. N.P. Balakrishnan, Botanical Survey, Port Blair, Andaman, 744 102 India.

Sumatra: vegetation mapping and profile making. Under the aegis of BIOTROP, Bogor, a French team under Professor F. Hallé a few years ago began this project, now in the hands of Dr. Yves Laumonier. They work from South to North, the map will be made in 3 sheets, scale 1:1,000,000, to be published by the Institut de la Carte Internationale du Tapis Végétal, 39 Allées Guesde, Toulouse, France. At the French end is Dr. F. Blasco, known for his vegetation map of India.

Since Sumatra is so poorly known — the average being a mere 22 specimens in 100 sq.km, and botanical descriptions of areas being few and far between — the task was difficult. Air photographs 1:100,000 had been made in 1976, satellite images are available from 1973 and 1978. A 500,000 soil map of 1976 could be used, and sketchy 250,000 and 500,000 soil cover maps recently made.

The subdivision of Sumatra into subareas was adopted from Th.H. Verstappen's Geomorphological Reconnaissance (1973); see *page 2229*. This framework was supplemented with available data on climate, soils and vegetation types, and as much 'ground truth' as could be obtained by field parties from Bogor. Two students from Leiden, N. A. P. Franken and M. C. Roos, joined up for 8 months and gave assistance in Jambi Province to complete the first, southern sheet which is cut off just above

Kerinci and Jambi town. They handled the herbarium collections and made profiles.

These profile diagrams, made in a varied collection of 60-100 by 10 or 20 m plots, bear scant relevance to a vegetation map, but in fact contain a large body of high quality original data. Hallé, who together with R.A.A. Oldeman thrust up the art to fresh heights (see their Tropical Trees and Forests, 1978), transmitted profile-making to pupils, and fascinating sheets are now being produced by the square metre, showing epiphytes and lianas aplenty for the first time. They will enable us to compare Sumatra with parts of Africa and Latin America where Hallé & Oldeman have worked. Stature, composition, turnover and future of the canopy can be read from such profiles, and be interpreted in relation to physical factors. Such studies may reveal indications for management of a particular type of forest.

While the first sheet of the map is still in preparation, Laumonier on 4 July 1980 took his Ph.D. degree on a thesis Contribution à l'étude écologique et structurale des forêts de Sumatra, 137 p. + appendixes, 28 fig. (11 of them in pocket), 24 tab. (Toulouse, address above), mimeo. The book is entirely in French. It brings together the main physiographical facts about Sumatra, most of it of course well-known, but new is a compilation of climatic data from 1963-1976. On account of bioclimatological considerations, an altitudinal zonation is proposed: 0-300-1000-1800-2700 m (p. 63). This does not tally with my findings on Mt Kerinci (visited by Laumonier) where zones change at 2400 and 2900-3000 m. But Laumonier does not give comment. Most of the thesis is devoted to analyses of the profiles, of which there are 10, half of them from below 300 m. A list of c. 630 names and numbers documents the profiles. The names have been correctly spelled and checks by Franken & Roos revealed that the identifications — made by invaluable Mr. N e d i (BO) — are highly reliable.

Yet the impression persists that the vegetation map as such in fact lacks a botanical foundation. Its framework is geomorphological, bioclimatic, and to some extent pedological. It is as yet unclear if and how these features are reflected in the dryland forests. The projected legends (p. 65-66) hardly venture beyond primary forest, secondary growth, savanna (whatever that may be in South Sumatra), swamp forest, Melaleuca, and herbs. In itself, this may not be an essential drawback, if the reconnaissance was good and the mapping accurate; this we hope to see. Within the limits of what has been left of the primary forest, a round of botanical exploration and stock-taking can yield very valuable gross descriptions of forest, supported by profiles. When this all materializes, there will be much to be happy with. A paper by Franken & Roos, Studies in lowland equatorial forest in Jambi Province, Central Sumatra, accompanied by fresh profiles, amongst others of Eusideroxylon forest, the last big stand in Sumatra, will probably be issued by BIOTROP in the course of 1981.

At Bogor, Dr. Setijati S a s t r a p r a d j a and her co-workers are preparing popular books on common Indonesian leguminous trees, fodder plants, mountain grasses and other plants, ornamental plants and hedge plants; and two books on common trees in dry areas and common grasses in

in lowland areas have been completed. She is also coordinating a project on the 'Utilization of plant resources', which includes the study of biological characteristics of various species of Leguminosae (Canavalia spp., Cajanus cajan, Lablab purpureus, Leucaena leucocephala, Parkia spp., Phaseolus spp., Psophocarpus tetragonolobus, Sesbania spp. and Vigna spp.), Amaranthaceae (Amaranthus spp.), Moraceae (Artocarpus spp.), Rutaceae (Citrus spp.), Orchidaceae (Arachnis, Dendrobium, Paphiopedilum, Vanda, etc.), Zingiberaceae (Globba, Nicolaia, Zingiber), and Amorphophallus spp. The study is concerned with morphological, genetic, growth and development, phytochemical and cytological properties, and emphasizes plant groups that have economic values (sources of carbohydrate, protein, vitamins, and medicine, as well as ornamental plants).

Dr. Didin S a s t r a p r a d j a is heading the project on 'Productivity of the pekarangan (Home garden) ecosystem' including inventory of cultivated plants and their wild relatives growing in the home gardens which up to the present time are relatively unknown to botanists and agriculturists.

Dr. Kuswata K a r t a w i n a t a (BO) is heading the LBN research project on 'The inventory of forest ecosystems and the roles of flora and fauna they contain' which was initiated in April 1979. The project covers a) Inventory of ecosystem types in forest areas, b) The ecology of dipterocarp and other forest ecosystems (community dynamics. regeneration and growth rate of important tree species, phenology and reproductive biology of important tree species, phenology and reproductive biology of important tree species, nutrient cycling, the roles of mammals and birds in plant dispersal, the roles of microflora in the forest), c) Research on autecology, geography, biology and taxonomy of forest plants, and d) The effects of human activities on forest ecosystems. This, together with projects headed by Drs. S a s t r a p r a d j a and those on animal and microbial resources, form of a LBN's 'Research Program on the Promotion of Biological Resource Utilization' financed by the Indonesian Government under the Five-year National Development Plan (1979-1984). For field activities, see Exploration.

Zingiberaceae. On a second trip, which took her to 9 of the 11 states of Malaya, Ms. Jacqueline F. R e i l l y (Westfield College, London NW3 7ST, England) made field observations during July and August 1979 and collected 74 numbers for the Kew Herbarium. She found that most Alpinieae have tough indehiscent fruits. Flower visitors were observed, and nectar samples analyzed. Pollination is mysterious and probably implicated: many species may be self-compatible. Ms. Reilly will take a Ph.D. on her ginger work late in 1980, and publish a condensation in Kew Bulletin

Ethnobotany in Sarawak. Another paper was published by C h a i, see Bibliography. Mr. Chai (SAR) is continuing work, and has collected more than 70 species of plants of local value.

Dr. Alex G e o r g e, formerly of the PERTH Herbarium, has been appointed Executive Editor of the Flora of Australia project, Bureau of Flora and Fauna (P.O. Box 1252, Canberra City, ACT).

With the 7th and final part of the series The Compositae of New Guinea Dr. Joséphine Th. K o s t e r had continued her work on the family after her retirement from the Rijksherbarium staff in 1967. She completed this revision of altogether 168 sp. in 63 genera minus the species of Senecio, which is still in the hands of Dr. P. v a n R o y e n (BISH), who also, with D. Lloyd as junior author, revised Cotula, Blumea 22: 197-206 (1975); this paper has not been numbered in the series. The parts by Ms. Koster were published as follows: I in Nova Guinea, Bot. 24 (1966) 497-614, II in Blumea 18 (1970) 137-145, III ditto 20 (1972) 193-226, IV ditto 22 (1975) 207-217, V ditto 23 (1976) 163-175, VI ditto 25 (1979) 249-282, VII ditto 26 (1980) 233-243. The Index to genera in the final part applies only to the parts in Blumea; one to the whole series has been made and is available from the Rijksherbarium, as are the reprints.

Aralidium. In the Araliaceae revision (Fl. Males. i 9: 16. 1979), W. R. P h i l i p s o n observed that this monotypic genus of west-Malesia may not belong in that family. In Taxon 29 (1980, August) 391-416, a multidisciplinary series of 6 papers appeared to examine its taxonomic position. On p. 402, sure enough, a new family is proposed for this one species: Aralidiaceae Philipson & Stone. It is (halfheartedly, p. 401) placed in the Cornales, closest to the Cornaceae. As for the other relationships: quot homines, tot sententiae.

Mr. Patrick H o m m e l has been commissioned by WWF to make a vegetation map of Ujung Kulon, SW. Java, in one year. At Leiden, he prepared a species list from various sources; he left on 30 March 1981 and will remain in close touch with Dr. M. Jacobs.

Dr. Richard P r i m a c k from Boston University arrived in July 1980 at Kuching, to prepare A forester's manual for the moraceous trees of Sarawak. The project is sponsored by the U.S. Forest Service. Aim is to prepare a field guide to the species, to study reproductive biology of Artocarpus, also seed biology and seed establishment.

Having completed the field work on the Forest Flora of Goa the manuscript of which is nearing completion, the Botany Department of the Forest Research Institute, Dehra Dun has recently launched a project on the preparation of a Forest Flora of Arunachal Pradesh, India. So far 6 collection trips have been undertaken and more than 3000 specimens comprising c. 700 species collected and identified. A number of new records and species new to science have already been brought to light through various publications.

At CAL, work on the Flora of India (see *page 3202*) continues. Fascicles 2-6 with the grass tribe Garnotieae, Simaroubaceae, the orchid genus Coelogyne, and Pittosporaceae were announced but not yet received. In progress are Annonaceae, Hippocastanaceae, Magnoliaceae, Ranunculaceae, Violaceae.

Tree Flora of Malaya vol. 4 is in progress at KEP. Completed were Crypteroniac. (Ng), Melast. (Maxwell), Myrsin. (Stone), Opiliac. (Ng). Under study are Anacard. (Kochummen), Meliac. (Mabberley), Rubiac. (Wong), Sapind. (Yap).

A.D.E. Elmer's field notes to N. Borneo plants, numbers 20003-22694, were typed out for circulation by Dr. Dan H. N i c o l s o n, Botany, Smithsonian Institution, Washington, D.C. 20560, U.S.A. They are not complete, but 77 p. of typescript are filled.

The tropical rain forest / A first encounter is the English equivalent of the Dutch title 'Het tropisch regenwoud / Een eerste kennismaking', by M. J a c o b s, a circa 350-page book to be published by Coutinho, Badlaan 2, Muiderberg, The Netherlands, in September 1981. The price will be about Dfl. 45.

Besides the biological aspects, about one-third of the text is devoted to the relations of man and forest, notable the world-wide concern about the future of the rain forest, the ways of study this ecosystem, the values of these forests, the problems of destruction and conservation together with their background, with outlines of tropical forestry.

Of course, climate and soil are dealt with, together with the great consequences of their conditions; life forms and forest structure follow; emphasis lies on composition and species richness, from which so many problems about the rain forests stem. Examples of plant—animal relations explain mutual dependence in the 'web of life'; the factor time receives due attention in the chapters on evolution and speciation. One chapter expounds the relations between primary and secondary forest; another briefly discusses all the marginal types like seasonal forest, swamp forest, and mountain forest.

Although the book concentrates on the Malay Archipelago, it covers the big rain forest blocks of Amazonia and Africa, in examples and comparative notes. Illustration is mostly by diagrams, but a fair amount of black/white photographs are also given. The book differs from the one by T.C. Whitmore, Tropical rain forests of the Far East (1975) in being less technical, and concentrating more on the true rain forest and less on adjoining types. It hopes to convey a more comprehensive understanding of this kind of ecosystem and its problems, and by pointing to important publications, to provide an inroad for further study.

Perhaps an English edition will be brought out later; if that happens, the title probably will be Rain Forest for Beginners.

Jatiluhur is a man-made lake NW of Bandung, west-Java, an island where suitable dam sites are extremely rare. Owing to insufficient protection of the vegetation in the catchment area, the lake is filling up with silt at alarming rates; this would put the power supply for Jakarta in jeopardy. A concise informative report, with bibliography, by Messrs. K. F. W i e r s u m & S. A m b a r, Tropical ecological forest research in Indonesia / Vegetation and erosion in the Jatiluhur area, 43 p. (1981, Bosteelt, Hinkeloord, Foulkesweg 64, Wageningen, The Netherlands) describes work done, initiated by Professor O. Soemarwoto, Pajajaran University, Bandung.

Cape York Orchid Project was conducted by Dr. Peter S. L a v a r a c k (new address: Parks & Wildlife, Pallarenda, Townsville, Qld. 4810, Australia). McIlwraith Range, in NE. Queensland between 13°15' and 14° S was scanned for orchids. Altitude is mostly above 400 m, up to 824 m,

rainfall is about 1200-1500 mm. There is closed vine forest, with deciduous elements, upland rain forest, swamp forest, open forests and woodlands, 15 (sub)types are actually distinguished. Two expeditions yielded 90 sp. of orchid, 10 of them endemic, and about half is shared with New Guinea.

Two publications resulted: P.S. Lavarack, Orchids of McIlwraith Range, ii + 43 p., illus. (1980, Jan., Qld. National Parks and Wildlife Service, Brisbane) in mimeo gives all data extensively; ditto, Austral. Orch. Rev. 45 (1980, June) 90-105 is an excerpt, both give species lists.

b) Herbaria, Gardens, Organizations *(continued from page 3403)*

Temporary deep-freezing of specimens for c. 48 hours at -18° C, as briefly described in Taxon 29 (1980) 198, like it is now done at Kew, has also been adopted at the Rijksherbarium, Leiden.

Relations with China are warming up. From Leiden in September 1980 Drs. W. F. B. J ü l i c h, mycologist, and A. T o u w, bryologist, went there for a 6-week trip, to meet botanists and to find out about possibilities for field work. They visited institutes at Guangshou (Kwangtung), Mengla and Kunming (Yunnan), and Peking. A number of one-day excursions could be made.

During the Cultural Revolution, institutes were closed down, staff sent to the countryside; those in high positions suffered most. Some collections were affected, especially in botanic gardens. Below the well-trained, high quality scientists who are now c. 65-85 years old, there is a gap, and those who are now c. 35-50 years are home-educated.

Mass efforts are going on to learn English, and there is a great eagerness for cultural exchange. University staffs are small, teaching loads heavy. Research concentrates on finishing the Flora of China, 30,000 sp. in 80 projected volumes, of which 23 have now been published.

Jülich and Touw were all the way enthusiastically received, and everyone asked about Dr. Ding Hou. We hope for further contacts; the flora of southern China and Malesia have plenty of elements in common for mutual interest and benefit.

Dr. K. I w a t s u k i from KYO too had a fruitful trip to China. He reported that in Kunming (KUN, director Professor W u Cheng-yih) a new Herbarium building is nearly completed, to house 600,000 vascular plant specimens and 20,000 cryptogams, in four stories, on a total of 3500 sq.m. Volume 3 of the Flora of Yunnan is said to be ready early in 1981, and all mss. for Volume 4 are in. A check-list of Tibet plants will soon be available. The Botanical Garden is expanding from 4½ ha tenfold.

The South China Institute of Botany at Guangzhou (no abbreviation known; director Professor C h e n Feng-hwai) has completed a Flora of Hainan, in 4 volumes. There, too, the Botanical Garden is fast improving.

The curators of the Japanese Herbaria collaborated to check and list up type holdings. For Arisaema (Araceae), Caprifoliaceae, Salicaceae and some pteridophyte groups, a first such list will be compiled.

New abbreviation? UKM-Herbarium of Universiti Kebangsaan Malaysia now has over 8700 accession numbers, mostly from Malaya. This includes 1800 ferns; there are also 2000 bryophytes. Duplicates are available for exchange or distribution. Next year Dr. L a t i f Mohamed, who is in charge, hopes to move the institution to a new building at Bangi, Selangor, Malaysia, 30 km S of Kuala Lumpur.

UPM is the proposed abbreviation of the Herbarium of Universiti Pertanian Malaysia, i.e. the Agricultural University at Serdang, S of Kuala Lumpur, where Dr. Ruth K i e w is in charge. The collection is small but well-kept and growing. Adoption of the Leiden loose-box system is under study.

In connection with the centenary of Hosei University, Tokyo, a group of Japanese historians, led by Dr. M. O m o r i visited Leiden to gather information on early activities of Dutch scientists in Japan. These activities resulted in a considerable collection of Japanese plants and botanical literature in Leiden, so the Rijksherbarium had their great interest.

The Biological Centre in Sarawak, Senengoh Arboretum, at the 12th mile from Kuching, now contains c. 1500 plant species, half of them orchids. Stocking with rare species from Sarawak is continuing.

The Aarhus-Herbarium (AAU) has purchased a set of A. J. K o s t e r m a n s plants from Ceylon, 2760 specimens. It also has obtained a very complete set of J. F. M a x w e l l 's collections from Thailand and Malaya. Mr. G. C o n g d o n has sent fine collections from Terutao I. and other stations in Peninsular Thailand.

A modern airconditioned herbarium has been under construction for quite some time now and soon the Herbarium of the DD Forest Research Institute, Dehra Dun, India will be shifted to this building. The new herbarium building is, however, within the campus of the Forest Research Institute and is not far from the present premises.

The BRI-Herbarium communicated: Mr. S.B. Andrews, Botanist, resigned early in February after ten years on the staff. Mrs. B.A. Lebler, Senior Botanist, retired in July after 17 years at the herbarium. Mr. L.W. Jessup, Mr. J.R. Clarkson and Dr. G.P. Guymer joined the staff.

Mr. D.E. Boyland, Senior Botanist, and Dr. Rosemary Purdie, Botanist, left the ecology group during the year and Mr. V.J. Neldner took up duty. Mrs. Margaret Saul, Illustrator, resigned and was replaced by Mrs. Gillian Rankin.

Mr. J.A. Elsol and Mr. R.M. Dowling attended the Second International Symposium on the Biology and Management of Mangroves and Tropical Shallow Water Communities in Port Moresby in July. In May, while in Europe on leave, Mr. Jessup made brief visits to the herbaria at Kew and Copenhagen. Mr. L. Pedley spent two weeks at Kew in November, continuing his study of Tephrosia.

Research Centre in Samarinda. In East Kalimantan, for Mulawarman University, and with $ 7,500,000 worth of government assistance from Japan, a laboratory will be built on Mt Kalua, Tamindung. Work will concentrate on reforestation, especially in the Man And Biosphere area at Lempake, and for training on Suharto Hill between Samarinda and Loa Janan. A group of experts led by Professor Akira Kawana came over for further planning.

The herbarium collections of C. A. B a c k e r c.s. at the Sugarcane Experiment Station, Pasuruan, East Java, were about 1975 transferred to Herbarium Bogoriense.

Central Institute of Medicinal and Aromatic plants, CIMAP, Lucknow, Director Dr. Akhtar H u s a i n, new address: P.O. Faridinagar (near Kukrail Picnic Spot), Lucknow, India. Its Annual Report 1979-1980, iii + 87 p., describes an impressive array of projects. Among them are morphology and pharmacognosy of 7 Dioscoreas, pharmacognosy of Costus speciosus (Zingib.), leaf and root characters of Aristolochia. There are regional centres in Pantnagar, Bangalore, Jammu & Kashmir, Koidakanal, and Tung.

At College, Laguna 3720, Philippines, the Los Banos Museum of Natural History now comprises 8 institutions, effective May 1980, under directorship of Dr. Ireneo J. D o g m a, Jr. They are: Herbarium (CAHUP), with Professors Norma M. Orlido Aguilar, J.V. Pancho, and Dr. Benito C. Tan — Mycology (CALP), with I.J. Dogma, W.S. Gruezo, T.H. Quimio — Forestry (LBC), with I.L. Quimbo — Entomology Museum — Zoology & Wildlife Museum — Hortorium — Culture collection — Wood collection. It is unclear whether the CLP Forest Herbarium (with F.N. Tamolang, J.P. Rojo, c.s.) joined.

New York Botanical Garden, Publications Office, Watson 207-B, Bronx, N.Y. 10458, U.S.A. sent a catalogue of all its publications since 1896 that are still in stock. Contact Dr. Maria L. Lebrón-Luteyn.

The KLU-Herbarium, established in 1960 by the then Professor Duncan P o o r e, has grown steadily and by now will have booked its 32,000th accession. Duplicates are sent to 26 Herbaria, L being the largest customer, followed by A, AAH, and MO.

Into the CAL-Herbarium 20,278 sheets were incorporated during 1980. The Wallich and type collections were enriched with 60 specimens, 220 Kew photographs and 347 other photographs. The Regional Botanist at Kew sent 2606 negatives of Indian specimens in red covers, which are mostly types. The Calcutta Garden received plants of 198 species, plus 205 medicinal plants for that section.

Wau Ecology Institute, Box 77, Wau, Papua New Guinea, sent its 4th biennial report over 1978 and 1979. While not especially concerned with botany, the staff did work on agroforestry and education, and published handbooks on common frogs, beetles, mountain birds, rodents, mountain ecology, reptiles of the Solomons; pamphlets on mammals and on conservation.

June 1980 the Forest Research Institute and its RAF-Herbarium (curator: Miss Y i n Yin Kyi) has moved from Rangoon to Yerin, Pyinmana, Burma.

c) Symposia, Congresses, Societies, Meetings

(continued from page 3406)

Asian Symposium on Mangrove Environment, Research and Management was held on 25-29 August 1980 in Kuala Lumpur, four years after an many-discipline Working Group had been set up; contact Professor E. S o e p a d m o, Botany, University of Malaya, Kuala Lumpur 11-22, Malaysia. He mentioned that a copy of the Proceedings can be obtained from Mr. Marc Steyert, Ecology, UNESCO, Place de Fontenoy, 75700 Paris, France.

The Mangrove Ecosystem Working Group under the IUCN Commission on Ecology, secretary Dr. G. B. K. B a i n e s, Parks & Wildlife Service, Box 636, Canberra, ACT 2601, Australia, circulates a Newsletter for internal use. According to number 2 (July 1980), a first international meeting was to be held in Port Moresby, PNG, in July 1980. Near Brisbane, where 350 hectares of mangrove are to be sacrificed for a new airport, a big planting project has been started.

International Symposium on Conservation Inputs from Life Sciences, at Bangi on 27-30 October 1980, marked the 10th anniversary of Universiti Kebangsaan Malaysia. A total of 30 papers were presented; contact Dr. L a t i f Mohamed, Botany, U.K.M., Kuala Lumpur 11-22, Malaysia.

Wallace's Line and Plate Tectonics may have been the title of a symposium held; I only saw some proofs of the forthcoming text, edited by Dr. T. C. W h i t m o r e (Clarendon Press, Oxford). Its 8 papers aim to examine the new biological and geological evidence, for a better understanding of the N-S crack through Malesia and its history, which reaches back into the Mesozoic. Paleoclimate and vegetation history, palms (by J. Dransfield), vertebrate faunas, plant distribution, are nicely presented in 2-column print, c. 100 pages. See also Reviews, under Hamilton.

d) Conservation *(continued from page 3426)*

Six publications on rain forest problems, world-wide. On *pages 3427-3431* we criticized the FAO estimate made by Lanly & Clement. Their lumping together of forests of very different ecological standing, as if they are nothing but factories of wood, must lead to irresponsible predictions on account of which action may be delayed or called off, to the detriment of the world's forestry situation. Other voices have made themselves listened to; all are from the United States.

1) Proceedings of the U.S. Strategy Conference on Tropical Deforestation, 78 p. (1978, Office of Environmental Affairs, Room 7820, Dept. of State, Washington, D.C. 20520, U.S.A.). Excellent, business-like report of a broad-based conference. It confronts "an extremely serious problem with immediate and long-range socio-economic and ecological consequences as the result of the accelerating loss of forest and vegetative cover in the humid and semi-arid lands within or near the tropical latitudes" (p. 3). In 41 points, conclusions and recommendations are set forth, based on brief statements by participants. One case in point is the discharge of

soil into the Panama Canal, result of deforestation by settlers on the watershed. Landsat has revealed that not 55% of the Philippines is under forest, as the government had presumed, but 39% (p. 42). However, "As long as the areas cleared for agriculture are not too large, the forest will be able to regenerate itself after the shifting cultivators move on" (p. 46). This comes from L. Huguet of FAO, who of course concludes "Is the situation desperate? I don't think so because there are ways to integrate forestry in agriculture". Will the last optimism die with the last tree? But on the whole, the field is well and sensibly covered; this booklet is the best to inform executives briefly and convincingly of the seriousness of the situation.

2) The world's tropical forests: a policy, strategy, and program for the United States, 53 p. (1980, Dept. of State publication 9117, sold by Superintendent of Documents, Printing Office, Washington, D.C. 20402. U.S.A. Stock no. 044-000-01769-5). This document came in the wake of the former; it states the problems in concise form (p. 2, 9, 12, 14, 15, 17-19, 21, 22), and explains what the United States — and other nations, also international organizations — can do about them. A list of various agencies is on p. 27-33. Strategy and program (p. 41-50) are of broad coverage and well-conceived; they deserve close examination and wide support.

Two agencies took up the matter in an impressive way. The one is the U.S. Agency for International Development (A.I.D.). It produced a report which comes next. The other is the National Academy of Sciences, which appointed a Committee on Research Priorities in Tropical Biology, under chairmanship of Dr. Peter H. R a v e n, Missouri Botanical Garden, Box 299, St. Louis, Mo., U.S.A. This 14-member committee held panels on Asian ecosystems, other ecosystems, human ecology, limnology, and plant physiological ecology. It sponsored the 4th and 5th publication in our series.

3) Forestry activities and deforestation problems in developing countries, 115 + 63 + 16 p. (1980; Office of Science and Technology, A.I.D., Washington, D.C. 20523, U.S.A.). Offset. (The four others are printed.)

A practically-minded report, for attention of all who are involved in aid to tropical countries. Forest-related problems there are far worse than is commensurate with ongoing programs, of which detailed overviews are given, tabulated in the 63-page Appendix. Stumbling blocks in receiving and donor countries (12 and 11 points) are frankly revealed (p. 34-37).

On 17 countries a case study is made; in our region these are Indonesia, Papua New Guinea, the Philippines, and Thailand. In a couple of pages generalities are set forth, forestry problems and activities, ecological impacts, constraints, successes, and failures. Useful information and conclusions are given in straightforward language. Appendix II lists donors.

4) M y e r s, Norman, Conversion of tropical moist forests, ix + 205 p. (1980, National Academy of Sciences, Office of Publications, 2101 Constitution Avenue, N.W., Washington, D.C. 20418, U.S.A.). Also Castle House,

27 London Road, Tunbridge Wells, Kent TN1 1BX, England. Price £ 8.10.

The best-proportioned overview of deforestation, in considerable detail. After a brief account of the methods followed in the estimates, definitions are discussed. Then the factors are examined, with their share in deforestation: forest farmers, the timber trade, cattle raising in tropical America, firewood cutting; with a chapter on monitoring the 61-page general part ends. In 3 regional reviews, for each country (46 in all) the situation is set forth, with facts, causes, and expectations; the 15 countries in our region are covered on p. 62-116. Summarizing tables are interspersed in the running, well-balanced and well-readable text.

Justice is done to the variety in the patchwork of destruction, yet at the end, some simple predictions are given. Rapid conversion threatens Australia, Bangladesh, India, Malaya, Melanesia, the Philippines, Sri Lanka, Sumatra, Thailand, Vietnam (forests largely gone by 1990); those in Kalimantan finished by 1995, Sabah and Irian Jaya by 2000 — all "if not earlier". Through 'moderate conversion' much of Burma's lowland seasonal forests, and of Papua New Guinea's forests, will be gone by 2000. (The expectations for Africa and America are here left out. Some areas there are believed to remain intact longer; there are no such areas in Malesia.) Documentation comes from c. 400 references.

5) Research priorities in tropical biology, xi + 116 p. (1980, same addresses as the former). In England £ 5.35.

Companion paperback to Myers's. The problems are again well-explained (p. 26-45), with the reasons why we must learn more about the tropical forest regions. What lends a special quality of authority to this booklet is the eloquent emphasis placed on the need for inventory-taking and taxonomic work (p. 46-60); in the list of critical areas, Sumatra should be incorporated rather than Celebes; also Luzon and Mindanao are to be added. Besides, a number of research sites is proposed, for various ecological work, rather sophisticated; simpler items like lianas and minor forest products are overlooked as usual. The last chapter makes recommendations on tropical aquatic systems, from rivers to wetlands, an excellent idea.

Contrary to e.g. the 1978 UNESCO-book Tropical Forest Ecosystems, where the absurdly-grown demands for research seem an excuse for lack of action, this outline is clear and convincing. We hope that many countries will join in with a solid investment!

6) Tropical Moist Forests Conservation Bulletin issued by the National Resources Defence Council, 1725 'I' Street, N.W., Washington, D.C. 20006, U.S.A. divulges world-wide news on the subject.

Number 1 (May 1978), 51 p., gives annotated lists of agencies, programs and institutions. Number 2 (December 1979), 29 p., gives a compilation of Current Developments. Both are extremely useful and will hopefully be continued.

Penyelamatan Siberut: Sebuah rancangan induk konservasi / Saving Siberut: A conservation master plan, iii + 134 p., 63 illus. (WWF Indonesia Programme; Bogor 1980). Mimeo.

Siberut is the largest (18.149 sq.km) and least densely populated (4.05/sq.km) of the four Mentawai Is. off W. Sumatra. Their isolation took place ½ million years ago. The highest peak is 384 m. The main forest is dipterocarps, and some freshwater swamp. Of the 330 plant sp. written up by Ridley in 1926, a quarter are useful to man. In 1978, 2/3 of the forests were intact, but all of it has been given out for logging, which does not in any way benefit the native people, and threatens the traditional sources of livelihood with destruction. Three companies collect rattan, which is a good source of income, but depletion is imminent.

All four primates are endemic. A map shows the numbers of their skulls on display in private houses. Five squirrels are endemic. More birds probably occur than here are listed. The native people (p. 61-75) live on sago as staplefood, and have a tradition of conserving their resources.

This Plan provides for a Development Zone of 2500 sq.km, a Traditional Use Zone of 1000 sq.km, and a Nature Reserve Zone of 500 sq.km. Aim is to create a nature reserve which meets the international criteria, and to make the entire island a Biosphere Reserve. Local and (inter)national committees are to be set up to supervise this. The budget calls for US$ 24,200. Problems are formulated, together with a solution. The coverage is broad, and many viewpoints are discussed.

The whole text is bilingual in Indonesian and English; execution is outstanding, illustrations fine. References 112.

A group of cave explorers in Palawan produced a useful report, edited by M. B r u c e, The Palawan Expedition / Stage I, viii + 47 p., 3 sketch maps (1980, Traditional Explorations, Box C 342, Clarence St. 2000, Sydney, Australia), mimeo. While in a popular tone and occupied with animals, it gives a useful overview, including information on transportation and hiring of porters, and, by H. Washington, a plan for conservation. This results in the following recommendations: 1) Stop the southern road being built, 2) stop lowland logging on the west and south coasts, 3) enlarge St. Paul's National Park to 50,000 ha, 4) establish a Matalingahan National Park in the south part, of at least 20,000 ha, 5) establish the remaining parkland as proposed, 6) conduct an education program.

It is about time. "Much of the island is covered by concessions. In 1976, there were 18 logging companies operating on Palawan, with a total concession area of 591,532 ha, or 44% of the total land area. From the logging companies' concession map shown in the Bureau of Forest Development, the area is larger now. In 1976, the annual aggregate production was 83,000 cu.m, but the allowable quota was 784,000 cu.m. Clearly, the Bureau intends an all out onslaught of the forests. The long range development plan for Palawan cities is the pre-requisite that logging sites must be reforested. It is doubtful if this is being carried out generally. Reforestation would only be with timber species and on such, a diverse rain forest would not result" (p. 29).

There are 12-15 mines, many for chrome or nickel. Hunting, poaching and trapping of animals for tourists and overseas markets is rampant. There is a lucrative international trade in butterflies. There is also estrangement and settlement of the indigenous nomadic peoples.

Conservation for Thailand—Policy guidelines is a 2-volume IUCN-report, 144 + 139 p. (1979). It is well-readable and informative.

Briefly described (2: 22-30) are the main forest types: of deciduous dipterocarp there is 68,500 sq.km, of mixed deciduous 42,000, of dry evergreen 3500, of evergreen rain 3500, of pine 2400, of freshwater swamp very little. The main natural lakes (2: 30-31) are Bung Boraphet near Nakhorn Sawan, formerly 20,000 ha, now 5000 ha; Thale Noi near Songkhla, 11,520 ha; Phayao, 1765 ha; Nong Han in Sakow Nakhow, 7765 ha.

The Protected Area System (2: 55-66) consists of:

a) National Parks, established 14 on 8612 sq.km, proposed 8 on 1276 sq.km, together 1.7% of the land area; tourism is encouraged.
b) Wildlife Sanctuaries, established 21 on 19,485 sq.km, proposed 12 on 7082 sq.km, together 5.2%; tourism is not encouraged.
c) Non-hunting areas, established 11 on 1067 sq.km or 0.2% of the land area; here only hunting is restricted.
d) Forest Parks, established c. 43 on 282 sq.km, proposed 12 on c. 140 sq.km; these are mainly for recreation.
e) Biosphere Reserves: Sakaerat, Mae-Sa-Kag, and Huai Tak Teak; these are unprotected.

In the Report they are listed with a few lines description.

One section (2: 88-97) is devoted to a summary of legislation, another (2: 98-107) to education; one lists the institutions (2: 108-128). The bibliography gives c. 244 references. The paper has been patient — how patient will the people of Thailand be with the shifting cultivators, the poachers, the loggers, the overfishers, the animal traders?

Nature in Thailand has suffered enormously in recent years, due to what also may be the greatest obstacle now: lack of discipline. Destruction of animal habitat "is a very serious problem. It has come about largely through forest destruction following encroachment by the landless people. Other loss of habitat has come about from rapid conversion of forest land to agriculture and other uses. Forestry operations also contribute significantly to the loss of habitat" (1: 67).

The country must pay heavily for its negligence. Big resettlement schemes in degraded forest areas are conceived under which 'forest communities' will work towards reforestation (1: 58). Dams have been projected without much environmental concern (1: 60). Marine ecosystems, especially in the Gulf of Thailand, are devastatingly overexploited, in addition to increasing pollution.

The present report is cautiously worded; a rather sorry state of affairs is implied here and there: "inadequate security against human disturbance such as poaching and land clearance, principally because of insufficient manpower and resources. Protection units in Thailand must be strong enough to withstand possible attack by armed gangs ..." (1: 25). Nothing is said about protecting the rain forests in the very South (if anything is left of them). Otherwise, in a constructive vein, a program is outlined; it seems broadbased and many persons were consulted.

Purari River (Wabo) Hydroelectric Scheme / Environmental Studies. The 33,000 sq.km basin of this south-flowing river in East New Guinea contains Mt Wilhelm and the towns of Mt Hagen and Goroka; the run-off equals

that of the Rhine. The projected Wabo Dam 200 km upstream from the mouth, in the middle of nowhere, is so large that it will take 8½ years to complete after decision. The resulting lake of 260-290 sq.km will hold 16 cu.km of water. Although it will receive an annual silt load of 57 million tons, it will lose but 27% of its storage capacity in 100 years.

The present 10 cm pile of 15 volumes of reports results from a broad-based investigation which began in 1977; it costs a mere $ 260,000. Of the 46 sub-studies, the last are to be completed in 1981 and some more reports will therefore follow; the total is estimated at 20, which together will coast $ 110.

A kind of interim report was published in 1980: T. P e t r, Purari River Environment (Papua New Guinea), 57 p., 11 fig. + 110 col. phot. It describes the scope of the project and present summaries of the ecological studies, especially on the delta where mangrove and fisheries might suffer. Its conclusions (p. 38-41) suggest rather mild negative environmental effects. However, "Although logging gives a low return it is seen as a simple method for villagers to participate in large scale timber cutting operations without the need for massive capital investment, and with little damaging impact on the primary rain forest" (p. 21). This points to a mildly destructive attitude towards irreplaceable resources. However, the forestry report is not yet in. As for the vegetation, we only have two papers by Barry J. C o n n, The vegetation of the lakes of Mt. Giluwe area ... (vol. 10, p. 37-62. 1979), and Notes on the aquatic and semi-aquatic flora of Lake Kutubu ... (p. 63-90), both with species lists. The Giluwe lakes are at c. 2000 m, Kutubu is at 800 m but lies West of the Purari basin. The mangroves are examined in Vol. 3 (1977) in their various aspects, all from the economic viewpoint.

Contact Ms. Aleni Flores, Environment & Conservation Office, P.O.Wards Strip, Waigani, Papua New Guinea.

The Fauna Preservation Society, which dates of 1903, and therefore the oldest international wildlife conservation body, which published the excellent journal Oryx 3 times a year, has in 1980 decided also to take wild plants under its aegis. Thus FPS has become FFPS: Fauna and Flora Preservation Society. Its Oryx 100% fund (so called because nothing of its money is deducted for expenses) enables quick assistance where this is needed urgently. The FFPS constant task is to act as a watchdog for all endangered wildlife. It has a number of overseas officials; they cover more than 70 countries and regularly report in Oryx. This journal nowadays carries articles on Malesia sensu lato quite often; it is included postfree in the annual subscription fee of £ 10. Secretary is David M. Jones, c/o London Zoo, Regent's Park, London NW1 4RY, England. It would be a good thing to have more members in our region!

Meru Betiri in E. Java is a 494 sq.km game reserve, on the rugged S. coast E. of Puger; the highest hill is 1223 m. In the SE. corner, there is a guest house. The vegetation has felt man's influence quite heavily. Part is converted into plantations and there is much bamboo. While part of the forest seems primary, with quite some deciduous elements, there is considerable variation. Botanically the area is poorly known, but Raffle-

sia zollingeriana and Balanophora fungosa are on record. Two species of python are there, and 5 sp. of marine turtles, heavily exploited on the beaches. Most spectacular are the last-known 4-5 Javan tigers. Dr. John S e i d e n s t i c k e r who for some time did field work there, has now produced The Javan tiger and the Meru Betiri Reserve / A plan for management, 167 p., with sketches (1980, WWF-IUCN, Gland, Switzerland). It gives a good description, lists of 145 bird species and of a few plants, and recommends a botanical study on which management criteria can be based. The 108 notes contain many references.

The Gunung Leuser Reserves in N. Sumatra to some extent derived benefits from the cutover of part of Sekundur, hence for the trees now cut down others may be protected. Three guard posts around the well-forested Kapi lands can now be built and manned. On 21 January the decision was taken that the Raya Garuda Mas loggers really must stop — now that the 10,000 ha for the 'pilot project' have nearly been finished.

Mr. Soetomo S u p a n g k a t, the new district chief of the Conservation Service (PPA), who was the top graduate of the Ciani Training School last year, has suggested to establish a Bufferzone Steering Committee, to be chaired by the Governor of Aceh Province.

There is great need for effective environmental education among the local population. There are good hopes that Mrs. Tati S o e g a r d j i t o, wife of the Manager of the Ketambe Research Station, will put herself to this vital task.

Mr. C. v a n B e e k at Utrecht, who completed his extensive field surveys of the region, will now compile a 1:300,000 map of the Reserves. Mapping the frontiers accurately is the most difficult part of the task, in view of all the encroachments.

In the North, around Blangkejeren, people complain about tigers stealing livestock. As the tiger since 1972 is a protected animal, the PPA people face difficult decisions. However, female tigers with cubs and young animals may temporarily catch more than they need. "We have built a splendid cage to catch a tiger", Mr. Jan W i n d writes, "so far in vain, fortunately".

Plans are maturing for aid projects by the World Bank to introduce creative forestry in the buffer zone; there are theories that the progress of the road Kutacane-Blangkejeren generates projects because it enables high authorities to move that far by motorcar.

Simalur or Simeulue, northernmost in the island row W of Sumatra, 1800 sq.km, was visited in 1917-1920 by Achmad. His collection contains many interesting items, which suggest that it occupies a plant-geographic position of its own, with affinities to N. Sumatra and Malaya; Pometia ridleyi (Sapind.) is a case in point.

Recently, the firm Kruing Sakti requested a logging concession for the whole island. Pending this, a proposal to establish a reserve there was turned down by the Head of the Forestry Service. Mr. John Blower, the conservation adviser in Indonesia, has now appealed to Dr. Emil Salim, Minister for development and environment, to hold up the negotiations about the logging and to give the reserve proposal a fair chance. We hope

for the best — also in the interest of the local people who would see their forest traded for erosion, physical and genetic.

Yayasan Indonesia Hijau (Box 3572, Jakarta) sent its Annual Report 1980-1; see *page 3232-3233* and pamphlet in last year's issue. Its conservation education programme is primarily aimed at youngsters between 15 and 25. Chairman Dr. Fred H e h u w a t conducts this project. Its magazine Suara Alam flourishes and is now printed in 10,000 copies. A regional approach is now applied: number 11 highlights Irian Jaya (= West New Guinea), 12 Kalimantan, 13 the Moluccas. Slide programs, lectures, films are also produced, and a collection of splendid terra cotta elephants, rhinos and other animals at a ridiculously low price. Other activities include an exhibit on Wildlife in the Sari Pacific Hotel, opened by Environment Minister Dr. Emil S a l i m, celebration of World Environment Day, attention for water quality in the Year of Water 1980, a staff visit to N. Sumatra to survey education possibilities there.

Stimulated by Minister Salim, YIH (which has office space near his) branches out through Kelompok Sepuluh, i.e. the Group of Ten. These are non-governmental organizations (actually there are 19 of them now involved) who are active in environmental affairs. In October 1980 they set up a National Environmental Forum.

Contact Ms. Corrie Pattinasarany, the public relations manager, or Ms. Regina Frey. They can do with some support, and are worth it.

After 7 years in Indonesia as an FAO adviser for conservation, Mr.John H. B l o w e r and his wife Wendy will in mid-1981 move to Burma for 3 years. Address there: Conservation & Parks Project, FAO, Box 101, Rangoon.

In British style, he joined the battle for conservation, and "managed to hold the line". With artful keenness he negotiated the obstacles of the jungle, in the bureaucracy and in the field, and in my view accomplished an enormous amount, under the most unexpected conditions. How lucky the Burmese are to have him!

As adviser to the PPA, Box 133, Bogor, he will be succeeded by Dr. John M c K i n n o n, who is already a veteran in this field.

Plans to log the subtropical rain forest at Terania Creek have run into a wide front of resistance. This forest lies at 28°30' S (between Kyogle and Byron Bay in the very NE of New South Wales, 120 km S of Brisbane, straight) in the so-called Border Ranges; a symposium on this area was published by the Royal Society of Queensland, Box 50, St. Lucia, Qld. 4067, Australia in 1977, 81 p.

The well-known rain forest expert Dr. Leonard J. W e b b, Griffith University, Nathan, Brisbane, Qld. 4111, Australia, has brought the affair under attention of the international scientific community many of whom will attend the XIIIth Botanical Congress at Sydney in August 1981.

The area of rain forests in NSW, of which Terania Creek is a fine example, has been reduced already from 10,000 to 3000 sq.km. The loggers have taken 70% already! Still, they are pushing hard for more. Of the remainder, only 16% is in National Parks; 8 sawmills are ready to chew up the unprotected forests, which by the mid-1990's will have been logged

out. To what purpose? Australia is a rich country, sparsely populated. Some cowboys who want to persist? On *pages 3234-3235* we have reviewed The fight for the forests, where R. & V. Routley gave a trenchant analysis of the pretexts used by the vested interests in forestry to have their way. Also, their paper in The Ecologist rain forest issue (Jan.-Feb. 1980) is highly relevant here.

To allow further destruction of these rare ecosystems with their many endemics and spectrum of values, would reflect very badly on the name of Australia as a civilized nation. The Premier of NSW, Hon. N. W r a n, Parliament House, Sydney 2000, to whom petitions were sent, has the matter still under consideration. In the name of science and of the forest, we wish him wisdom. Participants of the Botanical Congress could obtain further information from the National Trust, Observatory Hill (phone 02-275374), the Rain Forest Action Centre, 18 Argyle Street (phone 02-274714), or National Parks Association, 399 Pitt Street (phone 02-2333618), all in Sydney.

The Center for South and Southeast Asia Studies, University of California, Berkeley, U.S.A. devoted its 9th annual conference on Indonesian studies, on 31 July-3 August 1980, to Ecological Issues in Contemporary Indonesia. A 70-page draft entitled Indonesia's Environmental Progress in Economic Development, by R. G o o d l a n d, Office of Environmental Affairs, World Bank, Washington, D.C. 20433, U.S.A. was circulated thereafter. It briefly discusses forest resources, transmigration, agriculture, pollution, marine and coastal systems, energy, human ecology, environmental education and legislation. It gives a quick orientation. The rather extensive bibliography is of uneven value.

World National Parks Conference 1982, to be held in Bali, Indonesia. The Indonesian Government recently announced that it has accepted the invitation of the IUCN to host the World National Parks Conference in 1982. The meeting, to be held from 11-22 October, will have as its theme 'Protected Areas in a Changing World'. The Conference will be organized by the Department of Forestry with IUCN as a co-sponsor. Considerable support is expected from several UN agencies, national conservation agencies, bilateral organizations and non-governmental sources such as WWF. It is the third conference in a series which began in 1962 in Seattle; it was followed in 1972 by the 2nd conference in Yellowstone National Park. Continuing this 10 year cycle, the Bali meeting which is the first to be held outside North America, indicates recognition of the growing emphasis of the developing world on nature conservation as a vital part of economic growth. Contact Mr. J.A. McNeely, IUCN, CH-1196, Gland, Switzerland.

Moluccas: logging and conservation. The land area of 85,728 sq.km is reported to be at present for 70% under forest, i.e. 60,000 sq.km. In the N. islands Halmahera, Buru, Obi and Seram there is mainly rain forest, with Agathis, Canarium and Shorea as commercial species; in the SE. islands Wetar, Tanimbar, Kai and Aru Is. the forest has a seasonal character.

Since 1969, a total of 9,548,556 cu.m of logs have been extracted from the rain forest islands, where now 17 companies are working 18 concessions totalling 16,280 sq.km or 27% of the total forested area. Another 16,823 sq.km are under request, mainly in Halmahera (10,895 sq.km) and Seram (5128 sq.km), another 28%. Although this 55% seems not alarming, we should note that virtually all of it is located in the lowland rain forest in the N. islands; of this ecosystem, 90% is threatened with destruction here. Recently, a timber company started logging in 84.2 sq.km of the lowland rain forest in the proposed National Park Way Nual / Wae Nua, in Seram.

In the official forest classifications over two years, the following changes occurred:

	1979	1980
protection forest	23,506 sq.km	12,480 sq.km
production forest	17,930 sq.km	37,043 sq.km

No explanation was given in the report, but it is surmised that the change was made in order to satisfy all the requests for timber concessions, which totalled 33,970 sq.km. Reforestation has not been done by the companies, while efforts by the provincial forestry department were down with 1/3, to a meager 250 ha, during 1980.

Conservation receives scant attention in the annual forest report; at present 688 ha is under PPA protection, divided over 12 small areas. However, Mr. A. C. S m i e t who is now stationed there for FAO (Box 69, Ambon) has produced a report, together with T. Siallagan, Possible Conservation Areas in Maluku: Justification and Plotting, i + 2 x 17 p. (Indonesian, English) + map (FO/INS/78/061, Field Report 11; Bogor 1980). It proposes a network of conservation areas: in Morotai 450 sq.km at 0.1250 m; in Halmahera 750 at 200-1500 m, plus 600 at 0-1400 m, plus 500 at 0-1350 m; in Bacan 150 at 0-2200 m; in Obi 150 at 500-1750 m; in Sula Is. 150 at 500-1800 m (Obi and Sula were already heavily logged in the lowlands); in Seram 300 at 50-1100 m plus 1000 at 0-3000 m plus 300 at 0-500 m; in Buru 400 at 0-2800 m; in Wetar 250 at 0-1500 m; in Tanimbar Is. 200 at 0-200 m; in Aru and Kai Is. 800 at 0-70 m.

It is the intention, that concessions are 'frozen' until a decision has been made. The network as proposed seems quite good.