VI. MISCELLANEOUS INFORMATION

a) Research and Publications *(continued from page 2570)*

Carnatic Flora, S. India, is a project of the Rapinat Herbarium, St. Joseph's College (RHT), Tiruchirapalli 620 002, India (see *p. 2012*). The area is between about 11°-12° N 78°-80° E. Work is set up with a hope to make more materials available than Gamble & Fischer and Fyson could study and to improve their books. A 5 year's project, financed by the University Grants Commission, was started in c. 1975. It is indeed very desirable that good collections are made, and distributed without delay.

Sale of Ashton's Ecology of Dipterocarps in Brunei. Due to overstocking, a limited number of this excellent book (see *p. 1281-1282*, 1965) are now available at £ 3.25 (cash with order) from The Librarian, Forestry, South Parks Road, Oxford OX1 3RB, England.

Medicinal Angiosperms in SE. Asia is the subject of a book now in the process of completion by Miss L. M. P e r r y of the Arnold Arboretum, covering literature references before 1960, primarily on China to Malaya, Borneo and Philippines.

R.S. Troup, The Silviculture of Indian Trees, is being republished, in 6 volumes, according to The Indian Forester. The publication is issued by the Forest Research Institute, New Forest, Dehra Dun, India. Volume 1 contains 70 pages of introduction and 11 families: Dilleniaceae to Malvaceae in the Bentham & Hooker system. Price Rs. 22.00 or £ 2.56 or $ 7.92. "It is hoped that subsequent families will follow soon."

Paleobotanist wanted, by the Head, Department of Geology, University of Malaya, Pantai Valley, Kuala Lumpur, Malaysia. Interest: mesozoic and caenozoic vascular plants.

Publications on Sarawak. Dr. E.F. Brunig's book on Kerangas forest has been published; see Reviews. Dr. P.S. Ashton's Manual of non-Dipterocarp Trees of Sarawak is soon expected from the press. Dr. J.A.R. Anderson's Checklist of the Trees of Sarawak has gone to the printer. Mr. Paul P.K. Chai published a paper on the Mangrove Forest in Sarawak and a Key to Mangrove species in The Malaysian Forester. Contact the Forest Department, Kuching, Sarawak, Malaysia.

Pulau Tioman Natural History, Malaya. Following a field excursion to this island off the SE. coast of Malaya in 1973, by the Botany staff and Honours Students of the University of Malaya, a compilation of information on various aspects of the island's natural history was undertaken. Professor W.R.

Stanton arranged with the Faber-Merlin Company (who operate a small hotel there) for publication of a booklet aimed at combining some popular articles and some technical information. The booklet, which will include a series of check-lists of plant and animal species, as well as a comprehensive chapter on the island's geology (by Dr. T.T. Khoo of the Geology Department, U.M.) and a tentative list of some freshwater algae (by M. Ratnasabapathy of the Botany Department, U.M.) will appear in December 1976 or very shortly thereafter. Though not completely comprehensive and with some incompletely resolved data, the booklet should not only be informative to tourists but provide some foundation for further biological studies. The booklet will be available from the Faber-Merlin Co. Sdn. Bhd., main offices in Hotel Merlin, Kuala Lumpur, and will include many illustrations in both colour and black-and-white.

Nipah palm ecosystem. A new project (Ph.D. dissertation) undertaking a detailed examination of Nipa fruticans in relation to its environment, both physical and biotic, especially the animal species dependent upon it such as some prawn species, will commence in 1977. The candidate is Mr. F o n g Foo Woon, M.Sc., who is now in charge of the Field Station of the University of Malaya. Consultancy for this work has been arranged with Prof. M.S. Doty, of the University of Hawaii.

Arthrophyllum (Araliaceae). Mrs. K o h Ah Lan progresses with her doctoral study of this genus, with emphasis on morphology and reproductive biology. Mrs. Koh is temporary lecturer in plant anatomy, University of Malaya. Work is assisted by a University grant to the supervisor, Dr. B.C. Stone.

Ethnobotany in Sarawak. The first of a series of articles on this topic appeared in Sarawak Museum Journal. This year more information has been collected from the different ethnic groups, particularly the Iban of the 6th Division; seeds of some of the plants used by local Chinese herbalists have been sown at Semengoh. It is hoped in the future to incorporate an ethnobotany section into the proposed Botanical Garden.

Flowering of Dipterocarps in Malaya. In a letter from Dr. P.S. Ashton he mentions (dd. 25 May 1976) that, following the second longest drought at Kuala Lumpur since rainfall records began 107 years ago, there has been the heaviest flowering of Dipterocarps that anyone can remember.

Dipterocarpaceae in the New World? Word has spread that Dr. Bassett M a g u i r e of New York Botanical Garden discovered a tree in Guyana that appears to represent a new subfamily and the first dipterocarp from the New World.

Seedlings of Indonesian Trees. At the Rijksherbarium, Mr. E. F. d e V o g e l is about to finish the book resulting from the Leiden-Bogor NUFFIC project. The 150 descriptions, each with a full-page drawing, are ready for the press; the introductory chapters are approaching the final stage. One original feature is the distinction of 15 different morphological seedling types, instead of the current division epigeal versus hypogeal. A list of all Malesian dicot genera of which the seedling is known is added, under indication of seedling type. Ecological and taxonomic observations are given.

Flora of China. Academia Sinica. In October 1974 a Chinese scientific delegation visited Denmark and in October 1975 a Danish delegation visited Academia Sinica of which a report was published by the R. Danish Ac. Sc. Lett., Copenhagen, June 1976, 89 p. In this is a brief report on the Institute of Botany, housed in a former temple complex in the NW. part of Peking, next to the Zoological Garden and not far from Academia Sinica. The Institute has a staff of 300, for 7 departments, incl. a department of taxonomy. For this department Prof. Yü Te-Tsun received the delegation.

Flora Republicae Popularis Sinicae is planned in 80 volumes covering an estimate of 30,000 species; 4 volumes published. About 100 workers are engaged in compiling it, 30 in Peking, and the rest on other departments throughout the country. Six skilled artists are engaged full-time for preparing illustrations. Four other volumes are said to be in print. It was planned to complete the entire Flora in c. 10 years. The Department also produced Iconographia Sinicorum, of which 4 volumes were printed and the 5th and final said to be in print. The Academy publishes also Acta Phytotaxonomica Sinica. The Herbarium is the largest in China, estimated at c. 1,000,000 specimens, c. 80% having been collected after liberation. The mycological collection (c. 40,000) has been moved to the Institute of Microbiology. Exchange is on the way and had already materialized with Edinburgh and Kew. Prof. Yü Te-Tsun expressed interest in further exchanges with tropical Asian plants. See also *p. 2332*.

Ethnobotany of Timor. Mme Claudine Berthe-F r i e d - b e r g, Ethnobotanique, 57 Rue Cuvier, 75231 Paris, France, is preparing a voluminous manuscript, as a thesis, dealing with all relations between the Bunaq tribe in the mountains of central Timor and the plant world, including also an index of vernacular names. All kinds of uses will be accounted for.

Tree Flora of Malaya, in preparation at the Forest Research Institute, Kepong, volume 3. Completed: Araliaceae, Bignoniaceae, Casuarinaceae, Connaraceae, Styracaceae, Theaceae, Verbenaceae. Aquifoliaceae and Ebenaceae well underway.

Vegetation History New Guinea Mountains. Mr. Geoffrey S. H o p e, Biogeography, School of Pacific Studies, ANU, Canberra, completed the report on his two-year fellowship ending May 1976. He did field work at stations from West to East, at 137°, 140°, 144°, 145°, and 147° E, mostly above 3500 m, taking pollen cores and vegetation analyses. "As one of the first ecologists lucky enough to have viewed a wide range of sites along the cordillera", he writes, "I am now conscious that many of the general statements based on the central Papua New Guinea highland mountains cannot be extended to the whole region." This refers e.g. to well-known Mt Wilhelm.

"Ice appears to have attained its maximum extent about 18,000-16,000 years ago, and the permanent snowline lay at least 250 m lower on the Star Mts. than those to the West and about 150 m lower than the PNG central highlands .... Ice retreated steadily on Mt. Wilhelm and Mt. Giluwe, disappearing about 10,000 BP. On Mt. Jaya (i.e. Carstensz), however, two substantial readvances took place at 13,000 and 11,500 BP. The high glacial maximum snowline, early commencement of retreat, and subsequent sensitivity of the Mt. Jaya ice bodies provide what I regard as the first evidence for New Guinea of the effects of the sea flooding into the Arafura Shelf at the end of the ice age. Until the Shelf was substantially submerged the western half of New Guinea was probably significantly less humid than it is today, and its glaciers correspondingly more sensitive to change in precipitation, than those to the east." See also Reviews, under Hope.

Rattans are diligently studied by Dr. J. D r a n s - f i e l d of Kew. In 1974 he published his 69 page mimeographed A short guide to rattans (BIOTROP, Box 17, Bogor, Indonesia) which, although unillustrated, makes a fine all-round introduction to the subject, with data on distribution, ecology, silviculture, uses, taxonomy, collecting, and a list of c. 370 accepted names with (is)land, in SE. Asia and Malesia.

Dransfield is now engaged on a project 'Rattan Silviculture in Malaya', financed by the British Overseas Development to write up the taxonomy of the Malayan species, for which he will stay in Malaya from mid-March 1977 for 10 months. Mr. N. M a n o k a r a n of the Kepong Forest Research Institute works with him; thousands of seedlings of several species are being raised for tests.

The Mayaguez Institute of Tropical Agriculture, Box 70, Mayaguez, Puerto Rico, 00708, U.S.A. began about 18 months ago a program to introduce Southeast Asian fruits to the Western Hemisphere. While all of the major fruits of Southeast Asia have been introduced sporadically, some of the best, including the durian, rambutan, lanson, and mangosteen

are still only curiosities of botanical gardens. The program has begun with the introduction of seeds. However, eventually selected varieties will be obtained. Seedlings and grafted trees are distributed free in Puerto Rico and to investigators in the region. Bulletins on the major species are being prepared as well as leaflets giving instructions. Publications on durian and rambutan are badly needed. MITA welcomes cooperation in obtaining and distributing Southeast Asian fruits for the Western Hemisphere. Contact Dr. Franklin W. M a r t i n, Director.

Ecology of Nothofagus. Dr. Nigel C l u n i e of the Lae Herbarium, has worked over 1976 on this subject mainly on the S. slopes of Mt Giluwe, East New Guinea, and on the Nakanai plateau in New Britain. Further work is planned for Lake Kutubu and the Cromwell Mountains, the latter for a timber survey.

Evolution of Gramineae and Leguminosae of food value in Asia. With the publication of papers on the bioclimatic and taxonomic consequences of tectonic movement and orogeny in Annals of Arid Zone vol. 15 no. 3, December 1976, and on the botanical Neolithic revolution in Human Ecology, 1977, Dr. R. O. W h y t e (P.O. Box 167, Kota Baru, Kelantan, Malaysia) carries a stage further his controversial interpretation of the origin of Asian cereals and grain legumes. The long-term objective will now be to bring into one volume the evidence on the antiquity and evolution of the wild and cultivated species and cultivars of the Gramineae of monsoonal, equatorial and continental Asia and the Western Pacific islands. A major object in this study will be to define the genera and species which can be said to be of early Gondwanian/Laurasian or late Gondwanian plate origin respectively, and to follow their subsequent migration and evolution, either as wild species or ultimately as crop cultivars.

Natural plant succession in Malaya. Mr. K. M. K o c h u m m e n of the Forest Research Institute, Kepong, completed his analysis of a 30 year old plot of former farmland reverting back to forest. A paper on this was tabled at the 6th Malaysian Forestry Conference in Kuching in October 1976. As the oldest succession plot under study in Malaysia, this paper is of great interest because the plot had been laid out on land that had been exhaustively farmed and isolated from primary-forest seed-bearers. Beginning with single-species dominance by Melastoma malabathricum followed by Gleichenia linearis the community has now evolved into a species-rich but still distinctly secondary community after 30 years.

Work on the Manual of Malayan seedlings by Dr. F. S. P. N g has expanded to cover fruit and seed morphology. Preliminary accounts have been published covering 10 families: Alangiaceae, Araucariaceae, Burseraceae, Dilleniaceae, Erythroxylaceae, Lythraceae, Polygalaceae, Sarcospermataceae, Trigoniaceae and Violaceae (Malays. For. 38, 1975, 33-99). A further instalment dealing with Casuarinaceae, Ebenaceae, Pittosporaceae and Styracaceae is now in press in which the scope has been extended to cover branching patterns, following the Hallé & Oldeman analysis of tree architectural models.

Drawings of native Queensland plants. South of Brisbane lives Mrs. Kathleen M c A r t h u r, a free-lance botanical artist whose excellent drawings came only recently to my notice. She is a great nature admirer and takes actively part in endeavours to proposals of a new national park on the giant sand mass of Cooloola, the plans for which are threatened by an alternative plan for mining and cattle grazing.

Her habit drawings are partly in black and white, but a major part is in water colours which are very well reproduced by the Griffin Press. They vary in size from large postcards and charming correspondence cards to sizes as large as 12 by 16 in. They must contribute to stimulate feelings for conservation of the beautiful Queensland flora. They are also of botanical interest as several species are here drawn and reproduced for the first time in colour, as e.g. the rare Tecomanthe hillii, even from a new locality, a gully at Cooloola, the watershed of the Noosa River in Queensland, where it was discovered in 1972. All drawings are made after living specimens and are botanically correct. Almost all are accompanied by a brief legend.

For botanical institutes who wish to enrich their Iconographia by purchasing a set of her 'Wild Flowers' I give the address: Midyim, Orvietto Terrace, Caloundra, Queensland, Australia. — v.St.

Trees of Sabah. Volume I was published in January 1976, Sabah Forest Record no. 10. Contact Forest Department, Sandakan, Sabah, Malaysia.

The 'Alpine Flora' has now been re-named The High Altitude Flora and Vegetation of New Guinea. Dr. P. v a n R o y e n and collaborators at the Bishop Museum, Honolulu, are finalizing the general chapters. The orchids, some 225 species, half of which are presumed to be new, are also well under way. Two volumes have been projected.

Nickel accumulating plants. Dr. R. R. B r o o k s, Chemistry, Massey University, Palmerston North, New Zealand, and collaborators, have recently investigated plants in New Zea-

land and New Caledonia which concentrate nickel in their bodies. They are classified as such if they contain more than 1000 µg/g dry weight; this can be learnt from samples as small as one leaf from a herbarium specimen, through atomic absorption spectrophotometry.

A list of plant species known to accumulate nickel (Science 193, 1976, 579-580) supplemented in a forthcoming paper, contains certain species of Alyssum (Crucif.), Dicoria (Compos.), Geissois (Cunon.), Homalium (Flacourt.), Hybanthus (Violac.), Psychotria (Rubiac.), Rinorea (Viol.), Sebertia (Sapot.), with a predominance in New Caledonia. Rinorea bengalensis, the newest name on the list, is a common species all over Malesia; from extensive sampling of dried fragments (which once again demonstrates the value of the Hortus Siccus) Brooks concludes that it is possible through herbarium records to pinpoint ultrabasic areas. This species also takes up large amounts of nickel from substrates presumably relatively deficient in this element, however; while other species in the genus may also like some nickel or cobalt, R. bengalensis seems the only 'hyper-accumulator' and of some potential use in mineral exploration. In J. Ecol. 62 (1974) 493-499, the author speculates about growth inhibition through nickel on ultrabasic soils (in relation to Pimela) and gives several references.

Yams of South East Asia and their future is the title of a paper by Dr. F. W. M a r t i n, Tropical Agriculture, Box 70, Mayaguez, Puerto Rico 00708, U.S.A., in the SE. Asian Plant Genetic Resources Symposium (1975) 83-90. The author has worked on Dioscorea for a long time already, and on field trips in Malesia collected living yams for experiment and introduction in Puerto Rico, unfortunately without taking herbarium material. He and/or collaborators published a number of papers on Dioscorea, several on D. alata, bulbifera, or esculenta. We list:

— Fermentation and Diosgenin. J. Agric. Univ. Puerto R. 45 (1961) 121-122.
— Sapogenin-bearing D's. Prod. Res. Rep. U.S. Dept. Agric. no. 103 (1968) 19 p.
— Growing D's from seed. J. Agric. Univ. Puerto R. 54 (1970) 334-340.
— Crude protein content of yams. HortScience 6 (1971) 545-546.
— Variations in D. alata. J. Amer. Soc. Hort. Sc. 97 (1972) 685-688.
— Yam for chips. J. Agric. Univ. Puerto R. 56 (1972) 228-234.
— Production methods. Prod. Res. Rep. U.S. Dept. Agric. no. 147 (1972) 17 p.

— Nutritional values compared. Proc. Trop. Region Amer. Soc. Hort. Sc. 17 (1973) 290-294.
— Flours from yams. J. Agr. Univ. Puerto R. 59 (1975) 255-263.
— Potential of D. esculenta. Agric. Handb. 457 (1974) 18 p.
— Yellow pigments of D. bulbifera. Agric. and Food Chem. 22 (1974) 335-337.
— Tuber damage in D. alata. J. Agric. Univ. Puerto R. 58 (1974) 211-217.
— Potential of D. bulbifera. Agric. Handb. 466 (1974) 20 p.
— Carotene in African D. cayenensis. Ann. Appl. Biol. 80 (1975) 317-322.
— Polyphenol in D. alata. Agric. and Food Chem. 24 (1976) 67-70.

As regards the future, the author thinks much of the yam potential of New Guinea. Less optimism can be derived from Burkill's Flora Malesiana treatment (i 4, 1951, 299-335). Burkill (who has more to say on variation than Martin suspected) credits Sumatra with 2 endemic/18 non-endemic species, Malaya with 2/25, Java with 4/12, Lesser Sunda Islands with 0/6, Borneo with 4/12, Philippines with 7/20, Celebes with 5/9, Moluccas with 0/7, and New Guinea with 2/7, but it may be a secondary center of variation, and at the time still underexplored.

Dr. Martin expressed the hope to be in contact with taxonomists for mutual benefit.

Winteraceous chemistry. Dr. L. T h i e n of Tulane University during 1976 spent several months in East New Guinea, mainly at Wau, studying floral structure and function in Bubbia, Drimys, Galbulimima and Eupomatia (Himantandr.), as well as chemically preserving and analyzing their odours.

Araucaria ecology. Mr. N. J. E n r i g h t, Biogeography, ANU, Box 4, Canberra, ACT 2600 Australia, is studying Araucaria cunninghamii (Hoop Pine) and A. hunsteinii (Klinkii Pine) in Papua New Guinea. This has so far involved two field trips to New Guinea, one from September to November 1975 and the other from May to September 1976. A further, short trip is planned for August 1977. Most work is being carried out in the vicinity of Bulolo, but other stands have been examined, including occurrences of A. cunninghamii on Fergusson Island, and at Erave. He also hopes to spend some time in Cape York Peninsula in September 1977, examining the most northerly stands of Hoop Pine in Australia.

Lianas, some additions. After publication of my liana paper (*p. 2610-2618*), several papers came to my hands which I had overlooked or which came later:

E.J.H.CORNER, *The climbing species of Ficus: derivation and evolution.* Phil. Trans. R. Soc. 273 B (1976) 359-386, 18 fig. In this first paper on liana phylogeny known to me, Corner outlines two ways whereby Ficus evolved from pachycaul to leptocaul, independently in three groups. In Ficus subgen. Urostigma 5 sp. and in F. subgen. Sycidium subsect. Palaeomorphe 4 sp., all of clear systematic origin, strangling habit evolved to epiphytic climbing habit. In Ficus sect. Rhizocladus, 57 sp., and sect. Kalosyce 20 sp., developed a ground-based root-climbing habit from perhaps pachycaul trees. The latter section has the most beautiful figs of all: "they ripen orange and scarlet with pale marbling and finally purple-black with delicious smell and luscious texture; yet, so extravagant, they seem rarely to be eaten." Venation and an array of other characters are considered. Climbing figs appear to be an Indo-Malesian distinction, like rattans. Fascinating as these contributions are, they chiefly stress our ignorance about lianas in general.

J.van DONSELAAR, *Floristic and ecological data on the lianas of the Brokopondo district, Surinam.* Acta Bot. Neerl. 19 (1970) 287-296, gives a comparison of ten different habitats from the liana point of view, ranging from tall primary forest to savanna to forest fringes to secondary forest. He made fertile and sterile collections; an idea of identification problems in this well-known flora is obtained from his figures: 230 samples taken, most of them sterile, assigned to 132 species, of which 80 could be named to species with certainty, 15 nearly so, of 34 the family or genus could be identified, and 6 remained nameless altogether. Six species were new records for Surinam, 3 of them Menispermaceae. The species are recorded in a checklist, with occurrence in their various habitat; the primary lowland forest has by far the most. Later, the author had made some more identifications, resulting in some revisions of the list (Acta Bot. Neerl. 22, 1973, 164-165).

G.HERKLOTS, *Flowering tropical vines,* 194 p., 270 fig. + 16 col. pl. (Dawson, Cannon House, Folkestone CT19 5EE, England, 1976), £ 17.50, is superficial like the book by E.A. Menninger, Flowering vines of the world (1970), but better illustrated, and the text is more alive with personal observations. In 36 well-known families he deals with several hundred species from 5 zones: 1 India to S. China, 2 Malesia, 3 Tropical Africa, 4 Mexico and Caribbean, 5 Northern S. America. Don't take the zoning too seriously: Tristellateia cannot be named among the 'principal genera' of zone 1, and is not mentioned for zone 2 which it occupies. T. australasica is a common, here perpetuated error for T. australasiae (Fl. Males. i 5: 136), and the calyx is in fact glandless. The 'methods of climbing' brings little news; it says that

"few climbers rely only on thorns and spines" (p. 16), thus disregarding the rattans. No botanist needs it, unless as a gift to a non-botanical business relation; the obviously expensive execution shows off well.

Annette HLADIK, *Importance des lianes, dans la production foliaire de la forêt équatoriale du Nord-Est du Gabon.* C. R. Acad. Sc. Paris 278 D (1974) 2527-2530. A comparison of biomass production is made between trees (57 sp.) and lianas (33 sp.). While the wood of trees amounted to 378 tons per hectare against 18 tons of lianas (i.e. 5% of the trees), litter production dry weight of lianas attained 36% of the total, vs. 59% for the trees. Interesting figures!

Dr. A.H.GENTRY of Missouri Botanical Garden kindly sent me three papers by him on Central American Bignoniaceae, the richest liana family in that region: on *pollination and coevolution* in Ann. Mo. Bot. Gard. 61 (1974) 728-759; on *flowering phenology* in Biotropica 6 (1974) 64-68; and on *distribution and ecology* in Biotropica 8 (1976) 117-131. The most recent paper discusses the problems in measuring lianas in plots, and is therefore of the most specific interest.

Bolbitis Monograph by E. H e n n i p m a n is available from the printer on 31 March 1977; see *p. 2570*. The number of pages will be 331, the price approximately Dfl. 100. It is number 3 in the Leiden Botanical Series. The Leiden University Press who publishes it, has been taken over by Nijhoff, P.O. Box 269, The Hague, The Netherlands. Orders can be placed there.

Natural Sciences in China. A Danish delegation of scientists, including Professor Arne K. S t r i d as a botanist, who visited the country late in 1975, compiled a 89-page report under the above title, published by the Danish Academy of Sciences and Letters at Copenhagen in June 1976.

Director of the Peking Herbarium of the Academia Sinica is Plant Physiologist Tsui Cheng; of the c. 100 scientists working on the Flora Republicae Popularis Sinicae, the delegation met the taxonomists Professor T. T. Y ü (who collected many plants in SE. China in Merrill's time) and Hong de-yuan. The Flora is to comprise 80 volumes (4 published by now, 6 in press), and 30,000 species, to be completed in 10 years. A volume with part of the Rosaceae, by Yü, was presented. Thirty taxonomists work in Peking, the others throughout the country. The department is also publishing Iconographia Cormophytorum Sinicorum, a semi-popular work of short descriptions and line drawings, 4 vol. of 1000 p. each have appeared, the 5th and last is in print. New species are published in Acta Phytotaxonomica Sinica (4 fascicles with 520 p. in 1974, 3 with so far 380 p. in 1975).

The Herbarium has over 1 million specimens, neatly arranged in the Engler system. There is an interest in exchange, some with K and E already in operation, and loans. Taxonomy and floristic survey are given high priority in accordance with their fundamental character. The botanic gardens seem less important.

The Kwangtung Institute of Botany at Kwangchow, founded in 1929 in Sun Yat-sen University was also visited. Head of Taxonomy is Mr. Ling Ju-ren. Besides assisting in the large Flora, it is preparing a 4-volume Flora of Hainan (3 already published, vol. 3 of 629 p.), and a 6-volume Flora of Kwangtung, the first one expected soon. Also a popular medicinal Flora is in preparation. The Herbarium has c. 600,000 specimens, of which Mr. C h o w is in charge; he would welcome exchange, especially from SE. Asia. The library has 30,000 volumes, including fine old ones, and subscribes to 200 periodicals.

Illustrations are paid much attention to, and high-quality work is produced, both in Peking and Kwangchow. At the garden works Prof. C h e n Feng-huai who had studied at Edinburgh. It was set up in 1958 and contains c. 3000 species; a recent seed catalogue listed 538 sp. Many traditional herbs are cultivated. There is also an arboretum 100 km away.

While most of the report deals with experimental sciences, interesting impressions and comments are given. A pity that Forestry is not dealt with; we'd like to know the situation a decade after S.D. Richardson's book on the subject (*p. 1584*).

b) Herbaria, Gardens, Organizations *(continued from page 2577)*

Working space, Port Moresby. At the University Herbarium of Papua New Guinea, a few miles E. of Port Moresby, in the savannah area, a limited amount of bench space is available to visitors for short periods. Perhaps inexpensive accommodation can be found as well. Collecting equipment is freely available and the primary forest is not far away; visitors should, however, generally pay for their own transportation. There is a good library. Contact Dr. D. G. F r o d i n, Herbarium, UPNG, Box 4820, University, Papua New Guinea.

Palm Room is the location in the Kew Herbarium, specially designed and recently finished, where Dr. J. D r a n s f i e l d will sit among all the palm materials of the Herbarium. The excellent 'bagging' method of storage developed by Miss Sheila H o o p e r originally as a temporary measure, will be used in the future for all incoming material, "and hence", adds Dr. Dransfield in his letter, "we shall have just about the most accessible and workable palm collection anywhere."

Sandakan, Sabah. SAN 80261 Elaeocarpus stipularis was the 50,000th specimen in the SAN series to be incorporated. Total number of different specimens in SAN now exceeds 72,000.

The Sandakan Arboretum continues to expand. Seeds from 37 families were successfully germinated during 1976 and a large enrichment planting with Dipterocarp wildings carried out.

Institut für systematische Botanik, 8008 Zürich, Switzerland, new address: Zollikerstrasse 107; all departments of botany are now there.

Perth Botanical Garden. P. R. W y c h e r l e y, known for his conservation work in Malaya, now director of this garden called Kings Park, where largely native plants are grown, wrote a popular article in Wildlife in Australia 12 (1975) 116-120, with col. phot., reporting on the state of protection and research.

Kuching Herbarium, Sarawak. Three new members of staff joined the section this year and they will be specializing in fields of research previously not undertaken by the section. Mr. Cajetan Phang Min Sen, Soil Surveyor. Encik Abang Abdul Hamid Karim, Entomologist. Mr. Herbert Voigt, a G.V.S. volunteer, responsible for the Botanic Garden project.

A botanical garden is also projected. Objective is to provide a collection of plants from Sarawak and other parts of the tropics; to provide educational facilities; and to provide natural history orientated recreation facilities for the people of Sarawak.

The new range of glasshouses at the Royal Botanic Garden, Edinburgh, is now nearing completion and one section, comprising two climates (warm temperate and tropical), will be devoted to the display of collections of groups in which the garden has a research interest. This display, which will eventually be open to the public, will include the very large collection of Malesian Rhododendrons and other Ericaceae which have been accumulated over the last fifteen years, old world Gesneriaceae, including many from the Malesian area, Zingiberaceae and Musaceae. Almost all the plants in the display will be of known wild origin, and complete documentation will be maintained in the Garden's computerized record system.

Medicinal and Magical Plants of the Solomons. The Forest Herbarium, Honiara, has about ten small collections of plants with very full notes on medicinal and magical usage. Unlike the main BSIP series collections these are not duplicated in other herbaria. The most important collection is by Mrs. Margaret T e d d e r, a long time resident and naturalist, who, with her husband, spent much of her spare time in the bush. It comprises some 300 numbers. Botanists working on Malesian

plants will find much unique information with these collections, which are available on loan. Requests should be made to the Chief Forestry Officer, specifying collections of medicinal and magical plants. Some of them do have BSIP numbers

Institute of South-East Asian Biology, Aberdeen, AB9 2TN Scotland, U.K., as a sign of its growth and maturity, has issued a 12-page pamphlet on its activities. On its Reproductive Biology of Rain Forest Trees, see *p. 2567-2569*. In cooperation with the University of Malaya, they have facilities at Pasoh Forest Reserve, Negri Sembilan, 160 km by road from Kuala Lumpur. Students from SE. Asian countries can stay at Aberdeen for higher degrees, 10 are currently listed, together covering a wide range of subjects from taxonomy to ecology to conservation. A 6-weeks optional full-time course in Tropical Biology is also given, with visits to the Edinburgh glasshouses, and an Extramural course of 10 days each March, with twelve 3-hour sessions filled by an introductory lecture and discussion, and evening instruction. Participants (25 maximum) find their own funds. The British Council may help. Teaching overseas was done at Kuala Lumpur and Los Baños. Students may participate in expeditions. Well-known are already the Aberdeen-Hull Symposia on Malesian ecology (see e.g. *p. 2619*), and 4-6 Seminars are arranged each year, where outside speakers lecture.

Three lecturers run the shop: Drs. P. S. A s h t o n and Kwiton J o n g in botany, Dr. A. G. M a r s h a l l in zoology. Their publications, respectively 32, 10, and 22, are listed at the end of the pamphlet.

South Asia Institute, Heidelberg, B.R.D., Box 10 30 66 (see *p. 2342*) continues to retain its botanical interest; Dr. M. Jacobs was in November the guest of Professor & Mrs. U. S c h w e i n f u r t h for two lectures. Dr. K. H a u s h e r r is at present writing up his work on forestry and land-use on the eastern side of Luzon, Samar and Mindanao. Dr. J. M e t z n e r is in Australia writing up his geo-ecological fieldwork (land-use, erosion, demography) in Sumba and Flores; his paper on Man and Environment in eastern Timor is now in the press in Canberra. Dr. G. B u r g e r is working out his agronomy of eastern Central Java. For a review of the Kingdon-Ward itinerary see *p. 2636-2637*.

A long-standing project in Ceylon persists; a symposium summarizing their 10 years of fieldwork was held in April 1976, and plans are shaping up for a symposium devoted to the Lesser Sunda Islands.

The Kepong Arboretum has been expanded with the planting of many species from different parts of the country. A palm section was started in 1975.

The Wau Ecology Institute has made much progress during 1976. We now have three volunteers: two Canadians (Dr. Wayne Gagné, Bill Adams) and one American (Betsy Gagné) on our educational staff. Mr. G. Nalu, a local Biangai, is also teaching and works on agricultural pests. Classes are being taught both at schools (including the Forestry College, Bulolo: B. Gagné) and to groups visiting the institute.

Demonstration areas are progressing: for reforestation of grassland, and for growing vegetables without use of chemicals and with repeated use of the same ground instead of constant destruction of forests for new gardens (W. Gagné, G. Nalu). Mr. Adams is illustrating WEI publications. Paul Kores has greatly expanded the rhododendron garden and nursery. Abid beg Mirza, manager, has made various improvements, including production of vegetables in larger quantities for income. The high coffee price has also helped with mortgage payments and with initial steps to develop the new zoo. More visitors are coming, and several recent groups have seen birds of paradise displaying. WEI purchased three houses in town, and they are rented most of the time. The Szent-Ivany Laboratory is slowly being equipped, and is much used.

Our great needs now are cages for the zoo, and endowment funds to permit perpetuation of WEI and also to assure continuing steady growth when coffee prices decline and thus to decrease dependence on agriculture. Funds are also needed to lease the slopes of Mt Kaindi to protect them as a nature sanctuary and as a research/teaching area, and to help squatters plant fruit trees on already denuded slopes to replace vegetable gardens and reduce risk of fire and landslides.

As before, donations from the US are tax deductible if sent to Bishop Museum Ecology Fund, Box 6037, Honolulu, HI 96818.

Our first handbook, Common New Guinea Frogs, is out (now K 3.00; or from Bishop Museum US$ 4.50 incl. postage); also our second pamphlet, Ecology and Conservation in Papua New Guinea, the symposium marking dedication of the Szent-Ivany Laboratory, November 1975 (153 p., K 1.35, or from Bishop Museum US$ 2.00 incl. postage).

Rijksherbarium, Leiden. An increasing density in university regulations makes itself felt at the institute which for its size, excellence, and sort of research occupies a place of its own in the faculty of biology, and it has to cope with all sorts of measures designed (with a more or less lucky hand) for others. Every departure of a staff member means a long struggle with the bureaucracy to get the vacancy filled again. There is also a slow-growing need for a little extension, and an occasional beginning fire reminds us of the uncertain lodging for the priceless collections — wasn't it by

now that a new building had been promised, during more lighthearted days? Some extra space for the Herbarium has indeed become available in what is here known as 'the Far West', but repair and furnishing are still in the paper stage. However, as matters now stand, big construction will be 'temporized', which is a synonym of 'hurrying behind', in officialese. As a consequence, just like in the old Nonnensteeg building during the last years of terrible overcrowding, the spirit seems to rise above its normal level. Almost imperceptibly, the rise is there. And we really had some luck, when the faculty decided that the same number of tropical staff could be maintained after the retirement of Dr. R.A. Maas Geesteranus (mycologist, who also could be replaced) and Dr. R.C. Bakhuizen van den Brink, if we took over Dr. H.P. Nooteboom from the Laboratory of Experimental Taxonomy, which was accordingly done. Since all of the tropical staff is now under 56, this means safety for almost a decade. There are in Holland people who would like everybody pensioned at 63 to make room for the unemployed, but as a taxonomist is just then at the peak of his ability, we will try to fend this off.

The Park Hotel as well as the Witte Singel Hotel in Leiden have closed their doors. This means that Nieuw Minerva, Vrouwensteeg 11, Leiden, is now the nearest hotel to the Rijksherbarium in operation. Walking distance is 15 minutes. Rooms range from c. $ 10 to 20 with breakfast, all in. Bed & breakfast at private addresses very close to the Herbarium can still be had at c. $ 5-6. The Director or staff members of the Herbarium may be able to have a reservation made.

University of Queensland, Botany, Brisbane, abbreviation BRIU, not to be confused with the older and larger Queensland Herbarium (BRI), director Professor R. L. S p e c h t, known for his work on Arnhem land, sent a list of its activities. Dr. Specht is plant ecologist, preparing a book on 'Ecosystems of the world: heathlands and related shrublands'. Reader is Dr. T. H. C l i f f o r d, agrostologist; he has a textbook on Grass Identification in the press. Dr. R. F. N. L a n g d o n is studying fungi on grasses, Dr. A. B. C r i b b is working towards a flora of Queensland marine algae, especially Trentepohliaceae; altogether there are 8 staff members. Quite a number of advanced students are listed with their subject: surface architecture of fruits and seedling morphology in Cyperus (Miss B. F. A s h l e y), taxonomy of Xanthorrhoea (D. J. B e d f o r d), experimental taxonomy of Australian Euphorbiaceae (D. C. H a s s a l l), cytoanatomy of Dianella (R. J. F. H e n d e r s o n), and others.

c) Symposia, Congresses, Societies, Meetings

(continued from page 2581)

Round table conference on Dipterocarpaceae, is to be held on 14-17 June 1977 at Paris (Museum H. N. Entomology Room, Rue Buffon) and Brunoy (Grand Château, Écologie Générale). See *p. 2581*. Connections are by train, at Paris, Gare de Lyon 20 minutes' walk from the Museum, take 'ligne de banlieue' direction Melun, 3 times an hour, a 20 minutes' ride, Fr.4.50, at Brunoy 15 minutes' walk to the Ecology Laboratory. Accommodation can be arranged in Brunoy or in Paris, austere rooms for Fr.40, with shower Fr.55-75, with bath Fr.80 and up, mostly with simple breakfast. If you need a room, order quickly and precisely to Mme Géma Maury, Écologie, 4 Avenue du Petit Château, 91800 Brunoy (Essonne), France.

Contributions are expected from P.S. Ashton (classification and new modifications), T. Smitinand (Thailand and Indo-China), K. Jong (chromosomes), A.W. Rao (embryology), H. Gottwald (bark and secondary wood), N. Awashti (recent and fossil wood), N. Brazier (secondary wood), T.C. Whitmore (bark), J. Muller (relations flower—pollen), G. Ourisson (chemo-taxonomy), G. Maury (embryo, seedling), W. Meijer (Doona, Vatica, Vateria), E.F. de Vogel (seedlings supplement), Emphasis will be on classification.

Symposium on National Parks in Malaysia, organized by the Malayan Nature Society, was held in Penang in August 1976 and consisted of two days of presented papers which in many cases detailed progress toward establishment of parks in Malaysia, in other cases made recommendations for future sites, policy, and operations. It is intended to publish the papers at a later date in the Malayan Nature Journal. Information can be obtained from the Secretary, Malayan Nature Society, P.O. Box 750, Kuala Lumpur, Malaysia.

Role and goals of tropical botanical gardens. This Symposium held in August 1974 to celebrate the ceremonial opening of the University of Malaya Botanical Gardens the 'Rimbu Ilmu' (Forest of Knowledge) is to be published before long. Of the many papers included some will appeal to nearly all botanists, and the volume should be a useful addition to botanical garden and institute libraries. The price will be M$ 19.00 (plus postage) and will be available from the University of Malaya Press, U.M. Campus, Kuala Lumpur.

The International Conference on Legumes, mentioned on *page 2579*, will be held at Kew between 24 July and 4 August 1978. There has been a good response to this collaborative project and anyone else who would like to contribute is urged to contact the organisers listed below. The principal objective of

the botanical programme in the first week is an improved classification of the Leguminosae at generic and tribal level from a synthesis of diverse evidence. The agronomic programme is associated with the compilation of a 'Manual of Legume Crops', collated by Dr. J.A. Duke, using data provided by the United States Department of Agriculture and by correspondents in many countries. Sessions in the second week will be devoted to selected general topics of growth, yield, disease and pest resistance, nitrogen nutrition and fixation in forage and grain legumes. Further details from Professor A.H. Bunting.

Contributions of seed, particularly from tropical forests, have been much appreciated and further liaison with Dr. B.A. Krukoff is solicited: c/o The New York Botanical Garden, Bronx, New York 10458, U.S.A.

Organizing Committee: Mr. J.P.M. Brenan and Dr. R.M. Polhill, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AE, England, and Dr. P.H. Raven, Missouri Botanical Garden, 2315 Tower Grove Avenue, St. Louis, MO 63110, U.S.A.

Agronomics: Professor A.H. Bunting, Plant Science Laboratories, University of Reading, Whiteknights, Reading RG6 2AS, England.

Crop Manual: Dr. J.A. Duke, Plant Taxonomy Laboratory, 115/001 BARC West, U.S. Department of Agriculture, Beltsville MD 20705, U.S.A.

Fabology seems to be the new name of legume science. It has manifested itself with a stencilled journal The Bean Bag/ Current research on Legumes, edited by R.S. Cowan, Botany, Smithsonian Institution, Washington, D.C. 20560; number 4 was issued November 1976. The title reflects its jovial tone.

The International Group for the study of Mimosoideae (bilingual French-English), membership 59, secretary J. Vassal, Botanique, 39 Allées Guesde, 31077 Toulouse, France, also publishes a Bulletin, of which also number 4 arrived late in 1976. It is somewhat suggestive of the AETFAT Bulletin in scope. Subscription is FF 20 = $ 4 = £ 2.25.

Pacific Science Council. Professor Sarwono Prawirohardjo, who represented LIPI, has resigned for reasons of health. In August 1976 LIPI has appointed Dr. H.Tb. Bachtiar Rifai as his successor for representing this organization; he is now also a member of the Standing Committee on Policy of the Council. Dr. Rifai is the Chairman of the Organizing Committee of the Third Inter-Congress of the Association, July 1977.

The Conservation and development in the tropics, course at Aberdeen (see *p. 2798*), will be held 24 March-1 April 1977.

Botanical Society of Papua New Guinea (see *p. 2577*) held its 3rd meeting at Lae on 1 May 1976. Subjects were Forestry in PNG (J. Davidson), Orchids of the Central District (J. Dodd), Chipwood in the Gogol valley (R.J. Johns), Lowland grasslands under grazing (E.E. Henty), Leningrad Congress (D.G. Frodin). For further information, contact Dr. J. Evans, Forestry, Box 793, Lae, Papua New Guinea.

During a workshop in Denpasar, Bali called 'Restoration of forest to improve welfare and environment' two papers by LBN Bogor were discussed; one by Prof. Dr. Didin Sastrapradja on forest management and one by Dr. Setijati Sastrapradja & Drs. Rusdy Nasution on the role of Plants in cultural life.

Plantes Malgaches et Thérapie du Cancer is the title of the 75th anniversary symposium of the Academy of Science of Madagascar, to be held 5-15 September 1977. Involved are species of Catharanthus, Hazunta and Pandacastrum (Apoc.), Vernonia and its relatives Brachylaena and Vernoniopsis (Comp.), and also Croton (Euphorb.). Contact Pierre Boiteau, La Residence 76, Rue Aristide Briand, 91400 Orsay, France, who is in charge of the external relations.

Aberdeen Symposium on Malesian ecology, the 5th, will be held at Aberdeen, 30-31 May 1977, organizer Dr. K. Jong. Address: Institute of S.-E. Asian Biology, Aberdeen AB9 2TN, Scotland, U.K. Subject: conservation of genetic resources in Malesia.

Conservation Meeting for South Pacific. At Apia in Samoa, the IUCN organized a meeting from 9 to 17 June 1976 to do something about the threats to the vulnerable ecosystems of the S. Pacific islands. A number of sound recommendations were made with regard to the application of technology, of traditional environmental knowledge, management areas and parks, the value of an integrated approach, the creation of reserves, administrative organization, and others. For more data see IUCN Bulletin of August 1976, or ask Dr. W.L. Chew at the Morges Headquarters.

d) Conservation *(continued from page 2597)*

Thai ruining their own country. "Dear Sir", begins a letter to The Nation (Box 594, Bangkok), published on 14 June 1975, "It is always depressing to read (The Nation, 8 June 1975) about how the area of forests in Thailand has declined so drastically. Indeed, as the Deputy Director General of the Forestry Department noted, part of the cause is due to population pressures, i.e. expanding settlement and agricultural areas, "development", and poaching. However, as many forestry

officials and businessmen prefer not to disclose, the major reason why 50 million rai of forests has disappeared in the past 10 years is due to corruption.

Many of the destroyed areas have been denuded so completely that it will take centuries, if ever, for the forests to restore themselves. Other areas have been so severely disturbed as to alter the basic associations of many tree species. My point is that each forest in Thailand is under the jurisdiction of a regional forestry official and since large scale logging operations can hardly be kept secret for long, the only possible reasons why many forests have been so ruthlessly cut is that many of these forestry officials (and perhaps their superiors also) are blind or cripple and consequently never tour their areas, are incompetent, or shamefully dishonest.

After having visited many parts of the Kingdom I am constantly amazed at how openly and all too frequently huge trucks, each with several large tree trunks, are on the main highways. One wonders just why the Forestry Department has forest reserves, etc. since in many of these places, e.g. Khao Chompoo, Siracha; Nam Nao, Petchaboon; Doi Inthanon, Chiengmai; South Soy Dow Mountain, Chantaburi; etc., plus in numerous "private" holdings active logging operations—with bulldozers, elephants, gigantic trucks—are rapidly destroying the remaining 37% of forested land in Thailand.

'Green Gold' is what these greedy ones consider the forests as being since they care little about the ecological devastation that results from cutting. Exploit, destroy, and become rich—regardless of the means. This is why it has been estimated (optimistically) that there will be no forests in Thailand in 20-30 years.

Perhaps the best way to preserve the forests in Thailand is to destroy all the dead and rotten wood in the Forestry Department and to severely punish anyone else who dares to misuse the Thai forests which must now be considered a national treasure. Sincerely, J.F. Ridley-Hooker, Box 17, Bang Khen P.O., Bangkok 9."

Pressures on Australian rain-forests is a paper by I. Douglas, Envir. Conserv. 2 (1975) 109-119, 4 fig. At present, 18,603 sq. km is left (map given), of which 11.7% is national park; in Queensland 10,680 sq. km and 15.2%. Large-scale logging was done in the 19th century; much of the land then cleared from rain-forest is now of little agricultural value. "Today the grandchildren and great-grandchildren of the original settlers are leaving the farms, which had been won with such great expenditure of biological capital, to find jobs in towns and cities .... In less than 100 years a whole community has reached a peak and declined." Present land-use and

conflicts of interests are outlined. References 52. A lesson for other countries now squandering their rain forests!

The greening of Bali. In June 1975 the Director General of Forestry had sent a cable to the Governor of Bali to stop the cutting of trees in the nature reserve Bali West. But next month another 75 hectares were cut down and re-planted, so the area now looks like a barren plain.

Reforestation is, by common consent, a desirable thing. But the maximum profit is earned when a tract of forest is sold to the loggers and reforested after cutting. You get a good sum of money and also can tell everybody about your recent achievements in reforestation. Poor primary forest!

Environmental Education in Indonesia. Regina F r e y of Switzerland, after gaining some experience in Sumatra, has made a plan for popular audio-visual presentation of the conservation cause, at different educational levels, in Sumatra, Java, Kalimantan, Celebes, and west New Guinea. Expatriates are to train Indonesians to take over the program after 5 years, all in cooperation with WWF and PPA. An impressive-looking program (originator: R. Frey, coordinator: R. Frey, etc.) provides for administration, coordination, education, public relation, field operations, and materials, eventually involving 58 Indonesians in a time schedule with 2 months' precision. A nature journal is called for (cheap edition to begin with) and books.

Only one thing is missing: collaboration with the Yayasan Lestari (*p. 2589*), and so a genuine Indonesian initiative is ignored or bypassed. It seems odd to fear for failure because of such a reason; the more initiatives the better, people in Europe or the U.S. might say. But in the Far East, things are different, and work as much through persuasion as through organization. It is, for an expatriate, easy to overorganize and to underpersuade, and easy to forget this rule when things go wrong or don't go at all. If Ms. Frey realizes this, she will act with utmost respect and understanding, lest her work will bring more irritation than conservation.

Indonesia: gathering strength. The Nature Protection Service, Dinas Perlindungan dan Pengawatan Alam = Dinas PPA is one of the five agencies under the Forest Department (the others: Forest planning, Reforestation, Exploitation, Trade). Headquarters is Jl. Juanda 9-11, Bogor. Director is Ir. P r i j o n o Hardjosentono, appointed in April 1974. The PPA itself is also divided into 5 'sub-directorates': Natural resources, Nature reserves, Wildlife and zoo management, Hunting, and Tourism. The PPA has a network of 29 Sections divided into Rayons, the latter into Resorts. Budget climbed from $ 10,000 in 1969 to $ 830,000 (for permanent cost), plus

$ 28,000 in 1969 to $ 970,000 (for flexible cost); of the total, 37% was retained by HQ, the rest was spent in the field.

Ujung Kulon, the rhino reserve in SW. Java, has for a long time been receiving international attention and funding; since 1971 the WWF Netherlands Appeal has supported the G. Leuser reserves (see *p. 2185, 2596*). In 1974, FAO brought assistance in the person of Mr. J. H. B l o w e r as adviser to the PPA director. Mr. Blower, an Englishman, attracted two assistants, Mr. A. P. M. v a n d e r Z o n and Mr. J. W i n d, both from The Netherlands; they took up duty, for 2 years, in August 1975. Each of the three toured extensively for quick inspection of a considerable number of the ± 150 reserves now under the care of PPA; together they wrote over 40 reports. By the end of 1976 they had prepared a 200-page tentative interim report to FAO, 'Nature Conservation in Indonesia', with maps and statistics, covering the whole situation.

This report sketches the historical background, legislation, deals with the main reserves, and discusses the formidable conservation problems that Indonesia is facing. The massive plunder of the lowland rain forests in the country started about 1967, with gross misuse of agreements due to a lack of supervision (*p. 2353, 2395*), while a number of high authorities did some selling-out of their own, sacrificing the unrenewable resources of their country for personal benefit. A ruthless trade in animals has developed: in Jakarta alone some 25 export firms operate. Permits for unprotected species can be had at $ 0.35 for a monkey (Presbytis aygula or Macaca maura), or $ 0.60 for a python. A dealer in Singapore offers Sumatra rhinos at US$ 120,000 apiece, boasting of his good relations with Indonesian zoos (which are permitted to exchange animals with other zoos). The export of birds, legal only, amounts annually to 300,000-450,000; frighteningly high percentages die during transport alone. A permit for export costs about $ 0.01 per bird. About the orchid trade, we recall De Vogel's paper on *p. 2602-2604*.

Many reserves lack an adequate legal status. Under former and present law, only a Cagar Alam or Nature Reserve is fully protected, while a Suaka Margasatwa or Game Reserve is open to 'collecting forest products' which is anything from hunting to logging. Taman Wisata or Recreation Areas and Taman Buru or Hunting Reserves have an even vaguer status. Penalties for offences against the law are ridiculously low: a maximum of $ 1.25 is mentioned.

Development of tourism in the huge archipelago is another problem, in view of the poor infrastructure in remote places like Komodo, which could do with a few more tourists to see the varanes, while Cibodas suffers from an excessive tourist

pressure (*p. 2585*). Better facilities in the mountains of central and east Java (where the fine scenery is threatened by firewood collecting; see following story) might lure more tourists there and make them stay longer.

The shameless exploitation of turtles is a chapter of its own. On the S. coast of Java the animals have become scarce; on the beach of the Meru Betiri Reserve, egg production declined from 2¾ million a year to ¼ million. One of the beaches was found so well protected that a visiting scientist was flatly denied access during the time that illegal egg collecting and turtle killing was in full course! Small turtles are killed all the same and stuffed, to be sold to tourists in Bali.

In order to succeed in a race against time, an impressive number of sensible recommendations have now evolved. They include a strengthening of the PPA (in eastern Indonesia, its presence is negligible, for instance, while a considerable export of birds out of New Guinea is developing); upgrading of the status of many Game Reserves to Cagar Alam, with adequate boundary marking and patrolling; designation of special conservation units for G. Leuser, Ujung Kulon, and others; cancellation of logging concessions within reserves and prohibiting the construction of logging roads; establishment of new reserves including a marine Park in the Moluccas; regulation of trade; creation of hunting grounds, and taking the right to issue hunting permits out of the hands of the local police; stimulating the study of endangered species by Indonesian as well as overseas scientists; removal of settlers from reserves; establishing of buffer zones; preventing the planting of exotic tree species in, for instance, Wai Kambas.

A need also exists for an education program, and Ms. Regina F r e y has developed an extensive plan, which would be excellent if amalgamated with the activities of the Lestari Foundation (*p. 2589*). Ms. Frey recently visited The Netherlands to gather information and education material, much of which was prepared by Mr. A. H o o g e r w e r f: posters, booklets, calendars, pamphlets, stamps, all of which could easily be reproduced and distributed, using the Scout Organization, which in Indonesia is quite strong and widely branched.

Desiderata remain, as will be apparent from following stories. But altogether, since Mr. Prijono took office, a most impressive amount of progress has been booked. A somewhat messy field has been rather thoroughly surveyed, a structure has emerged, priorities for the future outlined. We can look with more faith towards the following difficult steps: realization of the goals and implementation of the law. It is hoped that FAO will continue its support, for the coming crucial years. WWF and Dutch International Technical Help could

also give essential contributions, which eventually must make Indonesia self-sufficient in conservation.

Indonesia: Training School for Conservation Personnel. The poor personnel situation in the Forest Service in general also makes itself felt in the PPA. Besides, there is a big gap in thinking between forest exploitation and forest conservation. In many respects it is utterly wrong that the exploitation and conservation agency belong under one department. Not only is conservation a discipline in its own right and a complex one at that, but it is too easy for the conservation authority to be overruled by the exploitation authority, who also holds the budget strings. Lands under valuable forest are too easily changed in status if one agency is in charge of them (see the incredible story of East Kutai, *p. 2587*). In the Philippines, the combination has proved disastrous (*p. 2591*). On the other hand, the Forestry service can do much to relieve pressure off reserves, as the firewood story will tell. Anyway, the idea has been launched to educate a middle echelon of conservation officers under the PPA alone, and Mr. J. H. B l o w e r, FAO adviser to the PPA, has made a plan for such a school. About 40 people annually should be taught for 3 years in the various aspects of conservation. This would cost just over 1 million dollars, too much for FAO which shortly before had fallen on harder times. It seemed that the plans would have to be shelved, when the Netherlands Government decided to come to the rescue, under the Dutch International Technical Help program. Negotiations are well under way so that Indonesia can submit an application for funds to set up this school, at Bogor. If everything goes as we hope, in 1978 things can start. Early in the 1980's the first pupils then will enter the Service which needs them so badly — after all, if forest destruction in Indonesia goes on at the present rate, by 2005 it will be all gone.

B r u n e i

The field work of Dr. P.S. Ashton, resulting in large collections, a book on the Dipterocarps of the mini-state and one on the Ecology of the forests, laid a solid foundation for further study. Brunei takes a place of its own in conservation matters. There is no law for complete protection of areas, and consequently, reserves don't exist at all. Yet the forests seem safer than anywhere, since logging is done for domestic needs only and timber export prohibited. And (although orang utan and rhino are lacking), these forests are among Borneo's richest. Ashton estimated the number of plant species, trees 10 cm and thicker only, at 2000; not bad for a country 5765 sq. km in area.

This is owing to the oil, which enables Brunei's 100,000

people to live comfortably along the coast. The interior (where the land goes up to 1850 m) is virtually uninhabited, and but modest shifting cultivation is practiced. We ardently hope that Brunei will retain these magnificent forests in their virgin state. This will also be good for the many rheophytes in the riverbeds, a remarkable community of plants adapted to sudden floods. In Borneo they are particularly well-developed but much neglected and, of course, in logging areas highly endangered.

The Brunei Museum is at present in charge of wildlife and conservation matters.

Newspaper Clippings on Tropical Forest Biology between February 1974 and July 1975 were summarized and published in English translation by BIOTROP, Box 17, Bogor, Indonesia, a 53 page pamphlet, well-indexed.

It is a wildly varied mixture of brief news items, about log exports, logging firms who want government support because of a slump in the market, warnings from authorities, news about symposia, animal trade, items like the lime kilns in Wonogiri consuming 10,000 tons of firewood monthly, and that there is no reason to worry that Java will become a desert from overpopulation as the Five Year Plan II will keep Java green. A 7-floor Gene Pool Laboratory is under construction at Bogor. The World Forest Conference will be held in Indonesia in 1978. Dungus Iwul Nature Reserve at Jasinga W. of Bogor is felled for charcoal. Wasteland now amounts to 180,000-250,000 sq. km in Indonesia. Before long E. Kalimantan can process 13,000,000 cu.m of timber. "It is hoped that even the waste left by on-the-spot processing could still be utilized."

J a v a

About 86 reserves occur here, many of them small and on mountain tops. A few large ones are here discussed.

Ujung Kulon and adjacent islands Peucang and Panaitan, 600 sq. km, are scenic and famous for their fauna, but rather poor on vegetation (owing to Krakatau floods, rhino's, and depletion by man), although Mt Honje inland might still be good.

Lake Danu, in the NW. corner of Java, 37 sq. km, reserve since 1921, consists of open water, 90 m altitude, surrounded by marshland. Endert, who gave a fine botanical description (Tectona 25, 1932, 963-986 + map) found Mangifera gedebe (its only locality in Java, otherwise known from Palembang and Kutai, very sparsely), Elaeocarpus littoralis, Glochidion palustre, Coix palustris, Alocasia bantamensis, Alstonia spathulata, and Stemonurus secundiflora, the other species, too, local and exceedingly rare. Endert compares the flora with

the Lake district in Kutai. Van Steenis who surveyed the boundaries, added several (sub)endemic species and expected even more (3 Jaren Indisch Natuurl., 1939, 214-222). The reserve suffers from encroachment, and plans are in the air to raise the lake level for industrial purposes, which would thoroughly spoil this singular place.

Cibodas will be extended! A proposal was made for this world-famous reserve (see *p. 2183-2184*) to contain all the primary forest on the Gede-Pangrango slopes, altogether 217 sq. km and stretching irregularly (mainly in the gullies) especially in the West down to well under 1000 m. The perimeter comes at distances varying from ½-7½ km within the circular road that passes Bogor, Cibadak, Sukabumi, Pacet, and the Puncak Pass. Very wisely, a plea is made to plant firewood around the primary forest, to provide for the needs of the population. Only thus can the primary forest be protected, and with it, the precious flora and fauna, the water flow, and the soil.

Moreover, the Netherlands Ministry of Culture has allocated funds for an Education Project at Cibodas. Two good reasons exist for this: 1) Cibodas, visited by large crowds of tourists, offers a place where people can see things with their own eyes, their interest quickly aroused, and can be provided with instructive popular information, 2) Parties of hikers and campers up the mountain, who want to be outdoors but lack knowledge and motivation, can be educated in behaviour and enjoyment of nature by guides who accompany them on their way (see *p. 2585*). Plan to build a hut at the Kandang Badak saddle at 2400 m (for the 4th time, the others were all reduced to firewood), fit in very well with this project.

Cikepuh (85 sq. km) and Cibanteng (447 ha) on the S. coast S. of Pelabuhan Ratu scarcely have value but for animals and recreation, but Leuweung Sancang (21 sq. km) also on the coast, SW. of Bandung has some primary forest, with Rafflesia patma, and the beaches are rich in sea-grass (which is carried off in quantity, and is in fact with 200 tons a year heavily over-exploited), but there are encroachment problems as well, which badly need attention. Pandangaran, 530 ha on the coast W. of Cilacap, attracts masses of tourists; botanically it seems less important. For Soemarwoto's education projects there, see following story.

Halimun SW. of Bogor, 750-1900 m, has fortunately been proposed as a reserve, 600 sq. km; on *p. 2321-2323* the botanical splendour has been sung. The partridge Arborophila javanica, believed to be extinct, was here found in numbers. The Forestry Service seems to be well in command in the area, and if they can be persuaded to respect the primary forest including the fine Altingia, a magnificent and needed addition to the Reserves in Java will have been made. No doubt

many a biologist from Bogor will find plenty to discover here the hill and low-montane forest supplementing the Cibodas riches. Who knows what international fame Halimun will generate?

Gunung Tilu, some 40 km S. of Bandung, 105 sq. km of mostly montane forest surrounded by tea estates, has also been proposed. To some extent it is in danger of being depleted as 'production forest', and action is needed, perhaps with WWF support, for a conservation infrastructure and an extension further South.

Muara Gembong, by the delta of the Citarum, the main river of west-Java which ends at the north coast shortly NE. of Jakarta, has also been proposed, 700 ha of which 500 mangrove. An urgently needed step since virtually no mangrove forest in Java has been conserved, which yet is economically so important for protecting existing coast lines, wood supply, and fisheries. Cutting by the Forest Department has made life difficult for the many herons, egrets, ibis and other birds which stay and breed there.

Mt Celering in central Java S. of Mt Murjo on the north coast, is said to be a rare plot of lowland Dipterocarps, 13 sq. km, established in 1973. A botanist should be called in for verification, also of the nearby supposedly natural teak forest.

Mt Arjuno, dating of 1925, 109 sq. km of montane and cemara forest on a high volcano, was cut back to 49 sq. km after the rain forest had been destroyed, presumably for want of fuel. The remainder is, however, worth keeping, also because of its fauna. Mt Tengger with 4 reserves of together ± 60 sq. km in its spectacular caldeira, where cemara suffers heavily from fires, finds its main importance in tourism. The same holds good for Mt Ijen (25 sq. km) with its rugged volcanic beauty and wide panoramas.

Baluran, originally 250 sq. km in area, is a long-standing reserve of savanna surrounding the extinct low volcano of that name, in the very NE. of Java, the driest corner of the island. It is the home of the greenish-flowered Erythrina euodiphylla, known only wild from here and formerly from Bali. Military, who assumed control over the area, shot many bantengs. Invasion of settlers, officially approved, have done much to degrade the reserve further. Implementation of elementary conservation measures is urgent. Also Meru Betiri, described on *p. 2550-2552*, is badly in need of recovery from various forms of human influence. Blambangan, too, the SE. peninsula of Java, established in 1939 and since that time shrunken from 620 to 430 sq. km (botanical impressions in Blumea Suppl. 4, 1958, 74-86), is totally ineffectually managed and suffers from various kinds of misuse.

On Mt Jang, 200 sq. km, mostly of Casuarina savanna above

1600 m, are proposed as water catchment area and to protect Rusa timorensis rusa. Van Steenis (Mountain Flora of Java, 1972, 33) tells how the Ledeboer brothers discovered that salt licks for the deer saves them the trek to the sea across the lowlands where they are killed. In Bawean Island N. off east-Java, 46 sq. km is proposed as habitat for the rare deer Axis kuhlii.

Training in Nature Reserve Management is done under supervision of Dr. O. S o e m a r w o t o, professor of Bio-management at ITB Bandung, in the reserves Pangandaran and Leuweung Sancang (see above under Java). Graduate students learn about general principles of conservation, data collection, ecology of Bos javanicus, the banteng, education of visitors, overpopulation problems like encroachment, and illegal fishing. WWF Yearbook 1974-75, p. 174-176 gives more details.

S u m a t r a*

Leuser Reserves. To follow the story on *p. 2596*, good news is the considered addition of the valuable Kapi region in the North, 1500 sq. km, briefly described by Van Steenis (Tijds. Kon. Ned. Aardr. Gen. 55, 1938, 785-795). This is highly needed to compensate damage in the perimeter of the Leuser reserves by settlers and woodcutters who supply the sawmill in the Alas Valley, where timber prices are climbing all the time. Population in the Alas valley is growing, partly because Bataks moved in from the Karo Highlands, which in Junghuhn's time were still under forest, now under alang-alang through misuse of the land. Also, a highway is under construction, along the Alas River, separating the two halves of the complex and further threatening the precious lowland forests. Boundary marking and patrolling are urgently needed. The Sikundur area, 300 sq. km of lowland forest on the Medan side, seems now once again in acute danger of being sold out to loggers. Very high authorities are rumoured to be involved in the transaction. This is the more shameful since a few years ago, President Suharto was approached by Prince Bernhard (then President of WWF) on this very subject, with the result that the logging plans were cancelled – temporarily, as it now seems. Sikundur is a most essential portion of the Leuser Reserves, the only big chunk of lowland forest in northern Sumatra, which the Government had pledged to maintain as a nucleus of nature, a treasure of biological diversity, and as such a capital to be preserved for the benefit of Indonesian people in the far future. If the highest authorities in Indonesia – whose eloquent phrases about the

* Some impressions are here given, also from Java; the rest of Indonesia comes next year.

value of natural resources testify to their awareness (see e.g. *p. 2583*) – allow Sikundur to be logged, with each tree a portion of Indonesian credibility will fall down. For a Gunung Leuser Field Station, the Netherlands Ministry of Culture has voted funds, in accordance with the submitted plan (summarized on *p. 2375*). It is hoped that construction can start before long.

Sibolangit. The 115 hectare Reserve annex 18 hectare garden, easily reached from Medan, is under consideration to be developed as a focus of Nature Education, WWF-funded.

Kerumutan, a ± 1200 sq. km area astride the equator SE. of Pakan Baru, established in 1968, and originally under lowland dipterocarp forest, has been logged over, and occupied by settlers. Some wildlife survives, but as a reserve it is lost.

Sungai Baruman-Sungai Kubu, on the Straits of Malacca between the two rivers thus named, 5000 sq. km, might be proposed as a reserve. Good lowland and swamp forests are said to occur there, and a substantial population of tigers. This would well compensate (if anything can ever be compensated with regard to lowland primary rain forest!) the loss of Kerumutan.

Kerinci, SE. of Padang, was declared a reserve in 1929, 125 sq. km, extends from 1500 m up to the summit of the volcano which is 3800 m. Between it and G. Tujuh to the East is the considerable and palynologically interesting Bentɔ̂ Marsh, traversed by the Batang Sangir, at 1500 m altitude. Gunung Tujuh itself is a former volcano which carries a splendid lake at 1995 m. These two items have been included in a proposed extension of 99 sq. km. The area, which is rich in plants and animals, has great touristic potential. Conservation work has hardly begun. Jacobs (Ann. Bogor. 3, 1958, 45-104) gave a description of the area, with map. In view of the widespread deforestation of the lower Barisan slopes, it would be most desirable to include tracts of primary forest at lower altitudes as well, if this is by any means possible.

Siberut, one of the Mentawai Islands, known for its 4 endemic primates, is also under consideration for a big extension (to 200-250 sq. km) of its rather vague Taitai-Batti reserve of 66 sq. km, but field work is needed first.

Berbak, a 1900 sq. km game reserve E. of Jambi, dating of 1935, is a swamp forest area, dissected by creeks and for an estimated 70% intact. It is rich in birds. In the years 1971-1974, no less than 285 sq. km was lost to settlers, who in places have penetrated the reserve as far as 5 km. Much can, however, still be saved. It is being considered as a Biosphere Reserve (which would be unfortunate if degraded vegetation is allowed for, as circumscriptions suggest). An extension into the dryland is planned; this would be essential,

since the swamps scarcely contain endemics but recruit their flora from the adjacent mixed dryland forests.

Wai Kambas, a triangular area of 1300 sq. km in the SE. corner of Sumatra, was a reserve since 1937, until in 1969 the then Governor of Lampung Province allowed it to be logged, that was his contribution to the sad story eloquently told by W. Meijer in his 'Indonesian Forests and Land Use Planning' (1974). In southern Sumatra ... "A value of $ 60-100 million of exportable timber and three times that value for local use or lumber export has gone up in smoke during the last 20 years of 'agricultural development' ... Now there are plans for large irrigation projects, but great parts of the catchment areas for these projects have been denuded, and costs of the projects are so high that the paddy fields to be developed will be too expensive for small farmers to own" (p. 60). Meijer's photographs on p. 63 of the Entrance Sign of this reserve with a sorry lot of grass and broken trees beyond it, and on p. 64 the logging camp with settlement, better than words show corruption and indifference that reflect so extremely badly on Indonesia's management. Because of the surviving animals the area, a small hop by plane from Jakarta, is being considered as a hunting reserve. Under the sad circumstances, this may be sensible.

Sumatra Selatan is the peninsula opposite Ujung Kulon, and with a tract of similar shape in the opposite direction which in the North will touch Lake Ranau by means of a planned extension. The Lake level is 540 m, mountains go up to 2000 m, but most of it is lowland. The whole is ± 200 by 10-20 km, a game reserve since 1935, its area, officially, 3568 sq. km. Pages 68 and 69 of Meijer's 'Indonesian Forests and Land Use Planning' give an ERTS-photograph with explaining map of the central portion. Clearly one can see, wee inside the Reserve, the illegal logging on behalf of the Indonesian Navy. There is also encroachment by transmigrants from Java. Nevertheless, much of the reserve is still good, with elephant, two-horned rhino, tiger, leopard, bear, tapir, kancil, etc. Owing to the combination of sea, lake, and mountains, the area is scenically beautiful; one more reason to keep it uninhabited is its being prone to earthquakes and volcanism. For the geomorphology, see Verstappen's Sumatra book (*p. 2229*) of 1973, p. 23-35. The Ranau region and its montane flora were described extensively by Van Steenis (Bull. Jard. Bot. Btzg iii 13, 1933, 1-56). Jacobs, on a trip in 1968 (Reinwardtia 8, 1972, 348) above Kota Agung in the vicinity of the central portion of the Reserve, found the flora poor in Dipterocarps but rich in other tree families and very interesting; subsequently several novelties have been identified in his collection. As the botany of Lampung is surprisingly poorly known, further exploration is expected to be rewarding. For all such

reasons, the area has great conservation potential, but it should be properly policed, managed, and supported. A major step would be the removal of the settlers to another transmigration project (for instance, Seblat, NW. of Bengkulu): as the population of Java at present increases with 5500 daily, it seems more meaningful to clear a nature reserve from illegal occupants and thereby saving it, than to postpone the crowding of Java with just another day and a half.

Whitmore's report to IUCN, under the title 'Conservation Review of Tropical Rain Forests / General Considerations and Asia', 116 p. (announced on *p. 2592*), dated December 1975, was issued July 1976. Part of a world-wide overview, it gives little information on Indonesia, some information on adjacent countries. As for Indonesia, the recent FAO-report (see following story) gives ample compensation, however.

My major objection concerns Whitmore's conclusion that ... "The network of reserves described above appears to the author to give reasonable geographic coverage to the whole of Indonesia, except central and southeastern Celebes which is still largely covered with rain forest and except Irian Jaya" (p. 74). This is misleading. Sound plans have been made to extend the conservation network over Celebes and west New Guinea. But even so, conservation as hitherto conceived in Indonesia, suffers of three main imbalances: 1) emphasis on large animals to the neglect of vegetation, 2) emphasis on mountains to the neglect of lowlands, 3) under-representation of Borneo, particularly as for the lowland dipterocarp forests in Kalimantan North of the equator, where the richest forests are, and East Kutai is in a sorry state. If these imbalances are not redressed, the WWF Rain Forest Project in Indonesia will essentially be a failure. They are of long standing, but it is the more vital that they are corrected without delay.

A more extensive report by Whitmore & Grimwood, which was announced, has not become official.

Optimism—Pessimism. On *p. 2592*, hopeful remarks were quoted about the Monkey Eating Eagle in Mindanao. But, writes Dr. P.S. Ashton, ... "I do know a Peace Corps couple who have just spent two years working on the conservation of the eagle. Throughout the 1½ years before I met them and discussed their work, the only eagles they had seen were in a cage at the Quezon Headquarters of the Bureau of Forests. There were no teams patrolling with WWF vehicles to end the hunting because forestry officials had commandeered the vehicles for conveying visiting functionaries and getting their kids to school. No one knows how many, if any, birds survive but the figure of 100 would appear to be hopelessly optimistic. Once

again, the carrying capacity for these birds in the undisturbed forest is always low, and logging, which is all but universal in Mindanao, has heretofore been associated with their disappearance and presumably still is."

Kedah Peak. The entire massif of Kedah Peak (Gunong Jerai) in northern Malaya has been gazetted as a State Park, all area above the 500 ft contour being included. The peak contains Virgin Jungle Forest Reserves, Watershed Forest Reserves, and will have several limited designated recreational areas. The solitary road to the summit (where there is a television repeater station) will be maintained. The Government bungalow at the 3200 ft level will also be retained. Educational facilities are planned, including possibly a small museum at the foot of the road. A survey staff, funded in part by the WWF Malaysia, is in the course of preparing a report with recommendations concerning natural vegetation and wildlife. The Kedah State Government (together with the Kedah Tourist Association) is to be warmly congratulated for this step which should serve as a splendid example to other West Malaysian states. The isolated mountain contains several endemic species and harbours several vegetation types, including the interesting heath forest over quartzite and sand. During the survey the well-known botanical artist Mrs. Barbara Everard was able to portray several of the Peak's species.

Man's impact on the tropical rainforest of Peninsular Malaysia: a review, is a paper by S.R. Aiken & M.R. Moss, Biol. Conserv. 8 (1975) 213-229.

Many figures, some of them shocking. At present, the forests earn c. 10% of the GNP, but at this rate by 1990 all will be gone. Effects on climate, erosion, wildlife, aborigines. Ruin of the soil by tin mining. Precarious future of existing parks and reserves. A clear, well-documented warning (68 references); if unheeded, Malaya will become an example of impoverishment, a lesson for Indonesia, the Philippines, and Papua New Guinea.

Taman Negara reported safe. The Taman Negara National Park in Malaya, which has been threatened by a proposed dam across the Tembeling River is now safe. All work on the proposed dam has been halted. Head of Game Department Mr. Mohammed K h a n deserves much of the credit.

Further, the Third Malaysia Plan (1976-1980) contains, for the first time in Malaysian Development Plans, a strong section on conservation in which several areas have been named in principle as Parks and Reserves.

Spare trees in reserves! "Constant 'creaming' of the best trees in logging operations will eventually lead (and probably very quickly) to severe genetic erosion in the remaining populations. This has already occurred among species of Cedrela and Swietenia in Central and South America, where trees of good form are now rare in natural forests and only remain in inaccessible places. Because of the rapid progress of exploitation in Africa, the enormous specimens which so impressed colonial foresters at the beginning and first quarter of this century are a thing of the past. Very large trees are now difficult to find except in a few reserved areas. The removal of these dominant rainforest species in large numbers, coupled with the enormous amount of devastation which occurs during felling and extraction, and their poor regenerative ability, is bound to bring about changes in these ecosystems if not to destroy them altogether." Quotation from B. T. S t y l e s & P. K. K h o s l a in Burley & Styles, Tropical Trees (1976) p. 62.

Radio tower on Mt Ophir. In a letter to the New Straits Times of 16 November 1976, Dr. R. E. H o l t t u m expressed concern for the threat posed by the road to the top and works there. Mt Ophir, the most accessible mountain in the early days of botanical exploration in Malaya, is for this reason the type locality of many taxa. In connection with this, Dr. B. C. S t o n e of Kuala Lumpur visited the place and wrote a letter to Dr. Holttum which the latter forwarded to the editor:

"A week ago I went to Gunong Ledang (Mt. Ophir), with Koh Ah Lan (one of my doctoral students) and our field man, Mahmud.

We found that the ascent road to the summit is virtually complete; paving has been done on the lower third (i.e. from the reservoir level) about halfway up; the rest is cleared for the road and drainages and it looks as if the paving might be finished in 2-4 months. The actual construction of (what we presume to be the planned) radio towers has not started yet. I suppose they want the road finished.

As one might expect some environmental damage has occurred because of the road, but generally this is average to moderate; that is, the road cut has cleared a swath about 20-25 yard wide all the way up; cut backs on steep banks have occasionally extended further, but not much. Drainage gutters in the road itself have led to downslope erosion on the cleared areas but this generally has quickly been righted by the vegetation present lower down, except in 3 areas where extensive fill-tipping has created a deltoid 'coverlet' of loose soil on very steep slopes along a few points at extreme recurves on the uppermost part of the road. These have overlain

downslope areas for some area, in the worst case about 250-300 yards long and perhaps a third as broad. This and 2 other similar overlays (resembling landslips) are clearly visible from the Segamat-Ledang road (i.e. on the southern face of the mountain).

At this stage however I would opine that the damage resulting has been tolerable, assuming the road up was an inevitable project. Because the summit will be a 'protected area' it is unlikely to have heavy traffic, and in fact no doubt a permit - or pass - will be required for non-employees. The tower area construction will undoubtedly cause some havoc near the summit; until this commences it is difficult to see how much. However, it might be like the G. Angsi or Ulu Kali area stations, which are fairly small (about 25 m2). Upon completion I believe the uncleared vegetation will be reasonably safe except along the road itself, where the margins will probably degrade (to secondary species) for a breadth of about 5-15 m either side.

At this point therefore I would say that no doubt damage has been done, but it seems fairly well contained under the circumstances. If this constitutes the only construction, and if I am right about road use, the area should retain a considerable part of its native cover and will be, like Kedah Peak, much more than just a shadow of its former self.

Your letter appeared in the Straits Times, and undoubtedly has been widely read. I don't know whether there is any official reaction yet.

I took some photos there on Mt Ophir and will send you copies of some when I get the film developed, so you can see the effects of the road."

N e w G u i n e a E a s t

On completion of the new laboratory of the Wau Ecology Institute (Box 77, Wau, Papua New Guinea), a symposium was held. A stencilled 153-page pamphlet Ecology and Conservation in Papua New Guinea with the 21 papers was published late in 1976; at $ 2.00 it can be ordered, also from the Bishop Museum, Box 6037, Honolulu, Hawaii 96818, U.S.A.

Evidently Papua New Guinea realizes her splendid conservation position with virtually all options for land use still open. The intention to develop the country wisely, modestly, with integrated planning, aware of its unique biological and ethnological values, is clearly expressed by Mr. Stephen Tago, Minister for Environment and Conservation. (By comparison: what a difference with the government of Indonesia, which in the western half is selling huge logging concessions, apparently without any regard for the fate of the land after the forests have been pulped.)

The other papers, too, demonstrate a sensible attitude for impact on the environment; a fine example is the one by J. Davidson on the Gogol Wood Chip project near Madang, 670 sq. km (p. 49-71), well-documented with facts, against the 8 points of Forest Policy. Several papers deal with animals and biological control, education and research are not forgotten either. The South Pacific Commission too is greatly interested in conservation as an aspect of sound planning. Areas have, however, not yet been outlined.

A brief History of the Wau Ecology Institute tells you how to become a contributor. Do!

IUCN Springboard for action in SE. Asia. IUCN Bulletin of January 1977, p. 3-10, unfolds a program of plans, based on a massive report by T.C. Whitmore & I. Grimwood. Virgin lowland rain forests justly are declared the core of the conservation program. A maximum size of 100 sq. km is claimed for a conservation area; this seems safe and sensible. Surveys, legislation, biosphere reserves, training and management, education and public awareness, research, are briefly discussed as fields of action at both national and regional levels. The plans are briefly outlined, per country, as follows.

Burma: survey of the population status of important species of mammals and birds. Survey of existing and proposed reserves. Training of professional personnel.

Thailand: not 62% is under forest as was supposed in 1972, but 36%. Protection of tiger, kouprey. Improvements to conservation areas, especially on Korat Plateau. Survey to identify more forest types for conservation. Saving of Khao Soi Daow watershed.

Khmer Republic: survey of population status of endangered animals. Survey and consolidation of existing protected areas. New reserves in Elephant Mountains, Cardamon Mts, Great Lake, Senmonorum, Hodrai-Sou, Dangrek Range.

Laos: establishment of new protected areas at Phou Khoa Khuay plateau, Hodrai-Sou, Bolovens watershed, Tchpone limestone mountains, Xieng Khouang with diverse vegetation, Nam Ou and Luang Prabang highland monsoon forests, Phong Saly and Upper Mekong with Chinese animals.

Vietnam: survey of existing reserves, Trang-Bom and Bach-Ma-Hai-Van national parks, and Krong Poko, Bantum, Kinda and Langbian game reserves. Survey of proposed areas, Hao Son-Dai Lanh 50 km N. of Nhatrang on the coast, Bao Loc south of Blao, Doc Xuyen, Canh Duong and O Loan on the coast, Langbian plateau in Darlac prov., Hodrai Sou, and Bac Lieu in the delta.

Malaya: Taman Negara, the reserve here still considered in great danger because of plans for a dam which would submerge

a most valuable corner of the Park, seems now actually safe (see *p. 2816*). Establishment of new protected areas, Endau-Rompin in Johore and Penang, Tasek Bara swamp area in Pahang, Sungei Neggiri in Kelantan, Grik in Perak, Belum in Ulu Perak all rich in wildlife, Ulu Muda on the Thai border, a catchment area, Telok Peat Swamp in Selangor for botanical education, G. Panti in S. Johore for its flora. Tiger reserve in Trengganu. Krau Game reserve at G. Benam, granitic hence complementing sedimentary Taman Negara. Education unit.

Sabah: extension and consolidation of the national park system is reportedly going well. Survey of the fauna is needed.

Sarawak: survey of existing parks, Bako, Niah, Gunung Mulu 528 sq. km, Lambir Hills. Proposed parks Mt Matang, Pelagus rapids in the Rejang, G. Gading, Simalajan, Loagan Bunut. Proposed wildlife sanctuaries Ulu Batang Ai-Lanjak Entimau for orang-utan, Gunung Pueh for plants and mammals, Turtle Islands. Extension of mangrove at Bako.

Brunei: seems in an excellent position to establish a really satisfactory system of reserves. Bukit Peradayan and Ulu Temburong are named. Important fauna to be surveyed.

Sumatra: for Gunung Leuser, management plan and implementation, a record $ 200,000. Berbak reserve. Tiger Reserve on the east coast of Central Sumatra. Siberut, primates. Breeding centres of Sumatran rhino. More details in separate story.

Java: Ujung Kulon management plan and implementation, Meru Betiri tiger reserve, Cibodas protection, Gunung Tilu establishment. Kuhl's deer in Bawean. More details in separate story.

Kalimantan: Tanjung Puting for forest and orang-utan, Kutai redefinition of boundaries and consolidation. Bukit Raya, establishment.

Celebes: Lore Kalimanta in the NE. central part by Lake Lindu, establishment and consolidation. Tangkoko-Batuangas near Manado, mainly fauna.

Western New Guinea: survey for reserves which have been pre-identified only.

Indonesia-wide: conservation education. Co-ordination of conservation by WWF/IUCN personnel. Study of human geography of rural populations, especially their firewood needs, and other socio-economic factors.

Papua New Guinea: survey of existing reserves, viz Variata, McAdam, Talele Islands, and Baiyer River. Establishment of additional areas, like Mt Bosavi, Mt Giluwe, Kerewo-Turama, Bensbach River-Moorehead, and survey of these.

Philippines: two-thirds of the parks now are being logged or otherwise depleted; redefinition and implementation is highly necessary; $ 200,000 has been voted for survey, bound-

ary demarcation, management plans, legislation, and staff training of the 32 areas out of 59 that are to be retained. There is also a program for Mindanao's Monkey-eating Eagle.

Comment by the Editor. No suggestion is made on the part of the IUCN that this program is complete, and indeed it is not. The essential gap is the Lowland Rain Forests of Kalimantan. In view of the richness of this rain forest area, the nucleus of the west Malesian flora, the proposed representation is inadequate. This is strange, since a botanist who should know better, was one of the makers of the report. But Tanjung Puting with comparatively poor forest, East Kutai heavily damaged (see *p. 2587-2589*), and Bukit Raya which is chiefly montane forest together do not contain enough diversity. After all, out of the 380 species of Dipterocarps recognized by Ashton in his FM-revision, 263 occur in Borneo and 62% of these are endemics. They occur in the lowlands, and the richest forests are north of the equator, where only East Kutai is, depleted to a large if uncertain extent. In view of the abundance of Dipterocarps in just these portions of Kalimantan where they form the skeleton of the forests, their immense economic value at present and potential for the future, and the current rate of destruction of again just these forests which affects these magnificent ecosystems beyond repair in many cases, it is urgent to undertake a massive effort to conserve a substantial representation of these forests. If such an effort is not made without delay, tens of species of Dipterocarps alone, and hundreds of other potentially valuable tree species, of which the future of forestry and forest economy of Indonesia depends, will be doomed to extinction at the hands of loggers. If this problem is not tackled, examined, and satisfactorily solved, the Rain Forest project now underway will essentially be a failure, since under it the richest forests are allowed to be ruined. Let me point to Durio (Kostermans' monograph in Reinwardtia 4), 27 species all, of these 19 in Borneo, of which 14 endemics; to Mangifera (Ding Hou's unpublished monograph for the Flora Malesiana), 23 species in all, 12 in Borneo, and to Nephelium (Leenhouts, pers. comm.), 30-35 species in all, of which ± 25 in Borneo, many very scarcely known. Also in Sumatra and Celebes, more reserves of primary lowland rain forests are needed. The PPA is aware of this, and continues its accession program.

It is good to read, in Chew Wee Lek's postscript on page 10, that IUCN is also moving towards an integration of conservation into overall development. A very vital point has been hit with regard to the provision of fuel, for which e.g. 90% of Thailand's 40 million people depend on the forests. Also appropriate, small-scale technology is advocated. The socio-geographic aspects in a conservation area deserve full

attention indeed, in order to integrate a reserve into the local social structure and make the people identify themselves with their plot of nature. Altogether, it means that IUCN is to broaden its sphere of expertise and of influence, to the ultimate benefit of the peoples of SE. Asia themselves. Co-existence or no existence, this article on page 12 of the same issue, epitomizes the situation.

Celebes: spoiling the game. Late in June 1976 Dr. W. M e ij e r re-visited the so-called Natural Arboretum that was so enthusiastically announced on *p. 2593*. "The tracks of woodcutters run through it everywhere", he now reported. "Nothing has yet been done about effective patrolling or boundary marking. The policeman, with his motorcycle declares authoritatively that all those planks by the roadside and the entrances have been cut outside the reserve. How can I swallow such nonsense? Outside the reserve almost no tree is standing any more. Last Sunday, before we left the main road, Ir. I d r u s of Forestry assured me that the reserve is well-guarded, and no tree is cut inside it any more. This phantasy is now believed in Makassar through the favourable reports of the policeman, and because never any personnel of the local Forestry Office bothers to visit the place himself."

Effects of a road under study. The Papua New Guinea University of Technology, Lae, was commissioned by the government to conduct an environmental impact survey on the possible effects of the proposed (imminent) road from Lae eastwards along the coast to Finschhafen, investigating social and biological aspects with a view to perhaps establishing certain tracts of ground as wilderness or conservation areas. Staff of the Lae Herbarium and the Wau Ecology Institute have assisted with some of the botanical and zoological aspects, spending several weeks in the foothills of the Cromwell Mountains.

Conservation Bibliography for Indonesia. Literature on the subject has always been accessible to a handful of persons who read Dutch and know where to look. Now that others are joining the conservation effort, a lack of ready information makes itself sorely felt. Dr. M. Jacobs of the Rijksherbarium therefore designed a plan for a Selected Annotated Bibliography, in English, with indication where all items can be consulted.

The plan provides for four main sections: General and introductory works; General subjects in conservation; Reserves with brief description and main literature about them, by island; Alphabetical list of authors (with some biographical remarks) and their works. A qualified person has been found,

and it is hoped that the funds can be obtained which enable him to work on it for 9 months in Leiden, followed by 2 months in Indonesia to locate the publications there. For publication, the style of the FMBulletin may be useful.

First reactions to the plan have been very good. If money comes forth, and everything else go as we hope, publication could follow in the second half of 1978.

Gunung Leuser Committee and Field Station. The Netherlands Ministry of Culture has agreed to finance a considerable portion of the Leuser Field Station according to a plan announced on *p. 2375*. A delay in the construction, however, has occurred following developments in the relation Gunung Leuser Committee (Netherlands), WWF Morges (Switzerland), and PPA Bogor (Indonesia). A new advisory and financing structure for the Rain Forest Projects in Indonesia has been devised. Under it, a WWF coordinator would be stationed at Bogor, in close touch with the PPA on the one hand and the Morges HQ on the other, while the latter will have a bigger hand in the decision-making and daily affairs. These things were by February 1977 still in the transitory stage. The Leuser Committee is being replaced by an advisory committee for all reserves in Indonesia. Since Dr. M. Jacobs did not wish to be associated with these developments, he resigned from the Leuser Committee in October 1976, and consequently ended his business with the Station. This has been taken over by Mr. H. D. R ij k - s e n, Wilhelminalaan 29, Haren, The Netherlands, who worked for 3 years in the Leuser reserves and has been closely involved in all planning about the Station.

Ecology and Development. The role of conservation in economic development has been touched upon in the review column of this Bulletin: DASMANN's 'Ecological Principles for Economic Development' on *p. 2380-2382*, UNESCO's 'Natural Resources of Humid Tropical Asia' on *p. 2392-2393*, MEIJER's 'Indonesian Forests and Land Use Planning' on *p. 2395*, all in *no. 28*, and the IUCN 'Ecological Guidelines for Development' on *p. 2646-2648* in *no. 29*.

A general ignorance, indifference and neglect has caused disasters throughout the tropics. Deforestation resulted in massive erosion, and a steady run-off has been replaced by floods and droughts in turn, while water works silted up. Shifting cultivation, haphazard agriculture and burning did away with huge tracts of valuable forest, now replaced by alang-alang. The total effect is a decrease of productive land area. Erik P. ECKHOLM's alarming, fascinating book on this subject, 'Losing Ground / Environmental Stress and World Food Prospects' (223 p., Norton, New York 1976, cloth $ 8) should be compulsory reading for all politicians and high authorities.

A major related topic, well-known to foresters as early as the 1920's but by Eckholm brought before the world forum, is the firewood crisis. People need fuel to cook their food, one ton per head of the population annually. In fact, about half the world's harvest of wood is consumed as fuel. I well remember in 1973 in Central Java a constant stream of people walking up the mountains and coming back loaded with wood. This caused the erosion which has brought down the shocking amounts of silt that are filling up artificial lakes like Ambuklao Dam in Luzon and Jatiluhur in west-Java.

A working group of the Netherlands Committee for International Nature Protection made a study of these and other problems, to make a plea with the Government to incorporate ecological considerations in their policy-making. Dr. M. Jacobs of the Rijksherbarium edited a 99-page memoir, which was submitted to the Advisory Board on Overseas Development. It calls attention for several priorities: integrated planning, birth control, reforestation, land reclamation, environmental education, support of nature conservation, Environmental Impact Statements, all stemming from the conviction that the interests of ecology and of economy are identical — if only considered in terms of centuries of even decades.

Fruitful work along these lines can be accomplished. The constant aim is land use in such a manner that bio-productivity is retained indefinitely. Conservationists can give sound advice. For instance, it is fine that the Cibodas reserve is extended so as to contain now all primary forest on the Pangrango-Gede slopes, but it will be to no avail if the people nearby are not stopped from cutting the trees. To lift the pressure off the primary forest, the logical step seems therefore to plant firewood: fast-growing pioneer trees, common but by no means common enough, easy to saw and to burn. In fact, this might make a good pilot project for integrated planning.

Such planning, and firm execution of it, could prevent the terrible waste of forest and land so common in many tropical countries, which end in irreversible ruin. Meijer has described it from south Sumatra, where he saw the disastrous results of haphazard transmigration. Actually, the ecological values of water, soil, vegetation, fauna, and biological balance can be retained at extremely low cost, to the everlasting benefit of all people in the region. Absolute protection of forests on watershed and in catchment areas above townships is a priority of such vital interest to communities as a whole, that any punishment is justified to prevent damage; but it seems again that it is conservationists who must tell and show the authorities what is really going on with their land and other natural resources, and remind them of their terrible responsibility.

Enough ecological mishaps have now been observed to welcome persons educated in ecology and conservation to speak up. But their advice has little impact unless they have seen, listened and understood. Meijer has already set an example, by travelling to a variety of places in south Sumatra, where he talked to people about their land use problems; his account of these conversations in 'Indonesian Forests and Land Use Planning' could open the eyes of many.

Good things grow slowly, including the right attitude towards ecology and development. If they grow simultaneously on both sides, positive results — badly needed as they are — will materialize faster.

The case for Hawaii. 'Mystery Surrounds Land Sale' read a headline in the Hawaii Tribune Herald of 8 January 1976. Involved was 12,800 hectares above Hilo to a Hong Kong Company, whose negotiator said that he had no idea what type of business the company is engaged in or what it intends to do with the land. But interest has been expressed for a long-range commercial tree planting operation, and a big survey was made. The company bought the land for $ 6 million, according to its press release. All but about 520 hectares are in state conservation district.

On 13 January, 1977, Dr. Otto D e g e n e r sent a long open letter to the Chairman, Land and Natural Resources Department, Box 621, Honolulu, Hawaii 96809. Quotation: "With sugar and pineapple companies either going bankrupt, going out of business or engrating to more favorable business climates in Central America, Philippines, Taiwan, etc. tourism may well become the chief source of income within the next few years for the Islands if carefully protected from questionable schemes. Why does no one hear of a tourist trade in once fabulous Madagascar? The Malagasy, now impoverished, wrecked it before it was born by excessive lumbering, foolish farming and ranching practices, and savage hunting of even the many different, endemic, cuddly lemurs for food - what cannibals! The Australians, on the other hand, have a multimillion dollar asset in their koala bear. Most older residents of the Hawaiian Islands, due to neglected biological schooling, are rushing to emulate Madagascar's blunders."

Every politician or responsible person in Malesian countries should take this to heart as well. For more details, contact Dr. O. Degener, P.O. Box 154, Volcano, Hawaii 96785, U.S.A.