

## VI. MISCELLANEOUS INFORMATION

### a) Research and Publications (*continued from page 3206*)

The rice weeds project. In 1976, a joint project was set up under the aegis of the Netherlands University Foundation For International Cooperation (NUFFIC, Box 90734, The Hague), by the universities of Utrecht and Amsterdam and the Royal Tropical Institute (KIT) on the Dutch side, and BIOTROP (Box 17, Bogor) on the Indonesian side. Coordinators are Professor R. van der Veen and Mr. P.J. van Rijn. Its objective is the study of weeds and their ecology in the rice fields of Indonesia.

A sharp distinction between dry and wet rice fields cannot be made for this kind of work: the dikes in the wet rice areas often carry dry rice weeds, and where locally fields are irrigated but part of the time, the weed flora assumes a mixed or successional character. More workable is the distinction between permanent rice fields on the one hand, and those under shifting cultivation regimes on the other; the latter have been excluded from the study.

The taxonomic and distributional side of the work is done by Mr. R. J. Dekker on the Dutch side, and Mr. Soemantri Wirjardja

on the Indonesian side, with headquarters at BIOTROP, Bogor. Inventories supported by collections were made of course in various parts of Java, Sumatra, west and south Kalimantan, SW. Celebes, and the Lesser Sunda Islands as far as W. Timor; the altitude covered goes from sea level up to 1200-1300 m.

As a result of this collecting, c. 4000 numbers have been gathered, most of them with up to 6 duplicates. Collecting was done in one institutional series under the letters NUFFIC. The plants are still to be distributed; presumably the BO and L Herbaria will receive a set. The collections have been mounted; these specimens will probably be retained in the BIOTROP building, a few km above Bogor. There is at present no other herbarium in BIOTROP custody than this weed collection. Seeds and seedlings are receiving due attention, in both field and indoor work, with which Indonesian participants are occupied.

Mr. Dekker is preparing a descriptive handbook on these weeds; it will contain about 250 species. All of them are being figured with a full-page plate by the draftsman Ahmed S a t i r i. Mr. Dekker will stay on through 1980, and hopefully a few months in 1981, and thereafter prepare the book for the press. Mr. Soemantri is engaged in the preparation of a series of Weed Identification Sheets for local use (explained in BIOTROP Bull. 11: 115-120. 1979).

Experimental work is done, also together with Indonesian counterparts, first by Mr. T.L. Pons, now by his successor Dr. J.H.H. Eussen. They study competition of the weeds with rice, to see how sowing densities and changes in the water level can be used to influence the balance, without resorting to herbicides.

Weeds of the vegetables in the highlands of Java were studied by Mr. Ary P. E v e r a a r t s, as part of an Agricultural Technical Assistance (ATA) project of Dutch aid to Indonesia. Field work was done between January 1976 and October 1978. Miss Sateyati of the Horticultural Research Institute at Pasarminggu near Jakarta supervised the work on the Indonesian side. Technical facilities were given by the Horticultural Research Station Segunung, in Pacet, west Java, where field trials on weed control and greenhouse observations are carried out. An island-wide inventory of the weeds was made. These weeds differ from those in the tea plantations in being more adapted to short rotation crops, and therefore having more annuals among them.

The principal weeds are 35 in number and these will be written up in a booklet of the above title. Descriptions of plants and seedlings will be given, plus ecological details, and of each species a plate by no less an artist than Moehamad T o h a. After return to Holland, Mr. Everaarts at the Rijksherbarium, Leiden, carefully checked up all details; the book will be published in the course of 1980 by the Horticultural Institute Segunung.

In that institute, but also at the BO- and L-Herbarium, a reference collection of 375 specimens has been deposited. Mr. Everaarts can be reached through the Editor of this Bulletin.

Flora of Thailand volume 4 (2) is in the press. It contains the fern families Aspleniaceae, Davalliaceae, Lindsaeaceae, Oleandraceae, Parkeriaceae, Pteridaceae, and Vittariaceae.

The alpine flora of Mt. Kosciusko (2228 m) in New South Wales at 36°27'S, the highest mountain of Australia, has been written up in a forthcoming book, which may be of great interest for our understanding of the Malesian mountain flora. Contact Herbarium Australiense, Box 1600, Canberra ACT 2601.

Ethnobotany, Sarawak. Mr. Paul P. K. Chai of the SAR-Herbarium completed an MS on 31 species for the Sarawak Museum Journal.

A Key to Queensland grasses (all genera and species) is expected from the press in the first half of 1980. Contact Queensland Herbarium, Meiers Road, Indooroopilly, 4068, Australia.

Ferns of Queensland is a book now in the stage of proofreading. Contact the Queensland Herbarium, Meiers Road, Indooroopilly, 4068, Australia.

Ceylon remains a focus of interest at the Südasiens Institut, Box 10 30 66, Heidelberg, B.R.D. A volume of 8 contributions about fisheries, hydrology, meteorology, tea cultivation, &c. is in preparation. Research into the state of the remaining montane forests will be continued in 1980. Contact Professor U. Schweinfurth.

Field and laboratory studies of intertidal benthic algae in the Townsville region is the title of the Ph.D. thesis prepared by Dr. Yinam Ngan at James Cook University of North Queensland. It deals with systematics, distribution and seasonality, and spore liberation, germination and sporeling growth in selected species.

Pasoh in Negri Sembilan, Malaya, a forest reserve of 650 ha, was studied by 70 scientists. The Malayan Nature Journal 30 (2) of 1978 carries the results in 30 papers (The Malayan Nature Society, Box 750, Kuala Lumpur, Malaysia, Mal\$ 25). We list some salient points.

Pasoh lies at 75-150 m elevation, receiving c. 205 cm rain, quite evenly divided over the year. In 10 plots totalling 11 ha, 5907 trees of 10 cm or thicker were measured, 8-10% exceeded 40 cm  $\phi$ . They belonged to 460 species. Dipterocarpaceae are 7-14%, Euphorbiaceae 5-16%, Burseraceae 5-9%, Myrtaceae (mostly Eugenia) 4-7%, Leguminosae 4-7%, Sapindaceae 2-5%, Myristicaceae 1-5%, Guttiferae 2-4%. In comparison with Manaus in Brazil, El Verde in Puerto Rico, Barro Colorado in the Panama Canal, Adiopodoumé in Ivory Coast, and Yangambi in Congo, Pasoh has the most even climate, is less disturbed than most others, and is the richest in species.

There is a high heat capacity of biomass and high wind velocity due to low leaf area density. Light intensity was studied from 55 m to ground level, every 2 m. Maxima of leaf biomass in trees occur at 30-35 m, 20-25 m, and below 1.3 m. Wood biomass peters out upwards, while lianas have a maximum at 20-35 m. Correlations between trees and soils were looked for, but the only site correlation found was one between girth increment and altitude. Average leaf size decreases from basalt to sandy podzol, but as smaller leaves cast less shade, a larger area of photosynthetic surface

can be packed into a forest of unit height. Soils of Pasoh are much poorer than under forest in S. Thailand or Ghana. Biomass increment may be 5 tons of dry weight a year per ha. Net productivity is 25-50 t/ha/y, gross productivity 70-100; forests in S. Japan attain 25-30 and 50-60. "The tropical rain forest is not a type of plant community with so high productivity as commonly imagined".

Of insects, 37,198 were sampled (84% of them flies) at various heights. In 100 g of litter, 796 soil mites were found. Of termite nests, 289 in a ha were found, belonging to 54 sp. Total biomass of 4 termite sp. was 6.05 kg ash dry weight per ha. In 15 ha of understorey, 630 birds were counted, in 50 sp., with a joint biomass of 18 kg; ranges of activity are 400-500 m. "Obviously, the 630 would have required a good deal more than 15 ha of habitat to survive".

Tree fall and death amount to 2 tons/ha/y in 400 tons of biomass. Litter is decomposed for 95% in 11 months, vs. 10 years in S. Japan. Small litter fell with 10.2 tons/ha in 1972, but 7.5 in 1973; composition did not vary much: 17% twigs, 72% leaves, 2% bracts and scales, 3-5% flowers and fruits, 4-5% other. Nutrient contents are in kg/ha out of 10 tons: N 119, P 3.2, K 37.4, Ca 82.0, Mg 20.7, Ash 531. Leaf-feeding *Macrotermes carbonarius* makes off with 32% (= 38.8 kg/ha/week) of the leaf litter to its mounds, of which there were 24 in 0.6 ha.

A total sum of Mal\$ 1,150,000 was spent on these ecological studies. This amount may roughly equal the timber value. If this is so, we may ponder how expensive logging is, and how cheap is scientific research. A real fright struck me when Dr. Salleh, the Director of the Forest Research Institute at Kepong, said: "Yes, I think we can retain Pasoh." So forces at work to destroy even this small, priceless study area perhaps nearly prevailed!

Philippine cooperation to Flora Malesiana. Following the journey of C. Kalkman & W. Vink (see *pages 3207-3208*), the National Research Council of the Philippines made grants available for revision work covering Malesia. Beneficiaries are Professors D. R. M e n d o z a : Papilionaceae-Phaseolinae, and J. V. S a n t o s : Gramineae-Rottboelliastrae and Coelorhachastrae.

Trees of Sabah volume 2 was expected from the press towards the end of 1979. It will deal with Elaeocarpaceae, Lecythydaceae, Rosaceae, Theaceae and others. Contact Forest Research Centre, Box 1407, Sandakan, Sabah, Malaysia.

A Manual of the Rattans of the Malay Peninsula by J. D r a n s - f i e l d, was expected from the press late in 1979, in the Malayan Forest Records. It can presumably be ordered from the Forest Department, Jl. Swettenham, Kuala Lumpur, Malaysia. The price is Mal\$ 20, equals c. US\$ 10.

The text and illustrations of the first (of three) volumes of the Handbook to the flora of southeastern Queensland will probably go to the press in the course of 1980. It includes dicots up to Sapindaceae in the Engler system.

A 1,000,000 vegetation map of Sumatra is in preparation under a joint project of BIOTROP (Box 17, Bogor, Indonesia), the Institute of Vegetation Mapping in Toulouse, France, and the University of Montpellier, France. Of the latter, Professor F. H a l l é is working in Indonesia since mid 1978, together with his collaborator Mr. Y. L a u m o n i e r, and several assistants and counterparts. From remote sensing data combined with ground truth, and profile diagrams, work on the South Sumatra Sheet is well on its way.

Bibliographia Lauracearum. For personal use, Dr. A. J. K o s t e r - m a n s had an interleaved copy, which he kept up to date. By June 1978, when he left Leiden for Peradeniya, Ceylon, two xerox copies of it were made. One remained at the Rijksherbarium, the other was sent to the Faculty of Pharmaceutical Science, University of Kyoto, Japan. The original book was sent to Peradeniya, but was lost in the mail. Thereupon another copy, made from the Leiden one, was sent; it reached Dr. Kostermans early in 1979. With it, he is now restoring the information in another interleaved copy.

Investigations into the distribution and systematics of mangrove species have also been in progress since 1974 at the UPNG-Herbarium. Part of these were published in the booklet Mangroves of the Port Moresby Region (1975). A comparatively small but distinct difference between north coast and south coast mangrove floristics exists, evidently aggravated further in more marginal habitats.

Other research, contributed by I. M. J o h n s t o n e, has focused on the distribution, ecology and occurrence of seagrasses and marine algae. Many new records and some new taxa in the former have been revealed. Dried and liquid material has been collected.

R. J. J o h n s at Bulolo has been continuing studies into the fern flora of New Guinea with the aim of writing a general handbook, with keys, illustrations, and maps. A small section has been circulated for comments within Papua New Guinea. Studies on patterns of forest regeneration also continue.

A. H a y has been continuing studies on palms, and recently located *Sommieria* sp. in the vicinity of Vanimo. Initial studies indicate that this genus was misplaced in the Arecoideae. Work on a general handbook to New Guinea monocots is continuing.

A balloon to photograph the rain forest was developed by Drs. A. & C. M. H l a d i k, Ecologie, 4 Avenue du Petit Château, 91800 Brunoy, France. In the course of 1978 they began experimenting in Gabon, Africa. From the U.S. Army they obtained a 12 m<sup>3</sup> zeppelin-shaped bright red balloon. When the weather is quiet and sunny, they get it out of its shelter of corrugated iron. Hydrogen is obtained by combining a compound of silica and sodiumhydroxide; meteorologists use it, too, in remote places. The camera weighs 3 kg; it is a 25 by 20 cm polaroid, which has the advantage that prints are available immediately after landing. It is operated by radio signals, and hangs in a triangle of metal, which makes it manoeuvrable by means of a cable. An extra wheel (without tube or tyre) has

been welded to one of the rear wheels, on it is the cable, of a specially light sort, 2 grams per meter. The car is jacked up, the cable attached, the wheels are turned slowly, and up goes the balloon. The lens is wide-angle: at a height of 100 m, it covers the same width. A useful height to work from is 250 m, from which about 4 ha of forest are photographed, at a much cheaper price than when a helicopter must be hired. The prints that I saw are beautiful, and in combination with ground truth, many more phenological facts can be learned from them than from an observation platform in a tree. During a visit to Wageningen in May 1979 they lectured on the new tool and showed slides; their paper was published in *Adansonia n.s.* 19 (1980) 325-336, 4 fig.

Canopy is a monthly newsmagazine published by the Forest Research Institute, MNR, College, Laguna 3720, Philippines. Volume 5 was completed in December 1979; each issue consists of 16 pages, 80 by 22 cm, printed in brown and green, 4 column. The contents are varied, the longest papers about 3 pages, but mostly cut up. The tone is popular, sense of duty and ecology are advocated. Editor is Conrad Fontanilla. No indication of a subscription price was found.

For *The Pterocarpus*, see page 3087, for *Sylvatrop*, see page 3088.

A Checklist of the vascular flora of the Port Moresby Region is being prepared by Dr. D. G. F r o d i n of the UPNG-Herbarium. This is to encompass the dry belt of SE. Papua as well as adjacent rain forest and the Sogeri subregion, with an inland limit of + 50 km and an altitudinal limit of 1000 m. The vascular flora is estimated at between 3000 and 4000 species. Families of flowering plants from A-Es are ready for publication, with work continuing on remaining families.

Research began in 1974, but has been underway more actively since the July 1978 herbarium fire. Records have been culled from collection lists (matched with locality lists) as well as from published sources and specimens at UPNG. Material in selected families has been checked at LAE, BRI, and CANB, especially in those where few recent precursory papers are available such as Acanthaceae, Boraginaceae, and Ebenaceae. In connection with the project, all early Papuan material in MEL has since 1974 been in the process of review, and improved localization for many collections has been possible. (This latter has been accomplished through use of the Cyclopaedia and new information accumulated on many collections.) It is hoped to produce a separate report on the MEL-collections.

Thonner's key to all families revised in English. Franz Thonner (1862-1928) was a scholar of private means. He made two expeditions to Congo, where he did anthropological work and made botanical collections; these were studied by De Wildeman. He mostly lived in Vienna, but according to Professor K.H. Rechinger he never visited the Herbarium; in 1918 he went to live in Prague. Much detective work yielded one obituary, in a journal of anthropology. On the only known photograph the explorer, with a large sun-hat added, has been mounted in front of a native hut. His lasting fame rests on the Anleitung zum Bestimmen der Familien der Blütenpflanzen. During five years of hunt, two second hand copies were found.

Herbaria in Holland, and also elsewhere, possess a number of copies for teaching purposes. In the plant taxonomy course for undergraduates, keys play a big role, since they compel students to look at plants and to learn terms applied to a useful purpose: identification. Part of the fun is to give them plants which staff members themselves did not even know at first sight. Thonner is the best work of its kind; it fails so rarely that the failures themselves became intriguing to the leaders of the courses: A. J. M. L e e u w e n b e r g at Wageningen, R. G e e s i n k and J. F. V e l d k a m p at Leiden.

Leeuwenberg was the first to embark upon a translation into English for a new edition, during the 1960's. He did 23 pages but, not encountering much interest, gave up. Years later, Geesink arrived at a similar idea, and casually mentioned it to Leeuwenberg; as a result, he could start at page 24. He shared the room with C. E. R i d s d a l e; the latter became interested, and suggested that he incorporate into the key the many footnotes with exceptions and special cases. Veldkamp soon joined them, and from 1975 on the three worked every Thursday evening, which thus became Thonnerstag in German. They regularly saw Leeuwenberg.

Although it is unknown how Thonner compiled his keys, it is presumed that it was virtually all done from literature. Engler & Prantl's Pflanzenfamilien was his main base. This work was scanned by the team, supplemented with later descriptions, and occasional dissections. The 7th and 8th editions of Willis' Dictionary supplied them with many new families, partly split off from others, partly really new; the former were doubly inserted. When in mid-1979 a first version was completed, its 173 pages were provided with an index to leads, and xeroxed in one hundred copies, to put the work on trial with other botanists. It was presented to the symposium in Berlin at the 300 year anniversary of the botanical institute. An exhibit demonstrated the relationship between Thonner's various works and editions.

The first edition of a world key, in German, was published in 1891. As Engler & Prantl's work was not yet complete at the time, part of the key was based on Bentham & Hooker's Genera Plantarum. In 1893 this key was translated into Japanese, and subsequently influenced Japanese and Chinese Floras. Thonner himself gave an English edition (1895), which contains additions and corrections, and hence can be regarded as the second published version of his key. He continued to improve it; the additions up to 1909 were included in the main body of the text, the later ones went into footnotes, until the second German edition appeared in 1917. This is also the last, and actually the third version.

Thonner also prepared keys down to generic level. This resulted in two works. In 1901 appeared the Exkursionsflora von Europa, 350 p., followed in 1918 by Nachträge und Verbesserungen, 55 p. This book was discovered in the Kew library and was unavailable in Holland; the Rijksherbarium plans to bring out a copy edition in limited numbers, in the course of 1980. In 1908 appeared Die Blütenpflanzen Afrikas, xvi + 672 p. + 150 pl., also consisting of keys to genera. It was translated into English in 1915.

To resume our story: after the Berlin meeting, several botanists took the keys to the test, and sent comments. The colleagues at Kew contributed much, and unexpectedly Dr. M. Schmid at Paris gave many suggestions

on New Caledonian plants. All these ideas, together with others from the team, were duly checked and incorporated; actually, at this moment not one page of the manuscript is without corrections. In the course of August, the text will be made ready for the printer. It will give a biographical note on Thonner, with bibliography, and the introduction to his key of 1917 in translation. Then the bibliographical history of the work will be discussed, and an account given of the present text. A glossary will be given, then the Key, and an index to the lead numbers. Early in 1981 it can be expected from the press. It was not easy to find a publisher who was willing to make a book at such a price that botanists all over the world should be able to buy it; the deal was made with PUDOC, Box 4, Wageningen, and Leiden University Press, Box 566, The Hague, The Netherlands, to set the price at c. Dfl. 30 for a paper copy and Dfl. 55 for a bound copy. Order: Thonner's Key.

Perhaps the present version could be stronger on tropical America; the team found this hard to verify. However, Pittier used it for his key to the families for South America (1917, 1926, 1939), and a few years later, Standley used his as the skeleton for his works on Mexico and Panama plants. (Connoisseurs diagnose Thonner's influence through the all-important initial forks, and certain key questions in critical spots.) On the other hand, the completeness time and again surprised the team. They estimate that Hutchinson's keys lead to the right plant in 60-70% of the cases, whereas Thonner's comes considerably higher than 95% .... provided that female or bisexual flowers are used. Geesink, who is well up in the Leguminosae, was able to make only one addition to the 26 occurrences of this group. Other large families may still harbour an occasional hitch: during this revision work, attention was concentrated mainly on the footnotes and 'split families', but the Saxifragaceae, this notorious dustbin, was straightened out, to 56 entries, up from 26 in the version of 1917.

Thonner's language is spare and consistent. He evidently did not presume any botanical insight present, and requests just plain looking. One lead via 'zygomorphic' flowers ends in the Asclepiadaceae, thus accommodating a few Ceropegia species with a curved corolla tube! Although the key will have over 2000 forks, all of them dichotomous, no arrival takes more than 25 choices. In all conceivable places, fail-safes were built in, e.g. in Populus where the lobed disc could be mistaken for a perianth. The number of errors discovered is astoundingly small. One is in an entry leading to Elaeocarpaceae, which said 'corolla irregular'. Veldkamp traced this improbability to Engler & Prantl, to find that the sentence continued '....ly fimbriate' - on the reverse of the page, where Thonner apparently had not looked!

No doubt Thonner was a remarkable person. If any reader comes across biographical data, let him by all means communicate them.

b) Herbaria, Gardens, Organizations (continued from page 3214)

UPNG-Herbarium, Port Moresby. The total damage of the fire in July 1978 (see page 3211) was calculated at K 360,000 = US\$ 420,000. It was discovered that all university insurance had been cancelled in 1977, all fire alarms disconnected, and no emergency telephones were available. The



responsible official had resigned a few months before the fire. Finding funds for a new building (which also must house a geological collection) proved unexpectedly difficult. Lacking insurance, compensation must be sought from the government. Student unrest at the University did not make matters rosier.

Present plans for the new Herbarium call for some 70 sq. m to encompass a collection room for 30-40,000 specimens, office, laboratory, and hand library. According to a note in *Taxon* 29 (1980) 14, it looked as if approval was forthcoming and construction could start before long. Until new space is available, such routine activities as sending materials out on loan — much was salvaged from the fire — mounting, &c. cannot be undertaken.

The PNH-Herbarium opened a new Botany exhibit in November 1979. The curator, Dr. R.M. del Rosario, expects to complete the new 'Patio Botanico' at the new site of the Museum in the former Congress Building, Rizal; Box 2659, Manila.

In the BRI-Herbarium, transfer of information from the labels of all 330,000 specimens will be completed mid-1980.

Near Samarinda a Reforestation Research Center will be built, for Malawarman University, with Japanese government assistance to an amount of Rp. 4.5 billion, or US\$ 7,500,000. Its activities cover the Lempake transmigration area. Construction would begin in February 1980.

A Biological Centre in Kuching, Sarawak was established with the help of Mr. Herbert V o i g t, a GVS volunteer for 3 years. He left in July 1979. More than 700 species were planted, plus 500 orchids, but nearly 200 orchids died. Planting is still in progress, writes Mr. Paul Chai; living plants and seeds are collected from all over Sarawak.

Storm forest in the Solomons. Early in 1979, staff of the Forestry Division (Honiara, Solomon Islands) revisited the site of T. C. W h i t - m o r e 's study of cyclone forest at Kolombangara (1974, Commonwealth Forestry Paper 46). Some plots had been lost to commercial logging, but most plots survive at Merusu, Sandfly, and Shoulder Hill. Girth increment was measured, and the data, together with others on big tree species and seedlings, were forwarded to Forestry, South Parks Road, Oxford. From a letter by Mr. K. D. M a r t e n.

Sydney. From the latest ASBS Newsletter we learned with great pleasure that the Premier of New South Wales, Mr. N. Wran, has announced that a new Herbarium building will be built.

Thirty years overdue! Congratulations to Larry and Barbara J o h n - s o n for their tenacity and fighting spirit.

A field station in Ceylon. Several years ago, Drs. G u n a t i l l e - k e (Botany, University of Sri Lanka, Peradeniya, Sri Lanka) proposed construction of a field station in the Sinharaja Forest in the SW. part of the island, but nothing materialized. In 1978, the National Science Council took interest. It was about time; the Sinharaja Forest, the only surviving plot of lowland forest in the island, after having been logged

halfway, has now become a Man and Biosphere reserve.

Dr. A. J. K o s t e r m a n s made the suggestion to build the station 5 km inside the forest, where a large concrete floor was, plenty of good water, and the forest very attractive. Resistance had to be overcome from the Chief Forest Conservator, who insisted that the station be built outside the forest in the village of Waru, but when people of the University, the Wildlife Department, and the National Science Council all expressed themselves for a place inside the forest, he graciously gave in. But help to protect the forest from loggers is perhaps needed for a long time.

Before the end of 1980, the simple structure may be ready. It is easily accessible by road, there are two guards. Work could be done e.g. in life plant study for anatomy, blastogeny, morphology, taxonomy, in plant-animal ecology, animal behaviour, also silviculture, in absence of a forest research station in the island. A natural arboretum could be staked out to grow rare old trees. Students contact Dr. Gunatilleke. They should be prepared to bring their own equipment.

Botanic Gardens, Peradeniya. Many of the c. 4000 trees were checked by Dr. A. J. K o s t e r m a n s, who set up a herbarium of these trees. He discovered 8 tree species that are not known to occur any more elsewhere in Ceylon and may well be extinct except in the Garden, among them a huge Diospyros atrata (Ebenaceae). Rejuvenating them would mean quite a deviation from the current pattern of borders with exotic flowers, to please visitors who drive around the garden in cars with music full-blast. But doing would mean having fresh endemic trees for perhaps another century.

Visitors to the BKF-Herbarium, Bangkok, Thailand. From 28 January to 14 March 1979, botanists from the New York Botanical Garden and Osaka City University, headed by Prof. Dr. Tetsuo K o y a m a made botanical excursions in Thailand. The collections are mainly Cyperaceae, Smilacaceae, Ranunculaceae and edible plants from the northern and peninsular regions.

During March, Dr. J. D r a n s f i e l d, Royal Botanic Gardens, Kew, collected quite a number of palms in Khao Yai National Park and Khao Chong Botanical Garden, Trang.

On his way back from Japan, Dr. Bertel H a n s e n, Copenhagen, Denmark (C), spent 2 days in May 1979 in the Herbarium studying Xyridaceae, Balanophoraceae and Acanthaceae.

Prof. Kai L a r s e n and his wife of AAU spent 2 weeks in May 1979 in BKF, for the study on Bauhinia, Cassia and Zingiberaceae.

From 2 May to 14 June 1979, Dr. J. E. V i d a l (P), accompanied by his wife, visited BKF and spent a full month trip to northern Thailand, accompanied by Dr. C. Niyomdham for studying medicinal plants in Karen Villages.

Dr. G. S. M o g e n s e n (C), in cooperation with Mr. D. Phanichaphol from BKF, spent a half month trip (15 July-5 August) to Chiang Mai, studying sporogenesis in Macromitrium (Bryophyta).

The Thai-Japanese Botanical Expedition 1979 took place during October-December. The Japanese team with Dr. T. S h i m i z u, Shinshu University, as the leader, was accompanied occasionally by Dr. T. Santisuk, Mr. Ch.

Charoenphol, Mr. T. Phanichaphol and Dr. C. Niyomdham from BKF; the expedition made quite a collection from the north to the peninsula of Thailand.

Holotypes of G. Kunze's pteridophytes in Genève. B. S. P a r r i s (CGE) published a note in Taxon 27 (1978) 567. Some of Kunze's holotypes were not destroyed at Leipzig. They were in the possession of Stefano Moricand, and now in the G-Herbarium; H. Zollinger consulted them.

At the CAL-Herbarium, 15,110 duplicate sheets from Regional Circles were incorporated; 1250 sheets were incorporated in the Regional Herbaria. Of Wallich material, 103 collections were taken out of the general herbarium and kept separate in the Wallichian Herbarium. In the Type Herbarium, 467 sheets were incorporated.

The Regional Botanist at Kew has sent over 7000 negatives of types of Indian plants from the K, BM, and LINN Herbaria. Also, data-cards recording other collections of Indian taxa were deposited in the Type Section.

On 25 July 1979, near the end of his tour through Indonesia for the sake of conservation, H.R.H. P r i n c e B e r n h a r d of The Netherlands opened the Ketambe Research Station by the G. Leuser Reserves in N. Sumatra (see *page 3016*). It stands on the quiet western bank of the Alas River — although the opening ceremony and ensuing festive banquet were attended by c. 200 persons. But normally, one hears only the forest concert. Near it are two small wooden sleeping houses for visiting scientists, and houses for resident workers. The station — the first in the whole of Sumatra — offers excellent accommodation for indoor study and basis for field studies. A small nucleus library is already present. Scientists who have an interest in working there, are advised to contact Dr. H. D. R i j k s e n, ATA, Box 109, Bogor.

For two years the phytotron for ferns and mosses (see *page 3017*) in the Leiden Botanic Garden is now in service. Rain forest mosses developed quite well, sometimes even spectacularly, but not always in normal ways, to the chagrin of Dr. A. Touw. Ideas for improvement are not all possible to realize; this unfortunately will limit the selection of mosses that can here be grown. The ferns do better.

The Bishop Museum, Honolulu, Hawaii, celebrated its 90th anniversary in December 1979. An article is devoted to it in the ASC-Newsletter (Association of Systematics Collections), vol. 7 (1979, October) 41-47.

The Museum was established by Charles Reed Bishop as a memorial to his wife, Chiefess Bernice Panahi Bishop, who died in 1884, the last survivor of the founding dynasty of the Hawaiian monarchy. She left a large collection of ethnographic and historical items.

The first Director, W.T. Brigham, extended the Museum's activities to include botany and zoology. The Museum sponsored the first Pacific Science Congress in 1920 and several expeditions to various parts of the Pacific. At present, the staff numbers over 200; the departments are: Anthropology, Botany, Entomology, History, and Zoology.

Chairman of the Botany Department (the BISH-Herbarium) since 1967 is Dr. P. v a n R o y e n, with a staff of 4. The Herbarium Pacificum con-

tains over 420,000 specimens, including 5500 types. Of Hillebrand's materials the originals were destroyed in Berlin, but duplicates survive here. Coverage is world-wide, with emphasis on the Pacific and Hawaii. Over 500 research publications have been based primarily on these holdings.

In 1961 the Wau Ecology Station in Papua New Guinea was established; it is an annexe to the Bishop Museum.

Herbarium Australiense (CANB) was established about 50 years ago, shortly after a visit to Australia by the then Director of Kew, Sir Arthur Hill, in 1928. He pointed out the need to maintain State Herbaria in all the Australian capitals, but foresaw the future of Canberra as a centre for nation-wide research. After a long and modest period of infancy during which the Herbarium mainly served as a tool for plant identification, its scope gradually widened. When the Division of Land Research became active in Papua New Guinea, it set up an independent Herbarium, which grew rapidly, while the original Herbarium, under the Division of Plant Industry (both of CSIRO) occupied itself with Australia. In 1968, the two Herbaria were placed under one curator, while the staff members remained in their own Divisions. It was not until July 1973 (when work in PNG was slowed down) that staff were gradually transferred to Plant Industry, and the merger became a fact. In 1974, the first part of a new herbarium building with adequate facilities was occupied, and it was hoped that the other part would be ready in 1980. Unfortunately, in mid-1979 the plans were shelved for at least 3-4 years.

This means that activities have to be conducted in half the space needed, which is not easy with holdings of now 360,000 sheets although storage in mobile steel racks gave about 40% relief. In 1978, 507 visits were received and 8568 specimens. For research, 2863 specimens in 32 loans were sent out, and 5153 specimens in 71 loans were received.

Two Herbaria, the FRI one at Yarralumla and the QRS one at Atherton, have been assumed status as part of the CANB-Herbarium, but will remain where they are.

Recently, a set of 1069 duplicate specimens collected in Australia by Robert Brown was transferred from BM to CANB.

This information was compiled from the Annual Report 1978, CSIRO, p. 32-35, 118-120, Director is Dr. H. J. Eichler.

The Andaman & Nicobar Circle of the Botanical Survey of India, in Port Blair has been shifted to the newly constructed, fully air-conditioned Herbarium building on 5 November 1979.

A medicinal plant garden has recently been started within the Calcutta Botanic Gardens, Howrah, India, with c. 125 species to begin.

A new field station of the Botanical Survey of India will start functioning in the course of 1980, at Gangtok, Sikkim.

Highlights of research activities of the Lembaga Biologi Nasional - LIPI, 1974-1979 is a 40-page booklet, obtainable from LBN, Box 110, Bogor, Indonesia. It lists 148 scientific, and 219 semi-popular and popular publications: a useful bibliographical source!

c) Symposia, Congresses, Societies, Meetings*(continued from page 3227)*

Weed Science Society of Indonesia (WSSI, or in Indonesian version HITPI) has its headquarters at BIOTROP, Box 17, Bogor; Dr. M. Soerjani is there in charge of the weed department. The newly introduced Indonesian term for weed is gulma; a synonym is tumbuhan pengganggu.

The WSSI held its 1st conference in 1971; the 200-page Proceedings (in English) was printed. The 2nd conference was held in 1973, no publication ensued. The 3rd conference was held in 1975; the 464-page Proceedings (partly in English, partly in Indonesian) was published in offset-form in ring-binding. So was that of the 4th conference, held in 1977, amounting to 89 pages (mostly in Indonesian). The 5th conference was held in 1979.

The Society publishes a somewhat irregular quarterly Weeds in Indonesia; the issues contain 12 to 48 printed pages in yellow cover. Here, too, there is a linguistic shift from English to Indonesian. A bibliography by J. V. Panchon in vol. 4 (1973) 18-31 of literature for identification lists publications by region, from Thailand, Indo-China, and Malesia minus New Guinea.

The Asian Pacific Weed Society (c/o Horticulture, University of Hawaii, room 102, 3190 Maile Way, Honolulu, Hawaii 96822, U.S.A.) published a stencilled Newsletter, and also maintains contacts with the Weed Science Societies of the Philippines, of Thailand, and of Malaysia.

The International Working Group on Dipterocarpaceae will hold its 2nd Round Table conference at the Forest Research Institute, Kepong, Selangor, Malaysia, from 27 June to 3 July 1980. The Proceedings are to be published by the host institute; contact Dr. Francis S. P. Ng. A report is due in the next FMBulletin.

The 2nd World Wilderness Congress is to be held from 9 to 13 June 1980, in Cairns. Contact Box 823, Cairns, Qld. 4870, Australia.

Aberdeen-Hull Symposia on Malesian Ecology. The Transactions of the 5th and 6th Symposia are now available from Dr. Adrian Marshall (Zoology, University, Aberdeen AB9 2TN, U.K.) at £ 4.00 apiece. They are:

5. JONG, K. (ed.). Biological aspects of plant genetic resource conservation in Southeast Asia, xiv + 95 p.

6. MARSHALL, A.G. (ed.). The abundance of animals in Malesian rain forests, 133 p.

Société d'Ethnozologie et d'Ethnobotanique (SEZEB) was established in 1965. Secretary is Mme. C. Berthe-Friedberg, Ethnobotanique, Muséum d'Histoire Naturelle, 57 Rue Cuvier, 75005 Paris, France.

It issues twice a year a newsletter of c. 20-35 stencilled pages, containing news on various work all over the (sub)tropics, and also periodically a bibliography (not annotated) on Ethnobotanique et Ethnozologie / Médecines traditionnelles. Membership costs Ffrs 40, for students 15.

A Flora of Thailand meeting was held at Kyoto in May 1979. The lectures are in press with Acta Phytotax. Geobot. 30 (4/6).

Dr. D. G. F r o d i n (UPNG) attended a workshop on mangroves held at the Australian Institute of Marine Science near Townsville in the latter part of April, 1979.

The Papua New Guinea Botanical Society is to meet again in Lae in April 1980, after a hiatus of two years. A two-day meeting is to look at various aspects of botany, utilization and conservation of lowland rain forest (0-600 m).

The Second International Symposium on Mangrove Biology and Utilization is to be held in Port Moresby in July 1980 (the first was at Honolulu in 1974).

Republic of Kiribati is now the name of a collection of Pacific islands across the equator. From W to E: Ocean I., Gilbert Is., Phoenix Is., and then S of Hawaii from N to S: Washington, Fanning, Christmas Atoll, Maiden, Starbuck, Vostok, Caroline, and Flint. Capital is Tarawa in the Gilbert Is. The total land area is about 250 sq.km, the total sea area within the 200 mile limit, 5 million sq.km. The number of inhabitants is c. 60,000, mostly Micronesians. (From Pacific Sc. Assoc. Information Bull. March 1979, p. 19-21, map.) But by all means let scientists use the established names without political connotation.

The Philippine Association of Plant Taxonomists (Box 2659, Manila) was established on 18 August for the purpose of promoting the advancement of plant taxonomy in the Philippines and to act as a center of information regarding the flora of the country.

The Association has its early beginnings from a similar organization formed in 1963 as the Philippine Society for Plant Taxonomy. The latter brought together the prominent botanists in the country who were then engaged in teaching and taxonomic research. Under the leadership of Dr. Eduardo Quisumbing, President of the Society, its main activity was the preparation of the 'Flora of Mt. Makiling, Laguna Province'. The unveiling of the statue of Sebastian Vidal, noted Spanish botanist who contributed greatly to early taxonomic studies of Philippine plants, at the Mehan Gardens in Manila, was one of the noteworthy accomplishments of the Society. It, however, remained inactive for several years until its revival late last year under its present name. The membership of the Philippine Association of Plant Taxonomists number 25 botanists, all actively engaged in taxonomic studies of Cryptogams and Phanerogams.

The holding of a symposium on 22 September 1978 with Prof. Dr. C. Kalkman as guest speaker, on the topic 'Plant Taxonomy and its Role in National Development' was the first activity of the organization. Also during the symposium the significance of the Flora Malesiana project was discussed briefly by the accompanying guest, Dr. W. Vink. On 8 December 1978, a symposium on 'Medicinal Plants of the Philippines' was held at the Planetarium of the National Museum.

One of the chief concerns of the present Association, under the leadership of Dr. Gregorio T. V e l a s q u e z, President, is the participation of the PAPT in the Flora Malesiana project of the Rijksherbarium in Leiden. The botanists who will undertake correlative studies are: Dr.

Jose Vera Santos (Gramineae), Justo Rojo, Demetrio Mendoza and William Guezo (Leguminosae) and Dr. Prescillano M. Zamora (Cycadaceae). The PAPT plans to conduct studies of the Flora of Polillo Islands, an area that has not been fully explored botanically. It is a well-defined site which can serve as link to the floristic distribution of the flora in this region.

The other elected officers of the PAPT are Dr. R.M. del Rosario, Vice President and Dr. Flordeliz R. Uyenco, Secretary.

d) Conservation (continued from page 3238)

The weekly Far Eastern Economic Review (Box 160, Hong Kong), occasionally carries substantial articles on the forestry situation in Malesian countries, like in the issue of 30 November 1979.

Thailand is already a net reporter of timber, Malaya and the Philippines will follow in a couple of years, and timber then will come on the red side of their budget. Spot shortages occur already. Meanwhile, uncontrolled depletions go on, for instance in Malaya, especially in Trengganu, Pahang, and Kelantan, where traditionally timber concessions have been issued "as a kind of political patronage". Loggers in Sabah and Sarawak are unwilling to sell below market prices to Malaya, and besides, it is cheaper to ship logs even to Korea than to Malaya. Regeneration does not work here, because of careless logging and poor supervision of seedling planting.

In Sabah no land is left for more concessions and even a timber man reckoned that "ecologically, the forests have already been long overcut". The government now buys up small concessions in the interior at bargain prices, then sells them to big firms.

As on Indonesia much has been said on *pages 3020-3024*, we can be brief. "Corruption has run rampant and, in certain cases, illegal logging became a veritable plague to legitimate concession holders". On Pulau Maya S of Pontianak in one month 20,000 cu.m of Gonystylus were stolen by some 100 logging gangs, directed by the very man who had been hired to end the practice, and it was rumoured that a monthly amount equal to US\$ 100,000 was channelled through the regional military command.

In the Philippines, authorized exports fell from 4 million cu.m in 1977 to 1.5 in 1979, and a total ban may follow in 1982. Still, firms scramble for a place on the exporters list, which is controlled by President Marcos himself. He reduced the annual allowable cut from 16 million cu.m in 1977 to 6 million, and recently declared certain lands as wilderness and ordered their closure to any form of commercial exploitation: mossy forests, protection forests, critical watersheds, and mangroves needed in foreshore protection. It was none too soon. Between 1966 and 1974, some 12 million cu.m of forest were destroyed; in the succeeding 5 years this slowed down to "only 6 million cu. meters". Eighty thousand people indulge in shifting cultivation, and also, "grave malpractices in logging have largely not been corrected". A 'rationalisation programme' started in 1975 has largely failed. The country's 341 sawmills operate at 29 % capacity, many are obsolescent, and located in rebel-controlled areas.

Thus we see the benefits of the timber boom crumble away in less than one generation. Let conservationists make themselves heard, so that some forest will still be there when the madness has subsided.

A UNEP Experts Meeting on Tropical Forests was convened in Gabon for 25 February to 1 March 1980, but actually held in Nairobi. Of the c. 55 participants from 25 countries, some 20 qualified as experts ... in the opinion of one (real) expert from the Netherlands. The U.S.A. sent 8 or 9 persons, Brazil 3, Indonesia none. Following some friction, FAO and UNESCO sent observers only.

An Overview Document had been prepared in advance, anonymously, but many knew that Dr. Norman Myers (Box 48197, Nairobi, Kenya) was the main author. He was absent from the meeting. The FAO man complained that it did not sufficiently recognize the social causes of deforestation, nor the productive functions of the forests. The UNESCO man found the suggestions for action too meagre and priorities unclear. Others had minor points of criticism, too.

It nevertheless occurs to me, that this 70-page Overview Document (UNEP/WG.35/4, 8 Jan. 1980), with its 253 numbered paragraphs, is the best account of rain forest problems so far. It is divided into a descriptive part (57 p., 203 par.) and a Programme of Activities.

Throughout, it puts emphasis on the multiple values and functions of the forests. While taking the postulate that tropical forests will be developed, it warns that the resource is exceptionally susceptible to irreversible degradation. Contrasts and relations with temperate zones are pointed out. Causes of forest degradation are well lined up: plantation agriculture, shifting cultivation, mechanical logging with its damage and wastage, and the poor shape of the institutional framework. Ways to reduce the depletion are fully discussed: ecological classification into areas for protection, manipulation, or replacement by plantations; improvement of silvicultural methods and logging practice; artificial regeneration. A vigorous plea is held for improvement of forestry services, training and research.

In the second part, consistently necessities are indicated at both national and international level, with pleas for conservation and wise use, highlighting again the multisectoral role of forestry, the need for inventoring the resource and monitoring the changes. Research should be both basic and applied. Agroforestry and community forestry are recommended. Finally, the division of responsibilities and funding are briefly discussed.

Some improvements could be made, to be sure; M. Jacobs wrote a 5-page comment, for instance, claiming attention for species richness as a key to understanding the forests, for evolution with its enormous spans of time, and for altitude above sea level. But the Overview Document could form the basis of an excellent small book on the rain forest resource.

The meeting, as recorded in the Draft Report by W.J. Lusigi, made some derogatory remarks about the luxury of museum forests, yet also arrived at the notion that the cost of tropical timber in no way reflects the expense in terms of deterioration of finite resources. An outline of goals was given and acclaimed, for realization by 1985, 1995, and 2000 and be-



yond. A Year of the Tree was proposed and considered. The conclusions of the meeting, still under consideration, may eventually be adopted by the United Nations. Thus concern for the tropical rain forests is expanding — along with deforestation.

Damage by logging is a sideline subject in an article by K. R. S. P r o u d, The Samunsam Wildlife Sanctuary, Sarawak. Tiger Paper 6 (2-3), p. 54-55 (April-July 1979). "Approximately 10.7 miles of secondary logging roads, which would produce a 100 feet wide swathe through the forest, and 18.1 miles of feeder roads resulting in a 50 feet wide belt of disrupted canopy along their lengths, would be needed as the basic road infrastructure to exploit the area proposed as a sanctuary (in the western tip of Sarawak, at the Indonesian border). In addition to the roads, 18.5 miles of skid trails would be required per sq.mi. of forest. (A skid trail is a tractor track cleared to exposed bare soil, the width of the tractor or larger — usually a strip 20 feet wide — along which the felled logs are dragged to the lorry loading site.)

The anticipated percentage of canopy cover that would be removed if the forest was logged was estimated to be from 33 % for the kerangas forest to over 67 % for the richer dipterocarp forest. By citing studies elsewhere in Sarawak the commissioners were able to indicate that with a logging intensity of 6-8 trees per hectare only 21 % of the forest would remain as undisturbed remnants after exploitation."

The reserve, 60 sq.km, was gazetted on 22 March 1979.

Consumers Association Penang, The Malaysian Environment in Crisis: Selections from Press Cuttings, 129 p. (1978, CAP, 27 Kelawai Road, Penang, Malaysia). Mal.\$ 3.00. — Cuttings from 1974 to date, all in English, reproduced in their original form, 1-2 on a page, grouped under 17 headings. Among them: Forest and Wildlife, Endau Rompin, River pollution, the Fishing crisis, Floods and Soil erosion, Water. Together they form an illuminating account of deterioration following disregard of environmental realities: the forests exhausted by 1989, no more fish in 42 rivers, the Gombak area a wasteland, beaches spoilt, fish beyond the reach of the poor, staggering rates of soil erosion, shortage of water at the Klang Gates Dam, charcoal prices up, saltish drinking water in Kuantan, garbage per capita tripled in 5 years.

The CAP offers a 22-minute 16 mm colour film 'Crisis in the Malaysian environment', which claims to be the first such film produced by a developing country. It is sold for M\$ 1000, or c. US\$ 485. Same address.

The WWF trustee for Indonesia is Mr. Julius T a h i j a, Chairman of Caltex Pacific Indonesia, an ardent conservationist. He has done much to improve the role of private enterprise in conservation, and Caltex has set a regal example by volunteering to build an Education Center at the Cibodas parking lot, far greater than the original plan under the Dutch-Indonesian cultural treaty provided for: this center cost US\$ 100,000, and its construction is nearing completion. No better place could be conceived for this purpose, near one of the best-known conservation and recreation areas, strategically situated in west-Java. Caltex also has undertaken to train two of its engineers in environmental conservation, and

to conserve two beautiful lakes in its Beruk-Zamrud oil field in Riau, Sumatra. Bravo!

Sarawak: Gunung Mulu National Park (lately the name was thus changed from Gunong Mulu). The site is c. 4°N 115°E, the altitude from 60 to 2377 m, the area now 529 sq.km, with a proposed extension of 125 sq.km.

The results of the Mulu expedition (reported on *pages 3196-3198*) are forthcoming fast. On 12-14 September 1979 a symposium was held at the Royal Geographic Society's house in London, and all sorts of data about the Park will be compiled in a special volume of the Sarawak Museum Journal. A fine concise presentation was already made by A. R. H a n b u r y - T e n i s o n and A. C. J e r m y in *The Geographical Journal* 145 (1979, July) 175-193, 3 maps, 2 pl.; it gives 52 references. Late in 1979 appeared the Gunung Mulu National Park / A management and development plan, prepared by J. A. R. A n d e r s o n e.a., about 300 pages in all. While the sections on management were still under consideration with the Sarawak authorities, your Editor was happy to receive the descriptive parts, from which some data are here taken.

The Park is on the margin of the NW. Bornean geosynclinal belt, which after considerable activity during the Tertiary has been stable for the last 10 million years. The surface geology is simple: from Brunei in the NW to Mt. Mulu proper in the SE we find shale, alluvium, limestone, and shale/sandstone (or greywacke). On the Brunei border there are extensive terraces with kerangas; then come alluvial plains, then the limestone formations which go up to 1700 m; they contain large caves (the biggest, Gua Air Jenih, with c. 26 km of passages), and include the spectacular pinnacles which were depicted e.g. on the cover of *The Malaysian Forester* during 1978. Even in this relatively even climate — the months July-September are somewhat drier — the mean monthly river flows vary by a factor 10, the extreme daily flows differ even by a factor 100. Access at present is only by river: by the Baram and Tutuh from Marudi to Long Melinau; the distance of 144 km can be covered in ½ to 1½ days, with difficulty at low water. A road has however been projected through the Park (parallel with the Brunei border at c. 3 km from it), as part of a larger highway system to connect Sarawak's 4th and 5th Division.

The vegetation includes all the main forest formations found in Sarawak; they form a patchwork of 14 types, determined by altitude, exposure, topography, drainage, and soils. They are the Forest types: Mixed Dipterocarp Lowland, to 800 m; Lower Montane, at 800-1200 m; Upper Montane in three altitudinal facies (see Reviews under MARTIN); Limestone Scree; Lowland Limestone; Lower and Upper Montane Limestone; Alluvial; Kerangas; Peat Swamp (180 ha only but with a neat fourfold zonation); also Limestone Cliff and ditto Cave vegetation. All these types (except rheophytes, which I missed, although anyway in nearby Brunei these are richly represented) are briefly and expertly described by Anderson & Chai; this makes in itself an informative piece demonstrating forest variation within one area. Naturally, the MDF is richest: in three plots of 1.2 ha combined, 284 tree species were counted 10 cm or thicker. In montane forest (800-1200 m), on 4 plots of a combined area of 0.5 ha, 226 tree species 6 cm or thicker were found, but only 34 attained a diameter of 30 cm or more.

Most interesting are the (tentative) lists of plant and animal species in the report. We give the largest families: Anacardiaceae (20 species in 13 genera), Annonaceae (33 in 14), Dipterocarpaceae (115 in 8), Elaeocarpaceae (23 in 1), Ericaceae (34 in 4), Euphorbiaceae (87 in 30), Fagaceae (29 in 3), Gesneriaceae (30 in 9), Guttiferae (48 in 5), Lauraceae (63 in 12), Leguminosae (29 in 16), Melastomataceae (54 in 20), Meliaceae (35 in 7), Moraceae (42 in 2), Myristicaceae (27 in 4), Myrtaceae (67 in 7), Palmae (117 in 22), Rubiaceae (116 in 43), Sapindaceae (21 in 13), Sapotaceae (25 in 8); together there are 1525 species in 500 genera in 104 families, plus 442 species of pteridophytes in 119 genera (the families are obscure).

What to think of the list? Some families may have been better collected than others: it is evident that Dr. J. Dransfield went in hot pursuit after the palms, to which the orchids make a strange contrast with their 10 species. I also suspect that more than 11 Cyperaceae can be detected. The Dipterocarpaceae may be pretty complete, and are represented with 44% of their 262 Bornean species. As for the Euphorbiaceae, they came up with 26% of the 340 species distinguished by Airy Shaw in his recent revision for Borneo. The Anacardiaceae are represented with 28% of the 70 species in Ding Hou's work. Not enough is known about the other lowland families. The harvest in genera containing fruit trees is not precisely to determine but looks disappointing: Citrus species none, Durio 6, Mangifera 1, Musa 1, Nephelium 4, Sandoricum 3. These figures suggest that not all genetic resources are accumulated in one area, and that the Mulu forests must find their main strength in dipterocarps and rattans.

The lists of animal species name 67 mammals, 262 birds (including all but 3 of the 29 Bornean endemics and all 8 hornbills), 50 reptiles, 75 frogs, 47 fish, and 281 butterflies; no evidence, however, of orang-utan, Sumatra rhino, or banteng.

The Park is inhabited by Penans, who have four camps in or near the boundaries, and their trails traverse the Park in meshes about 5 km wide. Their staple food is wild sago from *Eugeissona utilis*. They have hunting, fishing and gathering privileges as long as they maintain a nomadic existence. Much collaboration with them was set up during the expedition, and the Management Plan is intensely concerned with their role in the future Park organization.

The one-hour film of the expedition spellbound the Rijksherbarium staff when it graciously had been made available to us; it also inspired deep respect for the great scientific enterprise with Britain and Malaysia as the main partners but with many others involved as well. The parts of the management plan under review show a just concern with the lowland forests and the extension is aimed to increase their area. This is conservation on a grand scale, worthy of Borneo's outstanding biological richness.

Address of Dr. A.C. Jermy, the scientific coordinator: Botany, British Museum NH, Cromwell Road, London SW7 5BD, England.

Western Samoa established a national park of 2800 ha on Upolu, named O Le Pupu-Pu'e, or Cliffs Mountain. In another reserve, created as a memorial, the writer R. L. S t e v e n s o n (Dr. Jekyll and Mr. Hyde)

lies buried. More in a paper by Ian G. Trotman, Parks 3 (4), p. 5-8, 5 fig. (Jan. 1979).

The World Conservation Strategy, a joint publication by IUCN, UNEP, and WWF, was launched in many of the world's capitals on 5 March 1980. It will presumably be widely publicized and distributed, translated and be commented on. It is directed to "government policy makers and their advisers; conservationists and others directly concerned with living resources; development practitioners, including development agencies, industry and commerce, and trade unions". It wants to generate environmental awareness, and provide outlines for wise use of the biosphere by harmonizing development and conservation. The three main objectives are: "to maintain essential ecological processes and life-support systems; to preserve genetic diversity; to ensure the sustainable utilization of species and ecosystems".

The presentation ceremony at the Hague was attended by about 200 conservationists, government authorities, politicians, and newsmen, H.R.H. Prince Claus of the Netherlands delivering an address on the occasion. During the press conference afterwards keen interest was expressed from various sides in the ecological component of overseas development.

While execution is strikingly fine, and each of the four parts (Preamble and Guide, Executive Summary, WCS, Map Section) invite reading, our interest naturally turns to Section 16, Tropical Forests and Drylands. The opening words "Tropical forests are an important renewable resource", are in my opinion misleading: the secondary forest is renewable, the primary forest is not, and this vital distinction is not made in the text. Sound emphasis has, fortunately, been placed on the richness of forests below 300 m, and the Dipterocarp forests are listed as a priority issue. A good thing, too, is the citation of the Lanly & Clement report of FAO (1979) with enough critical remarks to alert the reader about its biased approach.

Map 1 gives the range of 'tropical rain forests' over-optimistically: not actual distribution (far too much was drawn for e.g. S.India, Indo-China, and Java), but the range of climate suitable to rain forest growth. Map 3, devoted to 'priority biogeographical provinces for establishment of protected areas', incredibly fails to indicate any priority for the dipterocarp areas of Sumatra, Malaya, Borneo and the Philippines, and instead lists under 'second priority' for Tropical Rain Forests: Celebes and the Moluccas (where the forests are the poorest of Indonesia), and the Lesser Sunda Islands (where some monsoon forests exist but hardly any rain forest). The criterion listed for top priority has been occurrence of any reserves and for second priority the occurrence of 1000 km<sup>2</sup> of reserve area. This is too mechanical an application of numbers to be useful as a guide in conservation, where quality is decisive.

The Strategy is to be updated from time to time, and refined for countries or regions; before a second edition appears some further consultations could make the Strategy much more effective.

Nature Conservation and Wildlife Management Indonesia. Terminal report, vi + 57 p. + 10 maps (1979, PPA, Box 133, Bogor, Indonesia). FO:DP/INS/73/013 Terminal report. FAO, Rome.

This is the general summary of the work done by Mr. John H. B l o w e r and collaborators as advisers to the Indonesian Conservation Service from late in 1974 through 1978. Much of it was mentioned in previous issues of this Bulletin.

When going through it, one again becomes impressed by the size of the task, the vision on the part of the Indonesian Government to build up a conservation system to be proud of, and the enormous difficulties to overcome: the total number is approaching 200. We select a few news items.

Sumatra: for Siberut, W off Padang, a large conservation plan was completed, which provides for land-use in the whole island, and a 500 sq.km reserve in the N, to accommodate the 4 endemic primate species.

Java: the management of the Cibodas-Gede proposed National Park remains unsatisfactory, owing to pressure from visitors and boundary incursions. A study on the deer Axis kuhli in Bawean I. has been completed; prospects look good. Bali Barat: the reserve in the western panhandle continued to deteriorate and much attention is required.

Borneo: the original area of Bukit Raya, some 1400 sq.km, declared a Nature Reserve by the Provincial Governor in 1973 has unfortunately now been reduced to 500 sq.km, covering only the highest portion of the original reserve. The lower mountain slopes have for the most part been included in timber concessions.

The proposals for a Kayan River Reserve, 8000 sq.km of forest extending from 2000 m down to 100 m (mentioned more extensively on page 3037) here still hopefully reported have been, as I learned recently, turned down by the Forest Department!

Celebes: in the N arm E of Gorontalo, the Dumoga-Bone reserve has been proposed, 3000 sq.km, to protect the catchment of a large irrigation scheme that is to be executed with World Bank support. Most of it is hill and montane forest, up to c. 1950 m. In the pit of the E arm the Morowale reserve has been proposed, 2000 sq.km with intact lowland rain forest and a range of other habitats up from the coast to 2422 m. In the SE arm, the interesting Opa-Watumohai reserve has been proposed, 1860 sq.km, which includes much of the intriguing Opa swamp and surrounding seasonal rain forest, from slightly above sea level to 1000 m.

Moluccas: the proposals for Way Mual and Way Nua in central Ceram (see page 3230) will hopefully be extended and merged to one national park called Manusela. A great evil is the trade in birds in the whole region.

West New Guinea: four reserves have been established by ministerial decree: Lorentz, 21,500 sq.km; Cyclops, 225 sq.km; Wassur, savanna and swampland in the S, 20,600 sq.km; Dolok, on Frederik Hendrik I., 6000 sq.km. Other proposals have been made; we will hear more about them in the future.

As desiderata are listed: approval of the Nature Conservation Act, with elaboration of subsidiary legislation ('algemene maatregelen van bestuur'), establishment of provincial parks, and revision of protected species lists: not only are the current lists inadequate, but their application easily leads to intensified exploitation of all others as actually unprotected species (p. 37). An instructive consideration for those conservationists who set their minds on such lists! Instead, the Report proposes that all species be accorded a certain degree of protec-

tion, excepted those specifically excluded as harmful pests. Personnel problems are discussed, responsibilities defined. Evaluation is proposed of existing reserves: there are too many small-sized ones, and criteria for new ones defined — however, admission of 'some light hand-logging' (p. 45) is in my opinion far too risky; suitable for an *Agathis* production forest, but not for a nature reserve, and inconsistent with the rightly advocated conservation of natural ecosystems in their entirety (p. 49).

A Conservation Master Plan is called for, to synthesize the efforts that hitherto have been of necessity piecemeal. Actually, Dr. John M c K i n n o n is working on such a plan. Another idea is the establishment of an Indonesian Environmental Conservation Advisory Committee. This too seems excellent: hitherto only the international WWF advisory committee has occupied itself with these affairs, from a distance. This position is fully defensible: much expertise is concentrated in the WWF committee, and for proper perspective, conservation needs the outlook from afar as well as from nearby. The latter, too, is indispensable; as I see it, only in a co-existence, either influencing the other from its own vantage point, can maximum fruitfulness be attained. The crucial value of environmental education is affirmed, and should be extended far beyond West Java. The development of environmental conscience through radio (which penetrates the remotest villages) and TV is in motion. The need for interpretation near reserves is acutely felt: the construction of the Visitor Centres at Cibodas and Pangandaran on the S. coast of Java is a first step only.

We get the impression that it is among Indonesia's national aspirations to achieve something significant in conservation. The FHO project has been extended with a 3-year implementation phase entitled National Parks Development, for 1979 through 1982.

The toughest bit is still to be realized, however. "By far the most urgent need is to save viable examples of the rapidly vanishing lowland rain forest in Kalimantan, Sumatra and elsewhere before it is too late" (p. 43).

Actually, for all the splendid things accomplished since 1974, no net addition to speak of has been made to the protected lowland rain forest of Kalimantan and Sumatra ... through no fault of Mr. Blower and his team. They proposed a splendid block of forest on the Kayan River, 8000 sq.km, from 2053 m down to 100 (see page 3037). This proposal, still mentioned, was turned down by the Forest Department, late in 1979.

Bukit Raya and surrounding lowland forest, 1400 sq.km, declared as a Nature Reserve by the Provincial Governor in 1973, has unfortunately now been reduced to 500 sq.km, covering only the highest portion of the original reserve. Surrounding areas on the lower mountain slopes have for the most part been included in timber concessions (p. 24). What such excisions mean in terms of species richness can be surmised from the table in P.S. Ashton's book on Brunei, extracted in the following story.

Such attitudes among the highest Indonesian authorities continue to cast doubt on their intention to protect what most needs protection. On page 2821 we have remarked that the essential gap in the Indonesian program is these lowland rain forests: without quick and effective protec-

tion, tens of species of Dipterocarps alone, and hundreds of other potentially valuable species, on which the future of forestry and forest economy of Indonesia depends — including the gene pool of fruit trees and rattans — will be doomed to extinction at the hands of loggers.

Very recently, the Indonesians earmarked the Kayan headwaters for official protection. This is to be the Mutlak reserve, 16,000 sq.km on the Sarawak border. All this land, however, is above 500 m altitude, cannot for this reason be assumed to contain the many species of plants and animals which are confined to the lowland zone below 300-400 m, and thus seems to confirm the suspicion that the leftovers of forest exploitation are good enough to be conserved.

Indonesia's declared intention to set aside at least 5% of its land area for conservation has in the lowlands of Kalimantan been realized for the 0.7% that is included within existing reserves, of which most lies in Kutai and is still being logged (p. 25).

Save part of each concession? In Conservation Indonesia (Feb. 1980), Mr. L u k i t o Daryadi announced that it will be required of concession holders that they save 1-2% of their area, "representing the richest examples of the ecosystems within the concession (and preferably in the center of the concession area), to function as Natural Genetic Resource Conservation Areas, or Kawasan Penyelamat Sumber Daya Alam."

The plan seems fine, inasmuch it reflects the will not to have all the forest logged. Yet the measure has its botanical and practical hitches. Botanically: 1) who is to determine what is the richest part of a concession? This requires inspection by an expert forest botanist. But assuming that all parts are equally rich, 1-2% may not be enough for a plot of forest to survive; 2) the more species, the fewer individuals on a hectare, the larger a reserve must be to sustain the minimum population. According to the best available estimates (*page 3249* in this Bulletin, page 8 in the same issue of Conservation Indonesia), the order of magnitude to ensure survival is one of hundreds of sq.km. Smaller concessions would result in sub-minimal 'resource areas', and expectations that they would survive might turn out to be unfounded in the long run: almost imperceptible but unstoppably species drop out, the composition changes, second-growth species invade and suffocate others. And for a tract conserved for its genetic resource, this cannot be the intention. The risk is too great. Better it would be, to combine the resource areas of adjoining concessions into a larger block. The idea of a central location in each concession — for re-seeding — must then be abandoned, but re-seeding goes slowly anyway: a 500 m hop for a dipterocarp seed is exceptional, and we must reckon 50-60 years for a generation of trees, so a travelling speed of the rain forest species of one kilometer in a century seems most optimistic. The practical hitches are formidable, and come down to the general question of control, touched upon in the Far Eastern Economic Review. Who knows if concession holders will abide at all? If they abide, why not setting aside a plot above 500 m altitude? How are they to protect the plot from, for instance, poaching and rattan collecting by their own personnel? (And in a genetic resource area, protection must be absolute.) What happens when the logging firm withdraws from the concession

when its work is done? Not seldom do shifting cultivators move in, and if the policy of more transmigration is pursued, we can expect a greater influx from Java.

Even if these questions can be answered — we hope they will — the problem remains of the responsibility: how can in good confidence a task be entrusted to persons whose immediate financial interest is opposed to it?

Let's not forget: here is the ecosystem with the greatest conservation value, in the country's own long-term interest. If these forests are allowed to be destroyed, the Indonesian conservation effort will be essentially a failure, from the biological point of view. Why not grant the proposals for Kayan River, restore Bukit Raya, and evict the loggers out of East Kutai — instead of coming up with this plan with so many hitches in it?

If it can be realized, so much the better — as an extra safety, that is. It would be self-deception to believe that because of it, other conservation measures would be less necessary. The 5-10% quota is still 4.3-9.3% away from fulfilment.

Proposed Yang National Park / Feasibility study, iii + 43 p. + 11 col. phot. + 5 maps; compiled by A.P.M. van der Zon & Dodi Supriadi (1979, PPA, Box 133, Bogor, Indonesia). FO/INS/78/061, Field Report 2, stencilled.

Mt. Yang in east-Java has been conservation area since in 1908 the Ledebor brothers began to protect the deer, *Cervus timorensis*; in 1937 they had built up the population from about one hundred to 8,000-10,000. At present, 500-1000 may still be there. The tiger became extinct in 1920, the banteng is no more, but the leopard is. Landscape, at about 2000 m altitude, is ideal for wilderness tourism, up to Mt. Argopuro (3088 m). It is an ancient place of pilgrimage, and an interesting archaeological site. Rich in mountain plants, and an important catchment area, it has great potential for development into a National Park, up from its present precarious status as Suaka Margasatwa. Various recommendations are made: the ancient airstrip could be repaired.

Maelang-Ijen-Raung / Feasibility study, iii + 36 p., 12 phot. + 6 maps; compiled by A.P.M. van der Zon & Dodi Supriadi (1979, PPA, Box 133, Bogor, Indonesia). FO/INS/78/061, Field Report 3, stencilled.

This volcano complex connects the Baluran Reserve in the very NE corner of Java and the Meru Betiri Reserve on the south coast. The Ijen Highland (summit 2148 m) is well-accessible, and scenic. Coffee is grown and sulphur is collected in quantity. Like more forbidding Mt. Raung (3332 m) it has an impressive crater lake. There are quite some mountain plants, and the forests on the slopes, although much damaged, have a great protective value for the water supply to the densely populated lowlands. This scenic area is sparsely visited, and well worth developing as a reserve; hopefully as part of one big threefold conservation area.

National Parks and Protected Areas of Indonesia, a 52 page report by J. A. M c N e e l y & E. A. S u m a r d j a (PPA, Box 133, Bogor), was prepared for the IUCN Meeting on Parks in Sydney, October 1979. In it are 18 reserves listed with data for the World Directory: Name; Category; Biotic province; Legal protection; Date established; Location; Altitudi-



nal range; Area; Land tenure; Physical features; Vegetation; Fauna; Zoning; Disturbances; Tourism; Research; Facilities for science; References; Staff; Budget; Administration address, name of coordinator.

The reserves thus listed are: G. Leuser; Siberut; Sumatra Selatan I; Ujung Kulon; Gede-Pangrango; Meru Betiri; Baluran; Bali Barat; Bawean; Tg. Puting; Kutai; Lore Kalamanta; Dumoga-Bone; G. Ambang; Tangkoko-Batuangas; Komodo; Way Mual & Way Nua; G. Lorentz. Together 47,457 sq.km.

Besides these, a number of minor reserves are listed: 68 are 100 ha or less, their joint area is 1309 ha; 26 are 101-1000 ha, together 10,480 ha.

Mr. A. F. S m i e t, a Dutch biologist, after a few months of preparation at Leiden, took up a WWF advisory post in the Moluccas, effective 1 January 1980, for probably two years. Address: Box 69, Ambon, Indonesia.

Philippines: a look inside. A report to FAO by J. W y a t t - S m i t h, Management Research of Philippine Dipterocarp Forest, xii + 144 p., 4 fig., 15 tables (1979, FO:DP/PHI/72/006), result of a consultancy mission in 1978, gives interesting information on the staggering problems.

Some estimates arrive at 38% of the land area as still being under forest but actually, while the 'ideal irreducible minimum' forest area had been calculated at 42% of the land area, even no more than 20% may have been left (p. 16-17). Dipterocarp forest is dwindling at 2000 sq.km a year; 1730 are destroyed through shifting cultivation. Pressure also comes from the paper industries (PICOP) to convert good logged-over dipterocarp forest into tree plantations.

The human population of the islands rose from 7.6 million in 1903 to 42.8 million in 1975, and is expected to be 84 million in 2000. Postal services are extremely slow and telephone connections beyond a township are virtually non-existent. The only reliable means of communication is by telegram, but cables between HQ and outposts may take one month to arrive (p. 51).

The country is divided into four climatic zones (p. 8 and 142); on each a different cutting cycle is imposed, from 30 to 45 years. Dipterocarp forest is classified as old growth (if less than 25% of the mature stand volume was removed) or young growth. Old growth occurs in varying proportions to non-dipterocarps; in Luzon this is 70 : 30, in Mindanao 72 : 28, in the Visayas 61 : 39, in Palawan 14 : 86. The lowest altitudinal zone occurs between sea level and 400 m, the next to 800 m (this is the upper limit of commercial dipterocarp forest). There seems to be no better classification of the Philippine forests than Whitford's of 1911. Dipterocarps comprise 65% of the standing timber; the remainder comes largely from 44 non-dipterocarp species (listed on p. 105-106). Luzon supplies 27.6% of the timber, Mindanao 53.8%, Palawan 9.3%, the Visayas also 9.3%.

Forest policy is outlined in several decrees which have been copied in the report. The policy is formulated by the Philippine Council for Agriculture and Resources Research (PCARR). Technical research is done by the Forest Products Research and Industries Development Commission (FORPRIDE-COM); problem-oriented research is done by the Forest Research Institute (FORI). The roles and relations between these agencies are discussed.

The report, picking its way through those problems connected with

forest research, deals extensively with FORI and its perspectives. FORI research projects in the dipterocarp sector amounted in 1977 to 19 ongoing, 56 planned, plus 28 ongoing and 54 planned in other sectors. A diversification programme is being conducted, to set up a network of centres and stations for research all over the Philippines; among them one for dipterocarp forests at Bislig in Mindanao, one for non-timber products at Zamboanga City, also in Mindanao, and one for wildlife at Puerto Princesa in Palawan.

The Dipterocarp Forest Research Centre (DFRC) at Bislig exists since 1976 in its present status. The centre has considerable staff, but lives in some isolation: located on the east coast at 8°N it lies 200 km from Davao, and direct connections with Manila exist only with 1-4 flights a week with change at Cebu.

Wyatt-Smith does not think the adopted system of forest management is wrong; the real problem is failure of control and forest protection, and people closing their eyes for it (p. 68). He therefore recommends to follow established lines of research: growth studies, timber stand improvement, killing of unwanted trees by chainsaw-girdling, regeneration studies, and others, all discussed. Protection naturally tops the list of priorities; implementation of careful logging would enormously reduce damage (p. 75). And study through reading is in order, starting with improvement of the dreadful library facilities.

A lesson is to be learnt from Malaya. There the satisfactory Uniform System of Lowland Dipterocarp Forest management was (in the mid-sixties) abandoned overnight and much good forest land was alienated for agriculture. Now only the hill forests and LDF on poor sites have been left to future forestry; very little research has been carried out on them, and it may not be possible to exploit them economically.

Nature Protection legislation in Indonesia, by Nico W. V i s s e r is a 142-page report to WWF/IUCN Headquarters (mid-1979). It covers therefore but part of the whole field of environmental law. Legislation in the present circumscription consists of 3 components: a) formally codified law, namely ordinances dating from 1931, 1940, and 1941, on animals, parks, and hunting, b) general measures taken by the local authority, within the framework provided by the codified law, c) Adat law, the traditional systems of regional rules, widely known and partly unwritten. Components a and b are European introductions, c is the indigenous one. During a long period of coexistence, they have grown into a fabric with overlaps as well as lacunae, in the Dutch, Indonesian, and recently also the English language, each with its own cultural background and tilts of meaning.

Small wonder, then, that problems arose at the IUCN Environmental Law Centre, Adenauerallee 214, D-5300 Bonn, West Germany, when advice was sought on a Draft Legislation to replace the 35 and 45 years old Ordinances. Environmental law specialists are in Indonesia in short supply, and so are complete texts. Hence there was a coordinating job to do for a student like Mr. Visser. He had come to know several Indonesian law people, sought their comments, and matched these against the technical comments which IUCN had received from conservation experts. Travels in Indo-

nesia also yielded the missing texts. His report gives the actual texts of the still-valid law and the drafts with lists of critical points, which may save the final text (still to be compiled) from many an impurity. It also gives a chapter on Adat law with three elaborated cases for Bali, Celebes, and the Batak lands in N. Sumatra. In the 'Work Report' persons are named and interesting background information given.

Next thing to be done is: compilation of the final text in English and Indonesian, well-matched; then get the final text passed and become law; then elaborate the gist of it into General Measures to be implemented by the local authorities. And a good thing might be a programme of explanation and introduction to judges and others who must make the law work.

A few copies of the Visser report are still available from the Editor of this Bulletin, through whom also the author can be contacted.

Adat and nature is the title of a paper by Mr. H. M. C. S l a a t s and Mrs. M. K. P o r t i e r, who spent 2½ years in the Alas Valley near the G. Leuser Reserves in N. Sumatra. They are collaborators of Professor G. van den S t e e n h o v e n, Volkenrecht, Oranjesingel 72, Nijmegen, The Netherlands. Part of the work was done in association with Professor Moh. K o e s n o e, Jl. Sri Ikana 57, Surabaya, Indonesia. The paper was published in Dutch, in Panda (the WWF journal) 14 (Sept. 1978) 124-126. We give here some excerpts in translation.

"Adat is the Indonesian term for the combined concepts: outlook on life, code of conduct, and man's acts based upon these. As 'culture' in the broad sense, Adat opposes 'nature'. While for Westerners nature has become something exclusive, worth of preservation, this is different for e.g. the Karo Batak. The latter lives amongst, together with, also against nature; he finds himself surrounded by an obscure, profusely growing mass of trees and plants and a huge variety of fauna in endless propagation. He lives together with nature, on which he is dependent for his living, feeds on fruits, cuts down trees for construction and fuel, manufactures tools from wood, utilizes parts of plants as medicine.

He feels himself against nature when he has to protect his dwelling from the all-encroaching forest full of dangers, and also when he is threatened by illness or crop failure. Being on such close terms with nature, his Adat too is tied up with it. His non-western attitude towards nature does therefore not stem from a lack of technology, but has its roots in different values and different urgencies. The choice of the plot of forest to cut down, the felling of the first tree and the preparation of the soil for agriculture are all accompanied by an elaborate ritual to justify the doings of man, to restore harmony between man and nature. A cut down tree is symbolically made to survive by planting a sprig of it back in the earth.

That notwithstanding information campaigns people go on to violate the Leuser Reserve boundaries has turned out to have its roots in local marital traditions. While conservationists sigh: "if only those people understood the interests at stake", a wedding is governed by the Adat, and a circumstantial and expensive affair which implies the transfer of a plot of land to the family of the bride. The groom, however, will in turn have to give up the land when his own son is to be married. Thus the land per-

petually changes hands. All would be well as long as the land remains in possession of the clan, and the population remains rather stable. But since several years there is an influx into the Alas Valley of people from other parts of Sumatra, who are no Alas. These people try to intervene wherever a marriage is being arranged and to buy up the land for cash — thus alienating land from the population, and thereby compelling the would-be husbands to find new land ... inside the Reserve.

Problems like these are to be recognized and their background understood before they can be solved. An early effort to harmonize the values of conservation and those of the local community might even effectively prevent the problems. Rather than to complain about a lack of understanding on the part of the local people, Professor Koesnoe emphasized "the need for us to understand the interests on the other side." So far Slaats & Portier.

I am strongly in favour of involving the local population in conservation efforts and willing to assume that the population is not destroying the forest in greed or blind hate but full of consideration for the trees. Nevertheless, sticking a twig into the soil will not generate a tree to replace the fallen one. That's why the Karo plains north of Lake Toba, still forested in Junghuhn's time, are now a desert of scrub and alang-alang. And the Bataks who destroyed the land now immigrated into the Alas Valley! The Adat compels an Alas man to avail himself of a plot of land, but does not prevent him from selling it later to a Batak. Certainly, the Alas are in need of money as everyone else is. But they were unwilling to serve as labourers on the road through the Alas Valley from Kutacane Blangkejerèn, and labourers had to be brought from Java. When the Leuser Reserves were established, a wide strip of land on both sides of the Alas Valley was designated as a buffer zone. In the southern sector, the people have destroyed that forest. So even if the plants and animals in the Reserve could be persuaded to understand the problems of the Alas people, where would man's encroachment end? The Leuser Reserves have been established by the laws on the books of the country; it would be a pity if the Adat with its traditional wisdom were to be turned into just one more pretext to use for private benefit what rightfully belongs to the nation. — M.J.

Western New Guinea (Irian Jaya) will be a conservation area by itself. As expatriate WWF adviser has been appointed Dr. Ronald G. P e t o c z, lately from the U.S.A. His background is geomorphology, and in March 1980 he visited the Rijksherbarium and the Natural History Museum at Leiden to obtain information on botany and zoology of the island. He is to be based in Jayapura, will take up duties in May 1980, for two years, and can be reached through PPA, Box 133, Bogor, Indonesia.

TPC is the Threatened Plants Committee of IUCN, based at the Royal Botanic Gardens, Kew, Richmond, TS9 3AB, England. Chairman is the Director of the Gardens, Professor J.P.M. Brenan; secretary is Mr. Gren Ll. L u c a s. It organized two conferences; the proceedings of the first, edited by J.B. Simmons (1976), was reviewed on *page 2879-2880*. That of the second was edited by H. S y n g e & H. T o w n s e n d, Survival or Extinction, ix + 250 p. (1979, above address), paperback £ 7.50; see

below. A third conference is planned for 13-18 July 1980 at Cambridge, U.K., on Biological Aspects of Rare Plant Conservation.

In July 1979 (Newsletter 4) the TPC set up The Botanic\* Gardens Conservation Co-ordinating Body. This aims to link all botanical gardens in their conservation activities. It can be joined for US\$ 20 or \$ 10 a year. If the fiction is given up that botanical gardens can serve as repositories for endangered species several important functions still remain. Botanical gardens are, after all, the places where plant science presents itself to the public, and where thus awareness of dangers to plants can be generated through education. Besides, they can propagate threatened plants, to 'bulk up' populations in the wild, also to supply amateurs with cacti, cycads, orchids, &c. For these purposes, it is useful that gardens exchange data about their stock so that they can share; a 'Botanic Gardens Green Book' with data on holdings is in preparation.

Another task is to assist in the regulation of the trade in plants, under the Washington Convention on International Trade in Endangered Species (CITES). Names of such species are kept on three 'Appendixes': I contains species threatened with extinction and affected by trade, II contains less endangered species, III contains species rare in one country but not in another. By 27 June 1979 CITES had been ratified by (in our region) Australia, India, Indonesia, Madagascar, Malaysia, Papua New Guinea, Seychelles, and Sri Lanka; it is hoped that the Philippines and Thailand will ratify soon. And there is quite a bit to regulate: in 1977, the U.S.A. imported 38 million plants subject to CITES, virtually none with permits. The trade is decreasing now.

Not connected with CITES is G. Lucas & H. Synge, The IUCN Plant Red Data Book, 540 p. (1978), paperback, available from IUCN, 1196 Gland, Switzerland, US\$ 20 or £ 10. It is also a TPC production, containing a red data sheet for 250 species, a less than 1% selection of the total now endangered. Some of them are already extinct; an occasional one is precariously surviving, like Sophora toromiro (Legum.-Papil.), an endemic of Easter Island. It was found aplenty in 1774, but introduced sheep and native wood collectors reduced the population until in 1962 the last tree was found dead. But before that time, the well-known explorer Thor Heyerdahl had collected seeds which he sent to the Göteborg Botanical Garden. There the seedlings are now thriving, as Director Per Wendelbo wrote to TPC after reading the Red Data Book. Ways of rehabilitation are now being sought.

For each species, the RDB gives name and family, status (Extinct, Endangered, Vulnerable, Rare), Distribution, Habitat and Ecology, Conservation measures taken, ditto Proposed, Biology and potential value, Cultivation, Description (a few lines), and References; no illustrations. For our region, the following species have been listed. Amaryllidaceae: Crinum mauritianum from Mauritius; Asclepiadaceae: Toxocarpus schimperianus from the Seychelles; Calycanthaceae: Idiospermum australiense from N. Queensland; Dipterocarpaceae: Vateria seychellarum from the Seychelles; Ebenaceae: Diospyros sp. ined. from Mauritius; ferns: Marattia salicina

\* For a long time I wondered about the difference between a botanic and a botanical garden, until Dr. W.T. Stearn told me that the former spelling is the older one. About 1900, the 'al' was added.

subsp. ined. from Lord Howe I.; Leguminosae-Mimosaceae: Serianthes nelsonii from the Marianas; Lythraceae: Tetrataxis salicifolia from Mauritius; Malvaceae: Hibiscus giffardianus and H. wilderianus both from Hawaii, Lebronnecia kokioides from the Marquesas; Medusagynaceae: Medusa-gyne oppositifolia from the Seychelles; Myrsinaceae: Badula crassa from Réunion; Orchidaceae: Corybas fornicatus from Malaya and Java, Paphiopedilum druryi from S. India; Palmae: Areca concinna from Ceylon, Burretio-kentia hapala from New Caledonia, Caryota no from Borneo, Ceratolobus glaucescens from Java, Cyphophoenix nucele from Lifou off New Caledonia, Johannesteysmannia altifrons from Sumatra, Malaya and Sarawak, Lodoicea maldivica from the Seychelles, Maxburretia rupicola from Malaya, Nengagajah from Sumatra, Neoveitchia storckii from Fiji, Pelagodoxa henryana from the Marquesas, Pritchardia macrocarpa and P. munroi both from Hawaii; Rafflesiaceae: Rafflesia arnoldii from Sumatra; Rutaceae: Zanthoxylum paniculatum from Rodriguez I. in the Indian Ocean; Simaroubaceae: Ailanthus fordii from Hong Kong; Sterculiaceae: Heritiera longipetiolata from the Marianas.

The RDB illustrates over two dozen of various threats to plant species with precise facts. It covers all regions, with emphasis on developed countries and islands. It is remarkable that here, too, plant-animal relations have hardly found a place. The RDB does not dwell on removal of pollinators or dispersing animals as a cause of extinction.

Survival or Extinction as a title is a hyperbole in view of the subtitle: The practical rôle of botanic gardens in the conservation of rare and threatened plants. Only in exceptional cases like Sophora toromiro can a botanical garden make the difference. Otherwise, the deliberations suffer from the same limitations we observed in our mentioned review of the first conference book. The prevailing concept of botanical garden covers but half the potential: it leaves no place for plant-animal relations at population level. This other half can only be realized in natural areas slightly modified to receive a public, in fact reserves with their ecology intact. We will wait for this breakthrough to be made — at the forthcoming 3rd conference at Cambridge?

The Ecologist / Journal of the Post Industrial Age (73 Molesworth Street, Wadebridge, Cornwall PL27 7DS, U.K.) devoted its vol. 10, 1-2 (Jan. 1980) to the tropical rain forests. The issue has 72 pages and costs £ 0.80.

It opens with 'A plan to save the tropical rain forests' by E. Goldsmith, on p. 2-3. It is called the World Ecological Areas Programme (WEAP). Under it, forests could be used as 'collateral' for loans to be advanced by international agencies for ecologically sound forestry projects. The plan has not been worked out in any detail, nor has an attempt been made to fit it in among the ideas already worked out by FAO and World Bank. Suggestions about financing are requested from the readers. Besides, a collateral is usually put up for sale if the debtor fails, and that cannot be the intention here.

The second paper is by A. Grainger, The state of the world's tropical forests, p. 6-54, phot., 17 fig. Much documentation — 134 notes containing even more sources — went into this compelling accumulation of astro-

nomical figures, all touching on the many aspects of a deforestation at a rate of 150,000 sq.km a year. On p. 28 countries are named where deforestation is critical: Australia (Queensland), Ghana, Guatemala, India, Ivory Coast, Malaya, Nigeria, Panama, Philippines, Thailand, West Indies; endemic: Brazil, Honduras, Indonesia (Kalimantan, Sumatra), Sabah, Sarawak, Venezuela; and developing: Cameroon, Colombia, Congo, Ecuador, Gabon, Liberia, New Guinea (both halves), Peru, Sierra Leone, Zaire.

Situations and disasters are well-sketched: in the Himalayas out of 1,500,000 sq.km of watershed of which 25% is still forested, soil conservation is applied to 11,000 sq.km only. A flood in the Ganges Basin in 1978 affected 43 million people with a loss of £ 1.2 billion. In Brazil, forest clearance for conversion into pasture sent \$ 7.7 billion worth of timber up in smoke, whereas only 4% of Amazonia is fertile land. In Java, failure to protect the watershed in the basin of the Citarum dam which provides Jakarta with electricity, led to a 7-fold increase in silt-load over just 3 years.

The facts are terrible, but the story behind them is less clear. The picture is like a cubist painting: bizarrely striking, but without a centre. The story is therefore difficult to memorize, like the one presented by Norman Myers in *The Sinking Ark*. No questions are posed and answers formulated; if there is any logic or background in the rain forest tragedy, I do not find it brought out.

The map of Malesia on p. 9 is ludicrous; a better one can be obtained from the Editor of this Bulletin. Author does not here explain what a rain forest is or how it works, nor what its capabilities are. This could be a good starting point when he elaborates this text, as he intends to do, into a book. Good luck!

The third paper has the most direct bearing on our region: R. & V. Routley, Destructive forestry in Melanesia and Australia, p. 56-67, phot. The first part, which deals with Australia, is a condensation of the authors' book 'The Fight for the Forests' (see *pages 3234-3235*). The second part, which deals with Melanesia but also with New Guinea, is new. According to the Routleys (Social Sciences, ANU, Box 4, Canberra A.C.T. 2600, Australia), Melanesia is in for liquidation of all accessible lowland rain forest by the year 2000. A Mr. A.K. Oram is quoted to advocate the felling of all the natural timber over say the next 5 years (p. 58); ironically, Mr. Oram was 'Acting Conservator of Forests' in Fiji. There, like in the Solomons, the main benefits accrue to foreign companies, to Japan, and to a small government elite.

In Papua New Guinea, however, local resistance developed effectively, and the fact that land is owned by the tribes may help block any centralized plunder. So far, there has not been much pressure, for several reasons: "world economic recession, affecting forest import industries in the developed world; the availability, at give-away prices, of more uniformly marketable rain forests, with but few environmental or other requirements imposed and practically none enforced, further North in Indonesia, Philippines and Malaysia, and nearer to main Asian industrial regions" (p. 60).

The Gogol project near Madang in the N of Papua New Guinea is extensively discussed. For all its advertisements as a showcase, it "gives

every sign of becoming an environmental disaster" (p. 61), complete with erosion, landslides, and silting up of streams. No clear commitment to reforestation was made: "the contracts are wide open, in far too many respects (except as regards public scrutiny)" (p. 61). And of course it is told that "the modified forest should be an improved habitat for ground fauna and for much of the bird life; it is possible that it could be more productive in this sense than the existing forest", as is quoted from a Mr. K.G. White. Didn't we hear similar utterances from Indonesian conservation officers who were eager to improve the Sekundur Reserve in N. Sumatra by getting it logged over first? (*pages 3029-3034*). Already in 1973, R. Schodde stated that 70-75% of the New Guinea birds are essentially rain forest forms, and that 65% of the endemics are even confined to the rain forest.

Besides, the Madang project operates at a loss: "Public revenue for sawlogs and chipwood does not cover the basic costs of management of the project and reforestation of one-fifth of the area cut" (p. 63). Since the whole Forest Department is losing money, it has (incredibly) "been proposed by FAO advisers ... that a special tax should be levied in forest development areas on the local population to pay for the reforestation of their forests" (p. 63).

All in the name of development! But in Australia, things are no different: Australians are subsidizing the destruction of their native forests. Producing the raw lumber is unprofitable, and so it has been arranged that this is drawn from public property, while the wood-processing industry is profitable and is in private hands. The industries do what they can to perpetuate this situation, and "much of the destructiveness of Australian forestry can be traced directly to the overwhelming commitment on the part of the forest services to the interests of big wood-based industry, which interests dictate the large-scale mass production forestry, and the heavy-handed, capital-intensive, factory style operations that are so destructive of forest values" (p. 58).

The paper ends with a plea for small-scale silviculture, "which takes only a small portion of forest at a time, leaves adequate buffers around the small logged areas, and makes proper provision for completely unlogged areas, to conserve wildlife and flora. Local people have themselves expressed strong dissatisfaction with wildlife conservation measures in the Madang project" (p. 66). It is they, after all, who are to stay after the loggers have left. Their interest in the forest goes beyond cash, and if they are wise they defend it tooth and nail.

Present and future forest and plantation areas in the tropics, by J. P. L a n l y & J. C l e m e n t, 47 p. mimeographed (Jan. 1979; FAO Rome), was printed in *Unasylva* 31 (1979) 12-20.

This seems to be the most detailed estimate of forest resources so far made, with a view on development planning in the various countries. Forecasts run to the year 2000. Forests, for this purpose, include stands of trees at least 5 m tall, with a crown cover of at least 10-20%, and 10 hectares or larger. Forests are termed 'closed' if the crown cover is more than 40%. This is a very wide definition. Moreover: "forests temporarily unstocked are considered as 'forests' if they are under a process



of natural or artificial regeneration and are not alienated for non-forestry purposes" (p. 3). This means inclusion of all depleted tropical rain forests, regardless of their ecological standing or future.

The world estimate for Closed Natural Hardwood tropical forests (not intensively managed) comes out as follows:

1970	7,970,000 sq.km	1990	6,871,000 sq.km
1975	7,665,000	1995	6,655,500
1980	7,366,000	2000	6,455,000
1985	7,105,500		

"It is quite difficult to estimate reliably the areas which have already been logged-over" (p. 43), but for Brazil, which has 56% of the world area of such forest, it is estimated at more than 95% of the operable closed forests. Depletion in tropical America is expected mostly along the Pacific coast (Colombia, Ecuador) and the Amazon Basin, but the largest relative decrease will occur in Central America. Also heavy depletion of natural conifer forests is expected, "which brings up the problem of the conservation of pine ecotypes" (p. 43).

Africa possessed in 1975 only 18% of all tropical closed forests, by 2000 the area will have decreased from 2,020,000 to 1,870,000 sq.km; decrease in West Africa will be 47%, in East Africa 18%, in Central Africa less than 3%. Operable forests will decrease, however, in West Africa by 55%, in East Africa by 50%.

Asia and Far East possessed 3,270,000 sq.km of tropical hardwood forest in 1975 (19% of the world total), but as much as 89% was closed forest (26% of the world total). Inoperable are 35% of these forests, but this high percentage "is more than traded off by the high commercial value of these forests" — four times as high as in Africa and America (p. 45). Intensively managed are 420,000 sq.km, mainly in India and Burma. The total area will shrink to 2,430,000 sq.km by 2000, an all-over decrease of 18%, but in the operable closed hardwood forests it will be 24%. "The sub-regions most affected are Insular South East Asia and the Indian Subcontinent."

I quote these figures as a selection, so that readers who come across them elsewhere can identify the source, and be alerted, since from an ecological viewpoint the Lanly & Clement FAO estimate seems irresponsible and grossly misleading. It is concerned with extraction but not with renewal from the same resource. Under the 40% criterion, the most valuable forests in West Malesia still qualify as 'closed' when after logging they are beyond repair. Secondary, species-poor forest is pooled together with species-rich primary forest, and among the latter the important altitudinal limit of 300-500 m between the richer lowlands and the poorer hills has been ignored. Mangroves, which like secondary forests are renewable, are taken together with dryland primary forests which are not.

Small wonder then, that the report concludes: "The overall figure for depleting of closed forests in the tropics (140 million ha in 25 years) appears less alarming than those generally quoted (like the one suggesting that 50,000 ha are cleared every day)" (p. 46). It has extended the concept under which the most valuable rain forests come in all (im)possible manners, and then suggest that there is plenty. What may be the result of optimistic figures but false expectations, wrong planning, and

heavier pressure on the rain forests because the set quota have to be extracted?

While the figures in themselves may be correct, the fact that counts is that the primary forests are irreplaceable and react badly to even slight damage. They contain the largest numbers of species which stand in danger of extinction. This report is cause for great alarm because of its unconcern with the future integrity of the biological network on which eventually all life on earth depends. Plants, animals and people in the tropics, but also in the developed parts of the world, are bound to suffer if these figures are believed and action for 'development' is taken upon their authority.

Conservation Indonesia is a bimonthly newsletter issued from PPA (Box 133, Bogor), under the WWF programme. Its 1979 issues mostly contained 12 pages each, in neat dense offset, with a variety of photographs and witty cartoons. The left column is English, the right, Indonesian. It covers the whole field and does fully justice to the plant world. The August 1979 issue carries a long interview with H.R.H. P r i n c e B e r n - h a r d, who in July made a 19-day visit to reserves in Celebes, Borneo, Java, and finally G. Leuser. But minor items, too are given: the October issue mentions an agreement to transfer the main entrance of the Cibodas Reserve back to its original place in the adjacent Cibodas Garden (administered by LBN).

We heartily recommend this periodical; it is an indispensable source of news and seems fully worth its price: overseas subscribers US\$ 10 for private persons, US\$ 20 for institutions. Account 3447, Bank of America, Jl. Merdeka Utara 21, Jakarta.

Minister Emil Salim's visits to Sumatra. During May 1979, the Indonesian minister for Development Control and Environment paid two visits to the island to inspect the conservation situation. On both trips, he was accompanied by a great number of high-ranking authorities and conservationists. One of them sent a report on the tour. We give some excerpts.

Minister Salim, a trained economist, astute and forthright; moreover, he actually goes out in the field to look and ask questions. He has caused in Indonesian conservation a revival of hope and faith.

The first part of the tour went to Way Kambas in Lampung. Illegal settlers in the reserve are victims of the irrigation schemes near Jepara. The project, which had Japanese technical and financial assistance, is doomed to failure because the water catchment area had already been deforested before the dam was built, and the latter will be silted up in ten years or less from now. No reforestation schemes can hope to make any difference this time.

Should the reserve be cleared of people? The answers depend on its value as a whole. Way Kambas has suffered as much as any reserve in Indonesia from logging, fires, and other human disturbance. But it still contains much valuable freshwater swamp forest, and there are plenty of elephant, tapir, tiger, plenty of siamang and Argus pheasants. Also, the reserve is close to Java. Being quite 'open' in parts, it is easier to see game there than is usual in Indonesia, and the reserve could therefore attract tourists. Its boundaries are natural, and it would be a pity

not to enforce its sanctity. Although Dr. Salim is very sensitive to the plight of the unfortunate settlers, he is less sympathetic to the logging in the reserve under the guise of 'local rights', but largely for the benefit of outside investors. Back in Jakarta, he successfully persuaded the President to stop illegal deforestation and, in a press release, put the blame squarely on local officialdom.

In northern Sumatra the Minister flew over the Leuser reserves, with visits to Bohorok, where the Aveling couple answered his questions, and to Sekundur. Meetings were held of two sorts. The one is with incumbent local officials, the other is with youth clubs and student groups. Some of his 'inquisitions' create an almost un-Indonesian sense of unease, because of the urgency of his environmental concern and of his own sincerity. On Sekundur we have reported on *pages 3029-3034* under the title 'logging a Nature Reserve ... to improve it'. The ministerial party were shown dipterocarp, coffee and fruit tree seedlings, proposed as improvements to the environment, and the cleared and still to be cleared (and burned) areas where deer, birds and elephants were to be 'rehabilitated'. Elephants for this purpose were to be purchased from Thailand, according to Dr. Ismu Sutanto Suwelo, who is in charge of the biological aspects of this PPA project. The project is implemented with the assistance and cooperation of the timber company Raja Garuda Mas, who has a logging concession within the reserve.

Raja Garuda Mas is presently applying for a further part of the reserve which it plans to log and then improve in a similar fashion. The company's representative (the young and forceful local manager who had the misfortune to lose his right shoe in the thick mud of his own logging road - it was later dug out) was given every opportunity to put his case, as were those arguing in favour of man-made environments and rehabilitation work. Conservationists who disagreed were also allowed to have their say. Minister Salim listened to everyone, asked his usual difficult questions and then made his decision: that no further concession should be granted until the success (or otherwise) of the present project was established without doubt. The manager of Raja Garuda Mas objected strongly, but the Minister's decision was final. This must be considered a victory for 'normal' conservation principles.

During the flight over Siberut Island, W of Padang, and in meetings held before it, there was much discussion of the various proposals which have been made for the future and somewhat controversial development of this island with its indigenous peoples and four rare endemic primates. Helmuth Buckholz was present at some of the meetings, and was able to explain the concern of Survival International for the primitive Mentawai peoples, now faced with rapid acculturation and enforced conformity to the Indonesian way of life. The tendency of local officials to blame diminishing forest resources and reductions in the endemic primate population on the habits of the Mentawai peoples is not realistic. Mr. Buckholz, who has worked in the Mentawai Islands for many years, speaks two of the local languages, made clear the kind of help these people need, and Mr. Blower put the case for reviewing the timber concessions into which Siberut I. has already been divided so that the forests on which these primitive people depend will not be logged.