



PRINCIPES

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THE PALM SOCIETY

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JOURNAL OF THE PALM SOCIETY

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Cover Picture

The crown of *Normanbya Normanbyi* at Singapore Botanic Gardens. Photograph by G. Addison.

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JOURNAL OF THE PALM SOCIETY

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Palm Hunting in Malaya's National Park

J. DRANSFIELD¹ AND T. C. WHITMORE²

To a palm hunter, Gunong Tahan is a mountain of great interest because of its two endemic palms, *Livistona tahanensis* and *Eugeissona brachystachys*, both described by H. N. Ridley after the classic ascent by himself and the zoologists Boden Kloss and Robinson in 1906. The mountain, 7,186 feet, is the highest in Malaya, a large rolling plateau surrounded by gleaming quartzite cliffs, and deeply incised to the south by the spectacular, deep Teku Gorge. Tahan is one of the most remote mountains in Malaya and is situated in the middle of Taman Negara, Malaya's National Park—a large area of more or less untouched forested country in the States of Pahang, Kelantan and Trengganu, with a rich fauna.

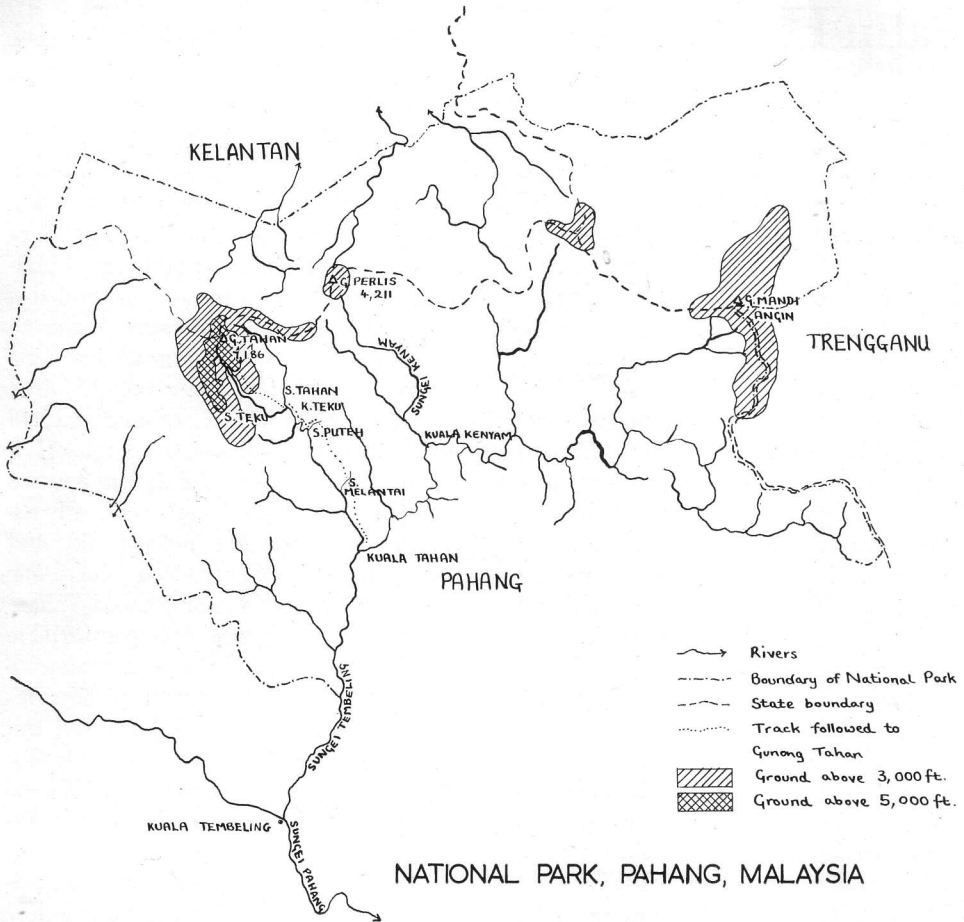
In February, 1968, we made an expedition to Gunong Tahan in order to collect *Livistona tahanensis* and *Eugeissona brachystachys* and other palms, and to study anew the so-called Tahan Woods at the foot of the mountain which are an important locality to Malayan botany. On February 15th we left the Forest Research Institute, Kepong, near Kuala Lumpur, with four aborigine tree climbers—Gerus, Gesak, Gi and Paling—and drove over the Main Range of Malaya into Pahang to Jerantut where we met Mohammed Shah of the Singapore Botanic Gardens, and then on to Kuala Tembeling, a village at the confluence of the great Pahang River and the Tembeling River. Here we were met by two park game rangers with a Malay

river boat driven by a powerful outboard motor. We were soon speeding up the Sungei Tembeling in a boat very heavily laden with food (Christmas puddings, steak puddings and tins and tins of curried chicken we soon came to dread) plant collecting gear and nine men—but not for long: one hundred yards upstream we ran aground and had to disembark to push the boat off a sandbank. No rain had fallen for two months and the rivers were all exceptionally low. We pushed off, and three hours later reached the Park headquarters at Kampong Kuala Tahan, where we stayed in a very comfortable rest-house for two nights while arranging for eight porters to carry food supplies and equipment the walk of three full days to Kuala Teku at the foot of Gunong Tahan, centre of the Tahan Woods and type locality of *Eugeissona brachystachys*.

We finally left the kampong early in the morning accompanied by one guide, two young apprentice rangers, eight porters, four tree climbers and Md. Shah, and were soon out of the scrub surrounding the village and into good forest, following up the Sungei Tahan. Palms in evidence included the very common wild sugar palm, *Arenga Westerhoutii*, *Calamus castaneus*, and the attractive *Arenga* sp. (*Didymosperma Hookerianum*), a small dark green palmlet not growing more than two feet tall, with pretty toothed leaflets and erect flower spikes. We made camp that evening at Sungei Melantai, a small river in a deep valley. Here *Oncosperma horridum* was abundant as clusters of small individuals on the hill slopes. The cab-

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bage of this palm makes very good eating and successive expeditions up Gunong Tahan have robbed the forest of all the old specimens near the track.

Next day we set off on the most dreaded part of the walk to Gunong Tahan—a high waterless undulating ridge like a saw, with 27 teeth, each one steeper and higher than the one before. The traverse took all day, and proved to be almost too much for us; it was with relief that at about 4 P.M. we finally slithered down the last slope past *Salacca glabrescens* with bright crimson male flowers, and *Cornera Lobbiania* to Ulu Sungei Puteh, where we

made the second camp. *Cornera* is a very common and distinctive palm on valley slopes and is rather decorative with its yellowish spines and pure white lower leaf surface. Its fruit is covered with black scales and the flesh surrounding the seed is delicious, in taste reminiscent of the lychee.

The map we were following proved to be very inaccurate—the Sungei Puteh was marked two full miles further south than its actual position; this accounted for the surprisingly long second day, and made the third day a much easier day than we had expected. On the last day of the walk to Kuala Teku, we fol-

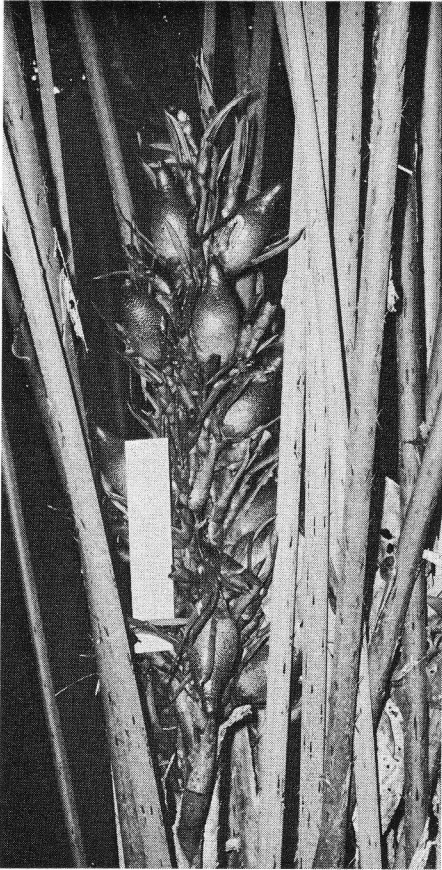


1. *Eugeissona brachystachys*. Gi sits under a fine clump on the trail to Gunong Tahan.

lowed the Sungei Puteh down to the Sungei Tahan, here a splendid rocky river full of rapids, lined with great *neram* trees (*Dipterocarpus oblongifolius*) leaning over the river and occasionally meeting overhead. The trees often have a rich epiphyte flora of such plants as *Cymbidium atropurpureum*, *Grammatophyllum speciosum*, *Psilotum complanatum*, *Lycopodium nummularifolium*, *Medinilla* spp, and a wealth of other plants. We followed up the Tahan, sometimes taking short cuts over small ridges, and it was on one of these that we first caught sight of the Tahan *bertam*, *Eugeissona brachystachys*, looking remarkably different from the common weedy *E. triste* which is found all over the west of Malaya but is known in the park from only one hillside. *Eugeissona brachystachys* is a stemless palm with beautiful leaves arching up to 25 feet.

The petiole and rachis are only sparsely spiny and are covered with hairs and peltate scales giving the rachis a mushroom pink tinge. The leaflets are broad and acuminate in a long drip-tip, and are of a lovely rich dark green. Vegetatively it makes a strong contrast to the dingy common *bertam*, *Eugeissona triste*. In flower, it is strikingly different—instead of the funereal dark brown flowers the flowers have shiny green petals of the same woody texture and the pollen is clear yellow as opposed to purply-brown. The curious egg-shaped fruits covered in minute scales are very similar to those of *bertam*. From Kuala Puteh north to Kuala Teku we found the Tahan *bertam* very common on hill slopes.

Climbing down one of the last hills we discovered a fine colony of *daun payong* or *koh* (umbrella leaf) *Johan-*



2. Close-up of the infructescence of *Eugeissona brachystachys*. Note the minutely scaly fruit, and the paucity of spines on the leaf rachis: 6-inch rule as scale.

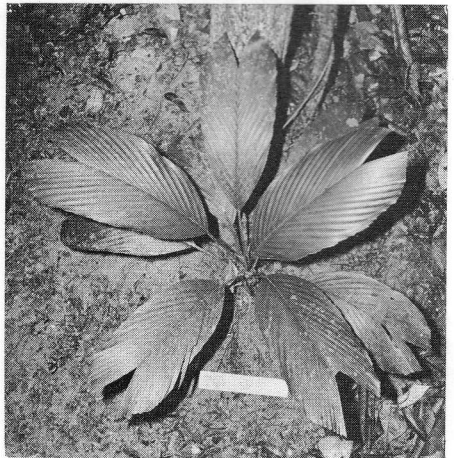
nesteijsmannia altifrons, that most regal of all Malayan palms, in old flower and young fruit. We later saw this palm in great abundance on the slopes of Gunong Tahan.

After losing our way for half an hour, we finally found Kuala Teku, the most idyllic camp site imaginable. All around us the great *neram* and *Tristania* trees soared, the rivers Teku and Tahan joined in a deep pool full of fine fish, and the sandstone rocks were lined with the delicate fern, *Dipteris Lobbiana*, forming a beautiful fringe to the river.

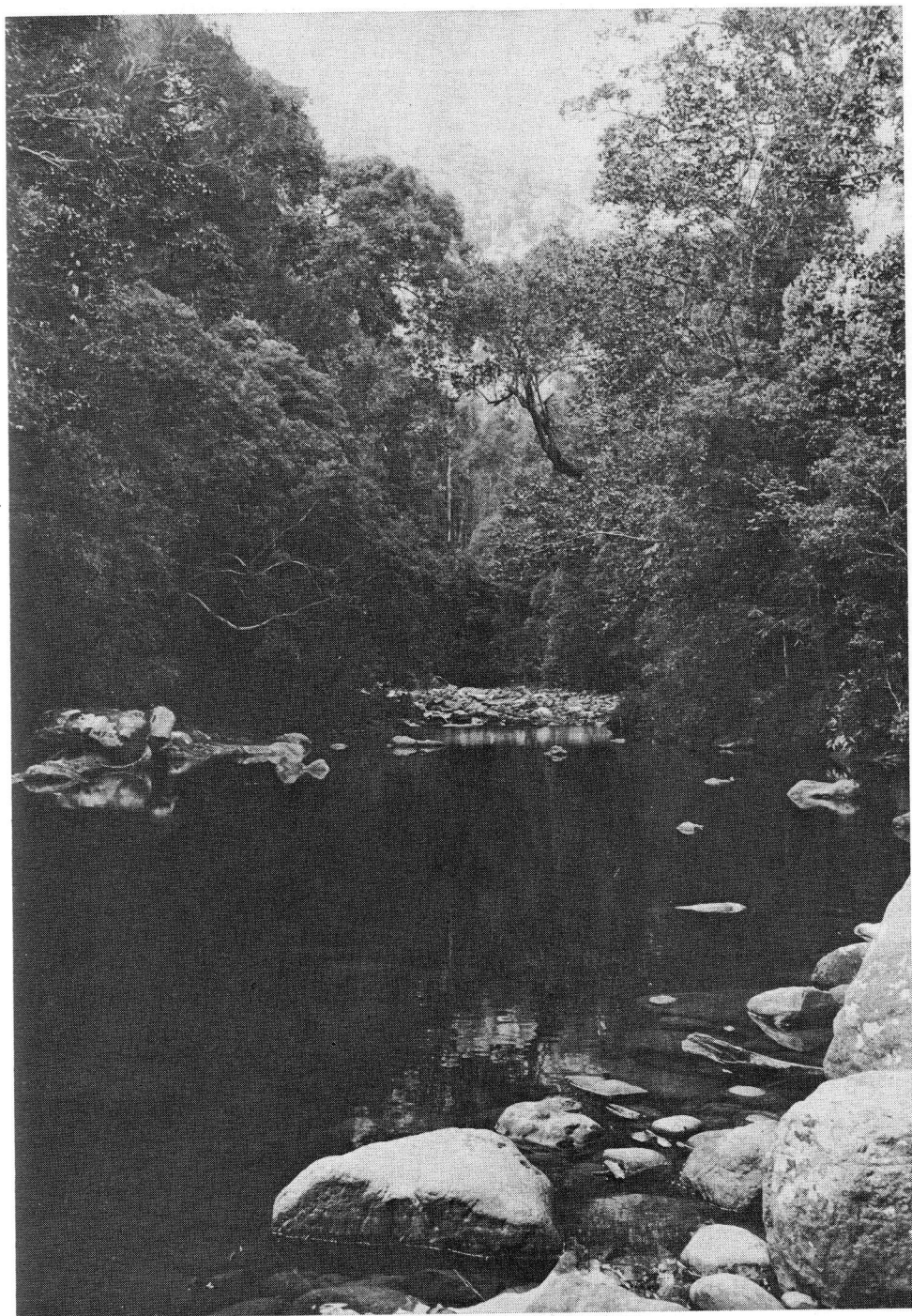


3. *Iguanura geonomaeformis*—broadly pinnate stemless form, Kuala Teku: 6-inch rule as scale.

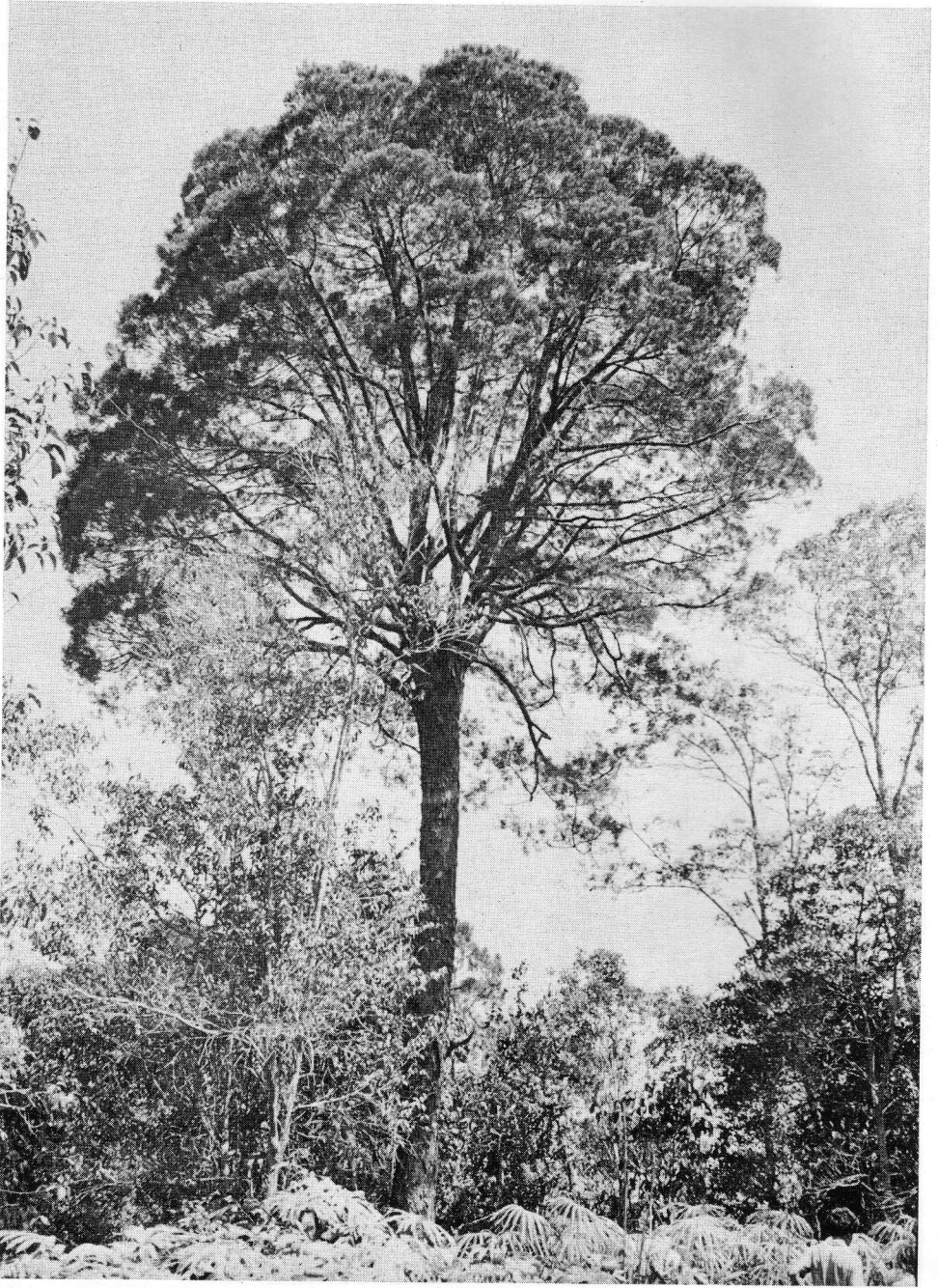
We planned to spend three days collecting around Kuala Teku, and then to shift camp partly to Wray's Camp at 3,000 feet at the lower limit of the



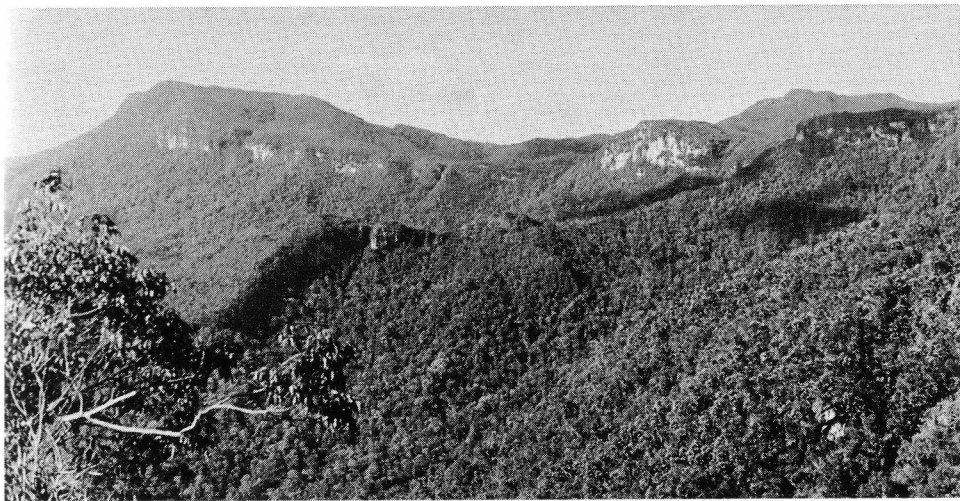
4. *Iguanura geonomaeformis*—entire-leaved stemless form, Kuala Teku: 6-inch rule as scale.



5. The Sungei Teku at Kuala Teku—our camp was on the right bank in the background. *Neram* trees lean over the river.



6. Wray's Camp, alt. 3,000 feet on Gunong Tahan, is graced by a beautiful old tree of *Dacrydium*: the mountain ferns *Matonia pectinata* and *Dipteris conjugata* below, and Paling as scale.



7. The view from Wray's Camp, over the slopes of the mountain—acres of *Livistona tahanensis* on the slopes below.

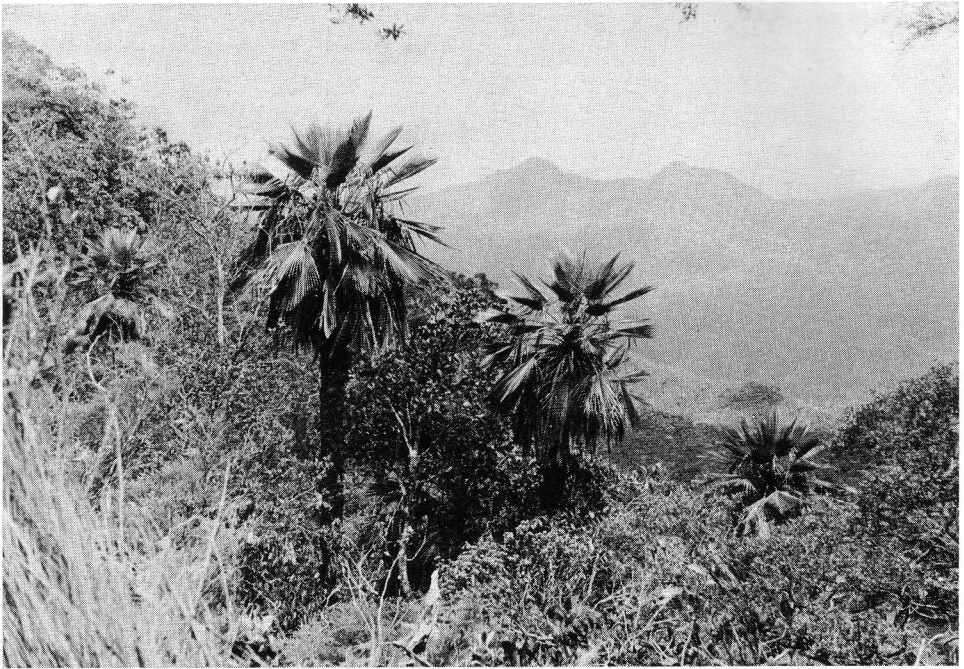


Upper Montane Forest, and then to work out from there collecting plants. The weather was superb—in fact, almost unprecedentedly good for expeditions up the mountain; we had only one half-hour shower the whole time we were in the Park—this kept at bay the leeches for which the Park is notorious.

Eugeissona brachystachys proved to be very abundant all around us at Kuala Teku, on steep hill slopes and ridgetops. Other common palms in the same habitat included *Licuala triphylla*, a very small *Licuala* with three- to five-partite leaves, the whole plant not more than 40 centimeters (16 inches) in height, *Licuala glabra*, a common rather variable species, *Pinanga disticha* common on slopes just above the river, the young leaves beautifully mottled with pale and dark green, and often flushed purple, and *P. simplicifrons*. Among the rattans we found *Calamus javensis* and *C. ramosissimus* and many species of *Dae-*

←

8. A fine *Livistona tahanensis* silhouetted. Note the stiff leaves.



9. A group of *Livistona tahanensis* in the mountain forest: Gunong Perlis in the background.

monorops. On the lower slopes and riverside alluvium was the decorative palmunculus *Iguanura geonomaeformis* which occurs in a wide range of forms: plants may produce fruit when they are stemless or not till they are trunked: leaves vary from entire through broadly pinnate with rhomboid leaflets to very finely pinnate. Every intermediate can exist between these extremes. The inflorescences are unbranched and arch out from amongst the leaves; fruit is white and fleshy when mature.

The walk up the ridge between the rivers to Wray's Camp only occupied half a day and so we were able to botanize as we went. The *Tahan bertam* was common up to about 2,000 feet and *Johannesteijsmannia altifrons* was very common locally up to 2,900 feet, a remarkably high record for this palm. At 2,900 feet it grows in Lower Montane Forest with *Dacrydium*, the ferns *Matonia*

pectinata and *Dipteris conjugata*, and many typically montane plants. As yet we could see no sign of the *Livistona*. When we reached Wray's Camp we came suddenly out into Upper Montane Forest, here very low for Malaya, and there, stretching for miles ahead of us, we could see the massif of Gunong Tahan with gleaming quartzite cliffs and stunted twisted montane forest through which emerged the crowns of *Livistona tahanensis* in extraordinary abundance—thousands upon thousands glittering in the sunshine as the wind blew over the mountain. We were soon out in the mountain forest collecting plants. *Livistona tahanensis* is found on Tahan up to about 5,000 feet. It reaches about 20 feet in height with a skirt of dead leaves in which grow epiphytic rhododendrons, medinillas, orchids, and ferns in profusion. The leaves are stiff and slightly glaucous and the flowers a rich golden



10. A gully filled with *Pinanga polymorpha*. Cerus as scale.

yellow in sprays. The fruits are shiny green. As the sun set that night, the mountainside flushed pink and mauve and the livistonas silhouetted against a pearly sky made an unforgettably beautiful sight.

Wray's Camp, perched on an exposed ridge-top proved to be windy and rather chilly, and we were very thankful the weather was clear. Even so we were grateful for the leaves of *Johannesteijsmannia* which made excellent wind shields and supplemented our rather flimsy polythene sheet tent. The peaty soil on which we were camping was so dry after the drought that the tree climbers set fire to the peat while they were cooking the rice one evening—a minor panic ensued in which we had visions of our tents, plants and the whole mountain top going up in flames, but we managed to extinguish the fire before it spread.

Palms are not common in the Upper Montane Forest, the *Livistona*, *Pinanga polymorpha*, and a few rattans being the only species noted by us. We found one gully filled with a sward of the decorative *Pinanga polymorpha* which, like many *Pinanga* species, has shiny black fruit borne on a pink axis. Among the rattans was the giant mountain rattan, *Plectocomia Griffithii*—unfortunately long past flowering and only with rotten fruit. This palm, the most massive rattan in Malay, is monocarpic, and many dying palms seemed to suggest that it flowers gregariously on Gunong Tahan. Some young plants showed signs of being mauled by elephant, which are partial to the sweet palm cabbage. Our guide told us that one particular elephant with regular habits goes rattan eating on Gunong Tahan every year—we followed its tracks and piles of old dung all the way up the ridge from Kuala



11. The great mountain rattan *Plectocomia Griffithii*.



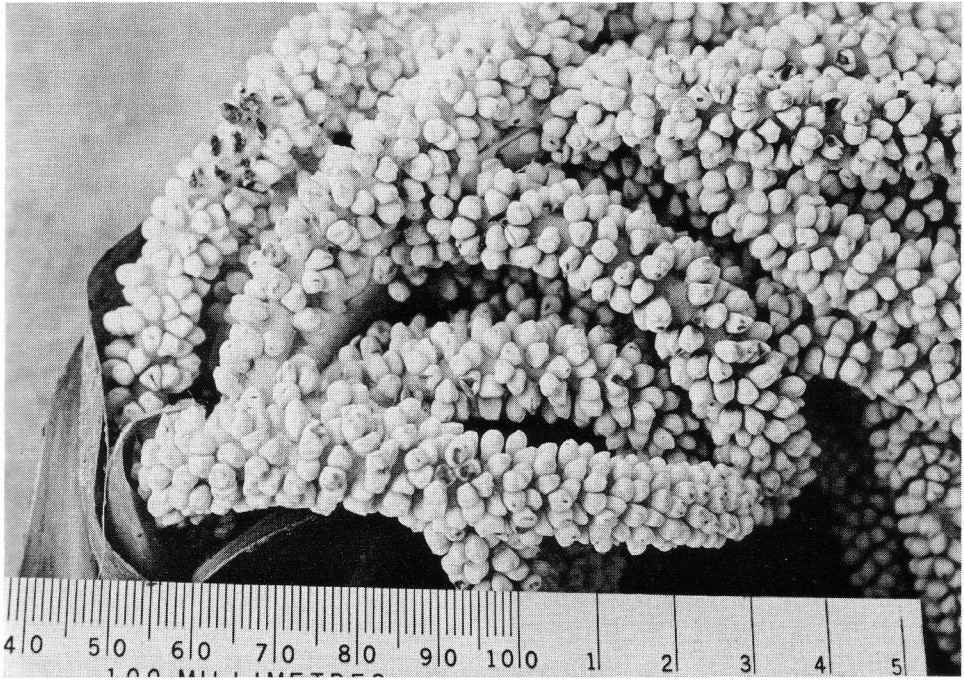
12. *Daemonorops angustifolius* at Kuala Kenyam, a common riverside species.



13. Gi dwarfed by a fine old plant of *Johannesteijsmannia altifrons* near Kuala Kenyam.

Teku to Wray's Camp and beyond. It is difficult to imagine how the elephant manages to extricate the palm cabbage from inside the leaf sheaths which are

covered in a formidable array of spines. *Calamus oreophilus* was abundant along the ridge-tops scrambling over the small trees of *Leptospermum* and *Baekia*.



14. The milky white flowers of *Johannesteijsmannia altifrons*.

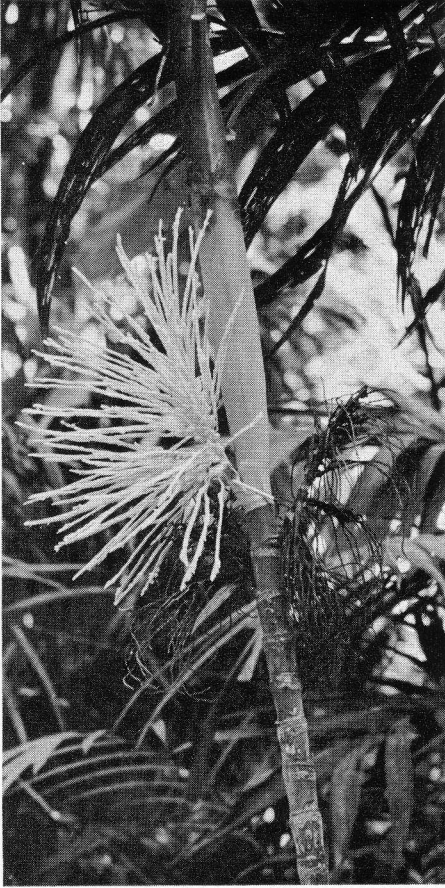
This is a very slender rattan with dark green leaflets arranged in fanlike groups along the rachis; the leaf bases are armed with short spines neatly marked with black, and the long pendulous inflorescences curve out from the stem.

Attractive herbs are abundant in the Upper Montane Forest of Gunong Tahan. *Gentiana malayana*, a small pale blue gentian, *Burmannia disticha*, with mauve flowers tipped with yellow, *Nepenthes gracillima* with white pitchers, and *N. sanguinea* with dark red-flecked pitchers, and small purple-flowered utricularias were particularly abundant. Orchids festooned the trees of *Leptospermum* and *Baekia* and some extremely bizarre mistletoes were conspicuous with flaming orange and crimson flowers.

We worked the middle slopes (3,000–5,000 feet) of the mountain for two days and then returned to the camp at Kuala Teku, where we rested for a day

and then began the long slog back to Kuala Tahan along the Sungei Tahan and the interminable undulating ridge. Twelve days after leaving Kuala Tahan we arrived back at Kuala Tahan feeling thoroughly tired and found two days rest at the Park headquarters most welcome.

The second part of our stay in the National Park was partly sabotaged by the very low water in all the rivers—we had hoped to work our way right to the headwaters of the Sungei Tembeling to the borders of Trengganu, but we only just managed to reach Kuala Kenyam on the Tembeling river after pushing the boats over shallow rapids. We set up camp on the alluvial flats just above the Sungei Kenyam near to the confluence of the Kenyam and the Tembeling—certainly not such a beautiful camp site as Kuala Teku, but nevertheless very pleasant. This camp was mem-



15. *Areca triandra* in full flower near Kuala Kenyam.

orable for the mosquitoes, tiger tracks found on the river sand near the tents early one morning, and a false alarm for a crocodile which metamorphosed into a monitor lizard by the time we reached the river bank. We spent five days here working the lowlands and hill slopes. In the forest on low-lying ground near the river, palms were very abundant, particularly a very spiny *Salacca*, differing slightly from *S. glabrescens*, *Iguanura geonomaeformis* and *I. Wallichiana* in every conceivable variant, *Cornera Lobbiana* and *Arenga* sp. (*Didymosperma Hookerianum*). By the

riverside *rotan ayer* (water rattan), *Daemonorops angustifolius*, often formed an impenetrable hedge. In one swamp we found a colony of *Pholidocarpus macrocarpus*, the largest coryphoid palm in Malaya. The colony consisted entirely of young trunkless individuals with gigantic windmill leaves on 15-foot petioles striped with yellow, and armed with massive thorns. We could find no mature plants nor the remains of any dead ones. How the large, heavy fruits six inches in diameter could have reached this isolated swamp is a mystery. More rarely, we found the giant rattan *Calamus erectus* var. *horridus*, *Daemonorops verticillaris*, with its tunnels of spines filled with biting ants, and *D. grandis*, *Pinanga simplicifrons* and the elegant *P. limosa*.

We had been told by negrito aborigines of the occurrence of *Johannes-teijsmannia altifrons* on a hillside near our camp site and we spent one day looking for it. It proved to be locally common on one ridge (Bukit Koh), and absent from the surrounding hills. Growing with it was a group of the decorative palm *Areca triandra*, with bunches of citrus-scented flowers and cherry-red ripe fruit. The leaves of this palm are very variable varying from finely-pinnate to broadly pinnate with rhomboid leaflets to entire. On the return to camp we found scattered individuals of *Nenga pumila* an arecoid palm with brick-red fruit, and a solitary *Orania sylvicola*, a rare palm in the National Park though abundant elsewhere in Malaya.

We reluctantly returned to Kuala Tahan, and on the night before we left were lucky enough to see a herd of eight *seladang*, (wild cattle), including one calf, in a patch of cleared forest just behind the rest-house. As we left the following morning, rain began to fall for the first time in almost three months.



16. *Oncosperma horridum*—a fine clump of this spiny palm near K. Tahan.

We are surely among the few visitors to the Park who have not had to complain of rain and swarms of leeches.

The National Park is readily accessible from Kuala Lumpur, the Federal Capital, and its rich and varied palm flora is by no means completely known.

ACKNOWLEDGEMENTS

Our thanks are due to the Game Department of Malaya for help in or-

ganising the visit, and to all the cheerful porters, tree-climbers and guides, who above all helped to prevent spirits from flagging on the long trek to Gunong Tahan.

GLOSSARY

Bukit—hill

Gunong—mountain

Kuala—confluence of two rivers

Sungei—river

CHECK LIST OF THE PALMS FOUND BY DRANSFIELD AND WHITMORE IN TAMAN NEGARA

Arecoideae

Areca triandra

Iguanura geonomaeformis

I. Wallichiana

Nenga pumila

Oncosperma horridum

Orania sylvicola

Pinanga disticha

P. limosa

P. malaiana

P. polymorpha

P. simplicifrons

Caryotoideae

Arenga sp. (*Didymosperma Hookerianum*)

A. Westerhoutii

Caryota mitis

Cocoideae

Cocos nucifera

Coryphoideae

Johannesteijsmannia altifrons

Licuala glabra

L. triphylla

L. acutifida

Livistona tahanensis

Pholidocarpus macrocarpus

Lepidocaryoideae

Calamus castaneus

C. erectus var. *horridus*

C. javensis

C. oreophilus

C. ramosissimus

Cornera Lobbiana

Daemonorops angustifolius

D. grandis

D. verticillaris

Eugeissona brachystachys

E. triste

Korthalsia spp.

Plectocomia Griffithii

Salacca glabrescens

New Palms from the Pacific, III*

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Many palms of New Guinea are incompletely described—only flowering material or only fruiting material may be known and vegetative parts may be only partially represented or described in notes. It is often difficult, therefore, to determine whether recent and often much more complete specimens represent undescribed species or not. For the genera *Heterospathe* and *Licuala*, however, sufficient information is now available to permit the publication of a number of new species with reasonable certainty that they are distinct. Most of the following descriptions are taken from specimens collected by Leonard J. Brass whose interest in palms, as expressed in detailed notes, photographs and ample collections, has contributed greatly to our knowledge of the family in New Guinea.

HETEROSPATHE

Heterospathe Scheffer and *Ptychandra* Scheffer were described as monotypic genera in the same publication in 1876 and have hitherto been separated on the basis of the number of stamens and nature of the pistillode in staminate flowers, the nature of fibers or sclerosomes in the mesocarp of the fruit, and the nature of the inflorescence. Both have conspicuously pedunculate inflorescences which bear two unequal bracts, the lower (prophyll) being short, ancipitous, open at the apex, the upper much exceeding the lower, terete, rostrate, and enclosing the inflorescence nearly until anthesis. In *Heterospathe*, the inflorescence is usually borne among the leaves while

in *Ptychandra* it often does not mature until the subtending leaf has fallen.

These genera could be distinguished with some facility so long as the species were few but recent collections from New Guinea, and in particular the taxa described below as *Heterospathe annexens* and *H. pulchra*, combine supposedly distinctive characteristics so that I am no longer able to maintain separate genera. Still a third genus, *Barkerwebbia*, was erected by Beccari in 1905 but was abandoned by him two years later (*Nova Guinea* 8: 205. 1907) in favor of *Heterospathe*.

The several novelties that follow are therefore described as species of *Heterospathe* and several species of *Ptychandra* are transferred. Remaining species of *Ptychandra* are insufficiently known or are doubtfully distinct, hence are not transferred. An emended generic description is provided but a satisfactory key to all species cannot yet be provided. As here circumscribed, the genus consists of 20 or more species distributed from the Philippine Islands to Micronesia, Amboina, Batjan, Ternate, New Guinea and the Solomon Islands.

Heterospathe Scheffer, Ann. Jard. Bot. Buitenzorg 1:141, 143, 162. 1876.

Ptychandra Scheffer, Ann. Jard. Bot.

Buitenzorg 1:140, 143, 160. 1876.

Barkerwebbia Beccari, *Webbia* 1:281. 1905.

Solitary or sometimes caespitose, unarmed, dwarf to moderate-sized, monocious palms with stems creeping or erect. Leaves reduplicate pinnate; sheath splitting abaxially and not forming a well defined crownshaft; pinnae acute

*For earlier papers, see *Principes* 10: 85-99, 1966; 13: 67-76, 1969.

to acuminate with prominent elevated midnerve and often thickened marginal nerves. Inflorescences interfoliar or infrafoliar at anthesis; peduncle prominent, bearing 2 unequal bracts; lower bract (prophyll) persistent, attached near the base and completely encircling the peduncle, not congenitally open but splitting abaxially, more or less dorsoventrally flattened with sharply ancipitous margins, open apically; upper bract attached below or sometimes above the middle of the peduncle, terete, rostrate, enclosing the inflorescence in bud, conspicuously exceeding the lower bract, splitting abaxially and caducous or marcescent as the inflorescence matures; rachis short to elongate, bearing only a few simple rachillae or several prominently pedunculate branches which may be simply branched or twice-branched; ultimate rachillae slender with sessile or slightly depressed, spirally arranged triads of a pistillate flower and 2 staminate flowers subtended by a spreading lip-like bract throughout the rachillae, or with paired or solitary staminate flowers toward the apex of the rachillae; bracteole of the staminate flowers small, bracteoles surrounding the pistillate flower 2, explanate to cupular and imbricate. Staminate flowers slightly to markedly asymmetric; sepals 3, broadly imbricate and rounded, more or less keeled dorsally and gibbous basally; petals 3, valvate, usually about twice as long as the sepals, prominently lined when dry, acutish, one usually somewhat larger than the others; stamens 6-36 or more, distinct, the filaments subulate and strongly inflexed at the apex, anthers oblong in outline, dorsifixed and versatile at anthesis, laterally dehiscent by longitudinal slits; pistillode either small and conic, or columnar, prominent, nearly as long as the stamens, sometimes with an expanded apex: pistillate flowers with 3 broadly imbricate

and rounded sepals; petals 3, broadly imbricate with briefly valvate apices; staminodes 3, dentiform; pistil unilocular, uniovulate, the ovule lateral at top of locule, pendulous, hemi-anatropous, ovary short, soft, expanded upward into a thicker styler region below 3 recurved short stigmas. Fruit globose to ellipsoid, small to large; stigmatic residue excentrically apical or subapical to lateral; exocarp smooth but drying granular over short sclerosomes in the thinly fleshy mesocarp, this with flattened anastomosing fibers against the thin operculate endocarp which is shining inside and not adherent to the seed; seed globose to ellipsoid, attached apically and laterally by the elongate hilum extending nearly the length of the seed; raphe branches simple to anastomosed; endosperm ruminant; embryo basal.

Heterospatha annectens H. E. Moore,
sp. nov.

Caulis solitarius ad 12 m. altus; folia ca. 1.5 m. longa pinnis utrinque 30; inflorescentia inter vel infra folia bractea supera pedunculo infra medium inserta, rhachidi ca. 2.5 cm. longa rachillis 3; flos masculus 6 mm. altus staminibus 15 pistillodis ovoideo-conico; fructus ruber obovoideus ca. 18 mm. altus 12.5 mm. in diam.

Stem solitary, 10-12 m. high. Leaves short, arched, on a typical plant averaging 1.5 m. long (including sheath and petiole to 54 cm. long), old leaves merely clasping at the base; sheath and petiole on type each about 24 cm. long, the sheath rather densely lepidote with appressed, brown-membranous scales outside, petiole lepidote to brown-punctulate below, brown-punctulate above; rachis 9-10 dm. long, densely brown-membranous lepidote; pinnae probably more or less 30 on each side, regularly arranged, evenly tapered to an acute or acuminate, obliquely and briefly toothed

apex, the midnerve and 2 submarginal nerves elevated above, densely brown-punctulate on nerves and surface below, the midnerve with large, brown, membranous, basifixed scales at least in basal portion, basal pinnae 34 cm. long, 0.7 cm. wide, middle pinnae 55 cm. long, 2.1 cm. wide, apical pinnae 18.5 cm. long, 1.4 cm. wide. Inflorescences several, among and immediately below the leaves, 5-6 dm. long; lower bract inserted ca. 5 cm. from the base, ancipitous, upper bract inserted ca. 10.5 cm. above the lower and only slightly below the middle of the peduncle, marcescent; peduncle 32 cm. long, clothed with brown and white scales having twisted marginal hairs; rachis short, ca. 2.5 cm. long, with 3 stout stiff rachillae to 28 cm. long, 4 mm. in diam., these glabrous or glabrescent; triads subtended by acute reflexed bract to 1.5 mm. long, bracteoles of pistillate flowers ca. 1 mm. high. Staminate flowers ca. 6 mm. long, yellowish (?), asymmetric; sepals 2.5-3 mm. long; petals 4-5 mm. long, ca. 3.5 mm. broad, strongly nerved when dry; stamens 15; pistillode trifold-conic, about one-half as long as stamen-filaments: pistillate flowers seen in bud only, the perianth in fruit with sepals 2.5 mm. high, petals 5 mm. high, staminodes 3. Fruit red when ripe, obovoid, 18 mm. high including cupular perianth (when not completely mature), 12.5 mm. in diam. (but probably wider when mature), with prominent excentrically apical stigmatic residue; immature seed brown.

Specimens examined. NEW GUINEA. PAPUA: Milne Bay District; Rossel Island, occasional in forests of south slopes, Mt. Rossel, alt. 700 m., October 14, 1956, *L. J. Brass 28409* (A, type).

Heterospathe annectens in several ways bridges the differences once thought to exist between *Heterospathe* and *Ptychandra*, resembling the first

in habit and small inflorescence borne among or below the leaves, resembling the last in numerous stamens, short pistillode and rather large fruit. For this reason the epithet *annectens* (linking, joining) was chosen.

This species, like *H. delicatula*, has a once-branched inflorescence with few rachillae but differs in caulescent habit, in the essentially glabrous rachillae, in larger staminate flowers probably of yellowish color, 15 stamens and large fruit. The numerous stamens or large fruit clearly distinguish it from *H. humilis*, *H. elegans*, and *H. Versteegiana* which may have once-branched inflorescences and upper bracts inserted high up on the peduncle.

Heterospathe Clemensiae (Burret) H. E. Moore, *tr. nov.*

Ptychandra Clemensiae Burret, Notizbl. Bot. Gart. Berlin **13**:468, 1937; **15**:10. 1940.

Burret listed a number of Clemens collections in 1940 additional to the type to which the following may be added, both identified by him:

NEW GUINEA, TERRITORY OF NEW GUINEA: Morobe District; Ogeram nang, 6000 ft., 24 Feb. 1937, *Clemens 5478* (A); Yunzaing, 4500 ft., 20 June 1937, *Clemens 6566* (A).

Heterospathe delicatula H. E. Moore, *sp. nov.*

Palma acaulis; folia 1-1.8 m. longa pinnis utrinque 18-21; inflorescentia inter folia erecta ad 8 dm. alta rhachidi tomentoso-lepidota 1.5-10 cm. longa rachillis tomentosis 3-5 ad 20 cm. longis; flos masculus purpureus 3.5-4 mm. altus staminibus 8-9 pistillodio ovoideo-conico; fructus subglobosus 10 mm. altus 8 mm. in diam.

Stems not produced above ground, probably prostrate. Leaves few, ascending, 1-1.8 m. long on flowering plants;

sheath lepidote with small, scattered, light brown, membranous scales, split about halfway to the base opposite the petiole, 10–22 cm. long, the margin fibrous; petiole 29–54 cm. long, rounded and with scattered, minute, pale scales below, convex and essentially glabrous above; rachis 48.5–91 cm. long, lepidote or punctulate above and below; pinnae 18–21 on each side, regularly arranged except the approximate basal pairs, acuminate, the midnerve and 2 secondary nerves near the margins prominent and elevated and membranous-lepidote or merely punctulate above, nerves and surface more or less densely brown-punctulate below and the midnerve with large, brown, membranous, basifixed scales at least in the basal portion, basal pinnae 15–22 cm. long, 0.4–0.7 cm. wide, middle pinnae 20–34 cm. long, 1.5–2.8 cm. wide, apical pinnae 10–16 cm. long, 0.7–1.7 cm. wide. Inflorescences interfoliar, erect, 68–80 cm. high; lower bract 16–19 cm. long, sparsely brown lepidote, upper bract prominently brown lepidote, terminated by a flat rostrum 3–4 cm. long, exceeding the lower by 33–38 cm. and exceeding the peduncle, this densely ferruginous-tomentose-lepidote at least when young; rachis ferruginous- or brown-tomentose-lepidote, 1.5–10 cm. long, with 3–5 rachillae, these 10–20 cm. long, tomentose like the rachis and bearing triads of flowers at intervals of ca. 3 mm.; triads subtended by a prominent acute bract ca. 1 mm. high; bracteoles surrounding the pistillate flowers brown, erect, to ca. 1 mm. high. Staminate flowers purple in bud, 3.5–4 mm. high, acute; sepals ca. 1 mm. long, more or less rounded; petals 3–3.5 mm. high, nerved when dry, asymmetric, angled and more or less acute at the apex; stamens 8–9; pistillode trifid-conic, ca. one-half as long as the stamens; pistillate flowers seen in bud only, the perianth

in fruit of petals 4 mm. long, sepals 2 mm. high; staminodes 3–4. Fruit red at maturity, subglobose, ca. 10 mm. high, 8 mm. in diam. when dry, 10 mm. diam. when fresh, with excentrically subapical stigmatic residue, drying granular; seed brown, 6.5 mm. high, 6 mm. in diam.; endosperm ruminant.

Specimens examined. NEW GUINEA. PAPUA: Milne Bay District; common in oak forest, north slopes of Mt. Dayman, Maneau Range, alt. 1150 m., June 22, 1953. *L. J. Brass 23005* (BH, type; A, isotype).

The epithet is taken from the dwarf habit and small inflorescences which, like those of *H. annectens*, are only once-branched into few rachillae. In this respect, these two species differ from those previously described except *H. humilis*, *H. elegans* and *H. Versteegiana*, all of which have the upper bract inserted well above the middle of the peduncle and staminate flowers with 6 stamens. *Heterospathe delicatula* differs from *H. annectens* in its acaulescent habit, somewhat smaller purple staminate flowers with only 8–9 stamens, in the smaller fruit, and in the much more slender, tomentose rachillae.

Heterospathe glabra (Burret) H. E. Moore, *tr. nov.*

Ptychandra glabra Burret, Notizbl. Bot. Gart. Berlin 11:713. 1933.

The type of this species was collected in flower by E. Mayr (n. 611) in the Cyclops Mountains, West Irian, in 1928. A somewhat more recent collection of fruiting material collected by Brass appears to belong here. The fruits are red, subglobose, 15 mm. high, 13–14 mm. in diam. with excentrically apical stigmatic residue. The Brass specimens cited below differ from the description of the type in that rachillae are sparsely brown-lepidote in flower, but the correspondence is otherwise so good that

the present disposition seems reasonable. Brass's field notes state that collections were made in mossy forest, where common in gullies and on sheltered slopes as an intruder from lower levels.

Specimens examined. NEW GUINEA. WEST IRIAN: 15 km. S. W. of Bernhard Camp, Idenburg River, 1800 m. alt., Jan. 1939, *L. J. Brass 12119* (A); *12139* (A).

Heterospathe glauca (Scheffer) H. E. Moore, *tr. nov.*

Ptychandra glauca Scheffer, Ann.

Jard. Bot. Buitenzorg 1:160. 1876

Ptychosperma Musschenbroeckianum

Beccari, Malesia 1:53, 100. 1877

(*'Musschenbroeckiana'*).

The name *Ptychosperma Musschenbroeckianum* is placed in synonymy here on the authority of Beccari in manuscript edited after his death by Martelli (*Nuovo Giornale Botanico Italiano* ser. 2, 42: 74, 78. 1935). The type of *Heterospathe glauca* is from Batjan Island, that of *P. Musschenbroeckianum* from Ternate, and there are minor differences in the number of stamens and of staminodes noted by Beccari.

Heterospathe lepidota H. E. Moore, *sp. nov.*

Ab *Heterospathe Versteegiana* sepalis floris masculi et feminei castaneo-vel ferrugineo-lepidotis et pinnarum nervis secundariis submarginalibus non brunneo-punctulatis differt.

Solitary, to 5.5 m. high, the stem 4 m. high, 5 cm. in diam. at base, 7.5 cm. in diam. under leaves. Leaves 2.5 m. long, 7.5 dm. broad, with ca. 35 pairs of pinnae; sheath short, ca. 20 cm. long, sparsely dark-brown appressed-lepidote where protected, with fibrous margin produced opposite petiole; petiole ca. 55 cm. long, sparsely to very sparsely brown appressed-lepidote above

and below; rachis similarly lepidote; pinnae slender, not prominently brown-punctulate below, with few large brown scales on midnerve below, the midnerve and submarginal secondary nerves prominent and elevated above, basal pinnae ca. 45 cm. long, 1 cm. wide, middle pinnae ca. 62 cm. long, 2.5 cm. wide, apical pinnae ca. 36 cm. long, 1.5–2.7 cm. wide. Inflorescences interfoliar, to 1 m. long, erect in flower with drooping top, more clearly drooping in fruit; peduncle ca. 85 cm. long, densely brown-punctulate basally to densely ferrugineous-lepidote-tomentose apically; lower bract (not seen) inserted near the base, upper bract inserted ca. 52 cm. above the base, marcescent with tubular base remaining; rachis densely ferrugineous-lepidote-tomentose, with 12–15 branches, the lower and middle branches at least again once-branched into densely ferrugineous-lepidote-tomentose rachillae to 36 cm. long, 2–3 mm. in diam., densely flowered, the triads subtended by a very low bract; bracteoles subtending the pistillate flower low. Staminate flowers yellowish, ca. 3 mm. long; sepals 1.2 mm. high, rounded and ferrugineous-lepidote dorsally; petals glabrous, 2.4–2.8 mm. long; stamens 6; pistillode cylindrical, as long as stamens in bud; pistillate bud with sepals ferrugineous-lepidote dorsally. Fruit red, drying roughened, ellipsoid-ovoid with excentrically apical stigmatic residue, 1.5–1.7 cm. long when dry, 1 cm. in diam.; seed ovoid, light brown, rounded at apex, 9 mm. high, 8 mm. in diam.

Specimen examined. NEW GUINEA. PAPUA: Northern Division; on steep slope of ca. 10 m. deep gully, fairly open to sun, ca. 2 km. N. E. of Sangara homestead (ca. 10 km. W. of Popondetta), alt. 200 m., August 7, 1953. *R. D. Hoogland & J. S. Womersley 3241* (A, type).

Vernacular name: *soriki* (Orokaiva language, *mumuni*).

Heterospathe lepidota, so named because of its lepidote sepals, is similar to *H. Versteegiana* but differs in its vestite sepals and in its pinnae with conspicuously elevated secondary nerves toward the margin of the upper surface and little or no brown punctulation on the lower surface. It clearly belongs with that group of species which Beccari at one time called *Barkerwebbia*, including in addition to the above two, *H. elegans* and *H. humilis*.

Heterospathe Muelleriana (Beccari)

Beccari in Martelli, Nuov. Giorn. Bot. Ital. ser. 2, **42**:50, 74. 1935.

Ptychandra Muelleriana Beccari, Nuov. Giorn. Bot. Ital. **20**:177. 1888.

New collections agree with the type of *Heterospathe Muelleriana* and extend its range substantially. They also permit the addition of information on the staminate flowers which are 7–8 mm. long with (10–) 14–15 stamens and a trifid-conic pistillode shorter than the stamen-filaments.

Specimens examined: NEW GUINEA. PAPUA: Eastern Highlands District; northeast slopes, Mt. Michael, alt. 2000 m., 9 Sept. 1959, *L. J. Brass 31484* (A). Central District; Mt. Obree, a. 1887, *W. A. Sayer s. n.* (FI, type). Milne Bay District; east slopes, Goodenough Island, alt. 1600 m., 20 Oct. 1953, *L. J. Brass 24839* (A).

Heterospathe obriensis (Beccari) H. E. Moore, *tr. nov.*

Ptychandra obriensis Beccari, Nuov. Giorn. Bot. Ital. **20**:178. 1888.

Ptychandra? montana Burret, Notizbl. Bot. Gart. Berlin **12**:324. 1935.

Additional collections suggest that *Heterospathe obriensis* would include *Ptychandra? montana* which Burret compared only with *Ptychandra glabra*

and *P. glauca*. I have examined types of both species and have compared other collections with them. Staminate flowers, not previously described, are 9–11 mm. long with 18–21 stamens and short conic pistillode. Fruit is variable in size, 29–35 mm. high, 22–28 mm. in diameter. The species as I now interpret it is known from the following stations in Papua.

Specimens examined. NEW GUINEA. PAPUA: Central District; Mt. Tafa, May–Sept., 1933, *L. J. Brass 4974* (isotype of *P. montana*, A); Mt. Obree, a. 1887, *W. A. Sayer s. n.* (type of *P. obriensis*, FI). Milne Bay District; mossy forest of riverbanks, gorge of Upper Gwariu River, north slopes of Mt. Dayman, alt. 2030 m., 15 June 1953, *L. J. Brass 22940* (A). District not known; Lala River, alt. ca. 5000 ft., 26 Dec. 1935, *C. E. Carr 14023* (A), 7 Mar. 1936, *C. E. Carr 16004* (BH).

Heterospathe pulchra H. E. Moore, *sp. nov.*

Caulis solitarius ad 10 m. altus; foliorum pinnae utrinque 40–50; inflorescentia infra folia ad 1.24 m. longa ramis in rachillas glabras glaucas 10–11 divis; flos masculus 3–4 mm. altus staminibus 6 pistillodio trifido-conico; fructus ruber globosus 8 mm. in diam.

Stem solitary, 8–10 m. high. Leaves fewer than 10, pale green; petiole and short sheath ca. 1 m. long; sheath alone ca. 35 cm. long with scattered, minute, brown, membranous, fringed scales; petiole ca. 65 cm. long, at first with pale appressed scales (at least above) becoming glabrescent or glabrous; blade ca. 2.5 m. long; rachis glabrous; pinnae probably 40–50 on each side, glabrous except for large, shining, brown, membranous scales on the midnerve below, the lower surface not or scarcely brown-punctulate, midnerve and submarginal nerves prominent above, basal pinnae

nearly 9 dm. long, 0.7 cm. wide, terminating in a loria, middle pinnae ca. 8 dm. long, 2.2 cm. wide, apical pinnae ca. 31 cm. long, 0.5 cm. wide. Inflorescences infrafoliar (1 in flower, 1 in fruit), ca. 1.24 m. long; peduncle 8.4 dm. long; bracts not known; rachis not known; branches several, again once-branched into 10–11 slender, glabrous and (at anthesis) glaucous or glaucescent rachillae to 16 cm. long, 2 mm. wide; triads subtended by an acute to rounded bract; bracteoles of pistillate flowers low, rounded, brown, to ca. 1 mm. high. Staminate flowers asymmetric, 3–4 mm. high; sepals glabrous, ca. 1.4 mm. high; petals angled apically, 3–3.5 mm. high; stamens 6; pistillode trifid-conic, shorter than the stamen-filaments: pistillate bud 3 mm. high, the pistillate perianth in fruit with sepals 2 mm. long, petals 3.5 mm. long, and 3 staminodes. Fruit red at maturity, globose, with lateral stigmatic residue in upper third, 9 mm. high, 8 mm. in diam.; seed brown, 6.5 mm. in diam. with 5–6 ascending raphe-branches from the base.

Specimen examined. NEW GUINEA. PAPUA: Milne Bay District; Fergusson Island, common locally in heavily mossed forest of ridge crests, mountains between Agamoia and Ailuluai, alt. 900 m., June 12, 1956. *L. J. Brass 27116* (A, type).

This species is exceptional in several respects. The glabrous rachillae with a distinct glaucescence at anthesis, the combination of six stamens and trifid-conic pistillode in the staminate flower, the lack of conspicuous brown punctulation on the lower surface of the pinnae, and the small globose fruit differentiate the species from all others in New Guinea. It is noteworthy that the staminate flowers of *H. pulchra* combine the number of stamens (6) formerly attributed to *Heterospatha* and the type of pistillode (trifid-conic, shorter than

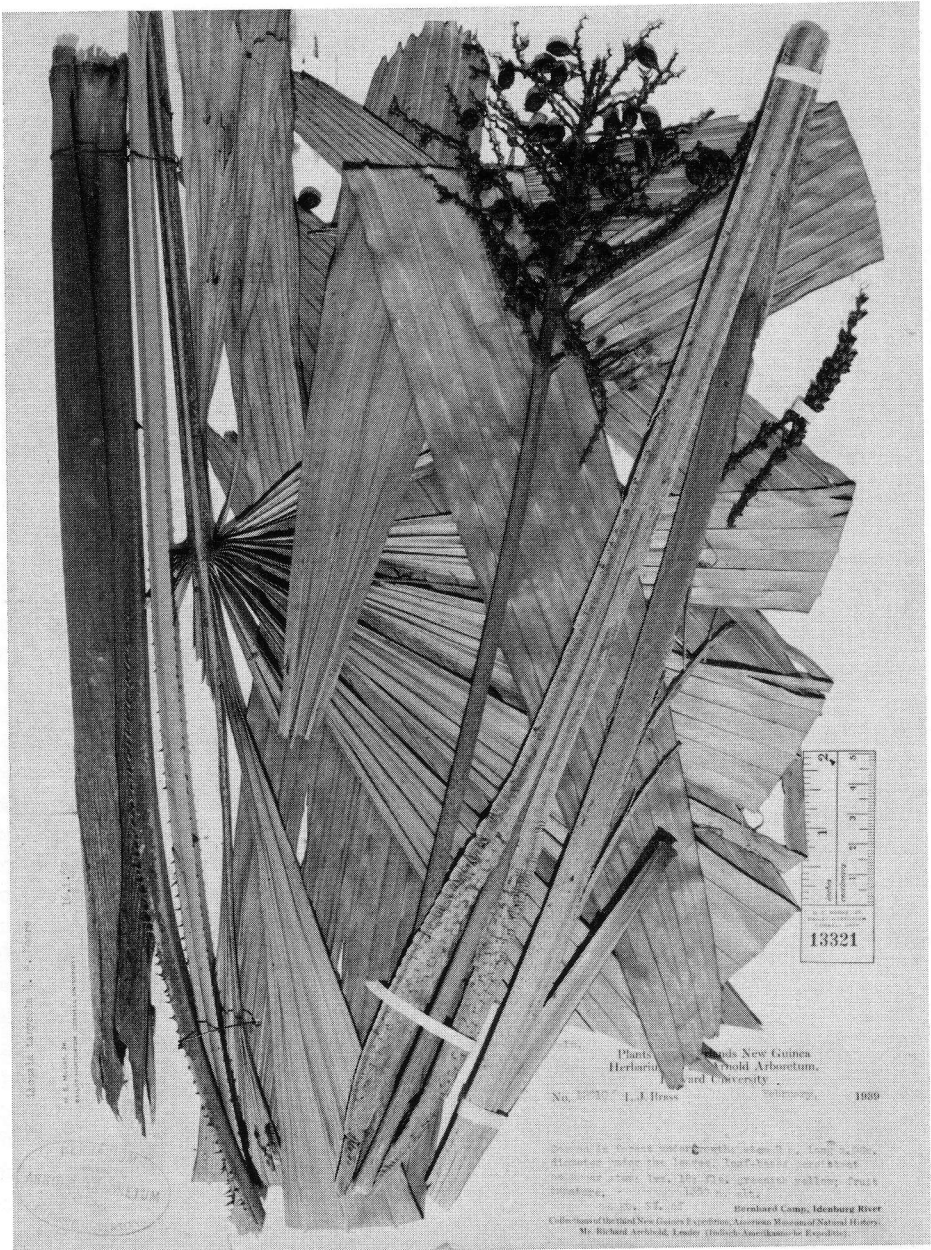
stamen-filaments in bud) formerly attributed to *Ptychandra*.

LICUALA

Licuala tanycola H. E. Moore, *sp. nov.*

Licualae parviflorae similis sed floribus pedicellatis, fructu globoso-ellipsoidal 13 mm. longo 9 mm. in diam., foliis dense brunneo-lepidotis vel brunneo-punctulatis, inflorescentiis bracteam unicam gerentibus differt.

Stem solitary, to 2 m. high, 6 cm. in diam. below leaves, clothed in upper portion with persistent leaf-bases. Leaves ca. 18; sheath (from interior leaf) ca. 35 cm. long in entirety, ca. 17 cm. long from base to point of separation from petiole, produced in a ligule ca. 18 cm. long adaxial to the petiole, this ligule adnate ca. 12 cm. to the adaxial margins of the petiole and with a free tip ca. 6 cm. long, the ligule of coarser fibers than the basal portion of the sheath and these tending to separate, the whole reddish brown when dry and rather densely clothed with irregular, impressed patches of very thin, membranous, brown-centered, irregularly hyaline- or whitish-margined scales where protected, or merely dark-brown-punctulate with persistent scale attachments where exposed; free portion of petiole ca. 78.5 cm. long, armed with recurved to spreading teeth to 3 mm. long for ca. 50 cm. above base, unarmed apically, concave adaxially at the base becoming convex with a rounded central ridge toward the apex, rounded abaxially at the base becoming prominently ridged toward the apex, the adaxial surface essentially glabrous with occasional small, linear, brown, membranous scales, the abaxial surface with a more or less continuous cover of appressed, brown-lacerate-margined, interlocking, peltate scales where protected or rather densely brown-punctulate with persistent scale



1. *Licuala tanycola*. Photograph of Brass 13010 showing inflorescence and leaf with sheath and ligule. Photo by H. H. Lyon.

attachments where exposed, continued abaxially as a prominent costa ca. 5 cm. long and then into the central segment, terminated adaxially by a short, acute

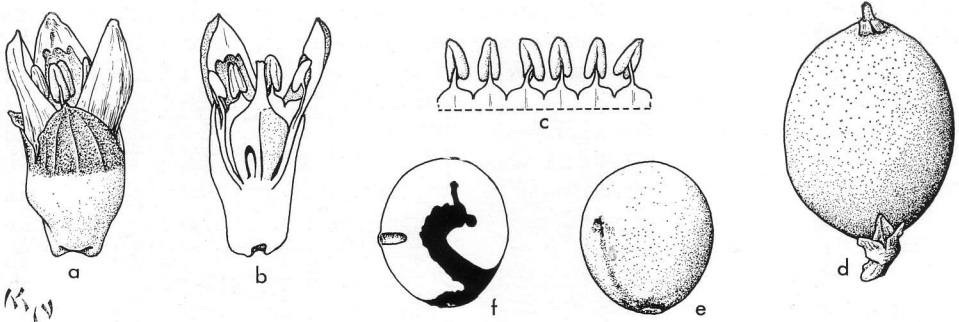
hastula 1-1.5 cm. long; segments (13-) 17-19, densely covered below, less densely above, with minute, shining, red-brown scales, the outermost seg-

ments (21-) 37-42 cm. long, 2-5 cm. wide at about the middle, the central on each side (41-) 50-68 cm. long, 5-9 cm. wide, the median segment with a long slender base, 50-70 cm. long, 5.4-7.5 cm. wide, all the segments widest at or above the middle, somewhat narrowed to the obliquely toothed apex and long-cuneate at the base, the major nerves 3-5 and elevated on the upper surface. Inflorescence 1.35-1.7 m. long (in 2 complete inflorescences available); peduncle elongate, 1.24-1.4 m. long, bearing a single ancipitous bract (prophyll) to 50 cm. long or more, inserted ca. 34-45 cm. above the base, expanded apically and often splitting dorso-ventrally into two keeled valves, both peduncle and bract rather densely clothed with patches of red-brown peltate scales with irregularly woolly-lacerate margins or merely brown-punctulate with persistent scale attachments; rachis 8-22 cm. long, with 17-30 or more branches, these either all undivided or the lower few once-branched with up to ca. 20 rachillae, the rachis and flexuous rachillae densely red-brown furfuraceous at anthesis and in fruit, each branch subtended by an acute bract, those of the lowest branches up to 2.5 cm. long. Flowers greenish-yellow in life, ca. 5 mm. long when dry, solitary or very rarely paired on reddish-purple (when dry) pedicels to 3 mm. long at bases of rachillae or only 1 mm. long at or near the apex, each pedicel subtended by a minute bract; calyx ca. 3.5 mm. long, produced basally in a ring around the apex of the pedicel and adnate ca. 1 mm. to the floral receptacle, then free, with 3 acute lobes ca. 1-1.5 mm. long, the base drying pale brown externally, not nerved, sparingly clothed with minute, red-brown scales, the lobes drying red-purple with distinct nerves and essentially glabrous; corolla 4 mm. long, drying red-purple with prominent nerves, the tube 1-1.5 mm. long, the

lobes 3 mm. long, thick, acute, excavate on inner surface; stamen-filaments connate by their bases in a 6-lobed ring at the throat of the corolla-tube, the bases broad, not lobed, suddenly narrowed into subulate tips, anthers basifixed, sagittate, ca. 1 mm. long; pistil 3 mm. long at anthesis. Fruit red (?), globose-ellipsoid at maturity, ca. 13 mm. long, 9 mm. in diam., with abortive carpels prominent at the apex; seed globose, 7 mm. in diam., with testa intruded beyond the middle.

Specimens examined. NEW GUINEA. WEST IRIAN: common in forest undergrowth, 6 kms. southwest of Bernhard Camp, Idenburg River, 1200-1350 m. alt., February, 1939, *L. J. Brass 13010, 13010A* (holotype), *13010B, 13010C* (A); occasional in rain forest of both ridges and river plains, 4 kms. southwest of Bernhard Camp, Idenburg River, 850 m. alt., March, 1939, *L. J. Brass 13436, 13460* (A).

Licuala tanycola, from the Greek *tanyein* (to stretch out) and *kolon* (limb, leg) in allusion to the long peduncle of the inflorescence (Fig. 1), most closely resembles *L. parviflora* Dammer ex Beccari of subgenus *Licualella* in Beccari's monograph of the genus (*Annals of the Royal Botanic Garden, Calcutta* **13**: 109-224. 1933 [1931]). I have not seen the type of *L. parviflora* (formerly at Berlin) but from the description, it becomes evident that *L. tanycola*, though similar in flower, differs in several respects. The peduncle bears only one major bract rather than the two reported for *L. parviflora* (though Beccari actually described only one), the flowering axes are more numerous from a continuing rachis, the flowers are clearly and prominently pedicellate rather than sessile, the calyx is prominently 3-lobed rather than shortly 3-toothed (Fig. 2), the fruit is globose-ellipsoid, ca. 13 mm. long, 9 mm.



2. *Licuala tanycola*. a, flower, external view $\times 6$; b, flower, vertical section $\times 6$; c, stamens removed from corolla-tube, abaxial (dorsal) view $\times 6$; d, fruit $\times 2\frac{1}{2}$; e, seed, external view $\times 2\frac{1}{2}$; f, seed in vertical section showing embryo and intruded seed-coat $\times 2\frac{1}{2}$. (a-c from *Brass 13010A*; d-f from *Brass 13460*, both at Arnold Arboretum).

in diameter rather than exactly globose and 9 mm. in diameter, and the leaves are densely brown-lepidote or brown-punctulate on both surfaces. Beccari described the leaves of *L. parviflora* as polished on both surfaces with no reference to scales which he usually mentioned.

Superficially, *Licuala tanycola* resembles also *L. Beccariana* Furtado of Beccari's subgenus *Dammera* which has a similar long-pedunculate inflorescence, bract and pedicellate flowers. The inflorescence bears only 3-4 branches, the flowers are twice as large as those of

L. tanycola and possess very different stamens.

A noteworthy feature of *L. tanycola* is the prominent continuation of the leaf-sheath above the petiole and adnate to its inner face (Fig. 1). Seldom is the entire leaf-sheath collected or even noted, though it may offer important diagnostic characteristics as in *Thrinax* (Read, R. W., *A study of Thrinax in Jamaica*, Ph.D. thesis, University of the West Indies, Mona, Kingston, Jamaica, 1967). Noteworthy also is the reduction of major bracts on the inflorescence to one.

NEWS OF THE SOCIETY

Mr. Otto Martens, immediate Past President of The Palm Society, has been awarded the Pacific Coast Nurseryman Award—the highest recognition to be paid anyone in California horticultural circles. The award is accorded to the individual having made outstanding contributions in the field of horticulture.

In presenting the award, Mr. James L. Perry, chairman of C. A. N.'s awards committee, cited Mr. Martens' efforts in

re-popularizing the use of palms in California landscapes. "In the past seventeen years, thanks mainly to Otto Martens, Californians have come to value this plant family as one of the greatest for semi-tropical landscaping. Mr. Martens promoted the use of palms. More than fifty species are now commercially available."

Keep up the good work, Otto!

* * *

Germination seems to be a problem to many of our members. Mr. David I. Carroll, of Lantana, Fla., worked out an ingenious method of germinating seeds in small quantities. He writes:

"I have had fairly good luck with seed germination in my home. All of the seeds are germinated in Perlite after a thorough cleaning, soaking, and treatment with fungicide. I have an enameled steel kitchen utility cart which I can move next to a sunny south window during the day, and out of the way at night. Under each shelf, in good thermal contact, is a heated rubber mat.

The source of "bottom heat" is the "Electromat," which can be purchased from Herbach and Rademan, Inc., 1204 Arch St., Philadelphia, Pa. (Cat. No. HRS 28, for \$7.95). When plugged directly into an AC outlet, the surface temperature is between 100° and 120° F. By operating both "Electromats" at half voltage I get a nearly ideal temperature of 80° to 85° F. In order to do this the two can be operated in series, or plugged into a variable output transformer. These mats are waterproof and eliminate the danger of shock. The bottom heat makes all the difference, especially for seeds received during the winter." Mr. Carroll sent along some data on the number of days from planting to germination:

<i>Aiphanes erosa</i>	115 days
<i>Chamaedorea oreophila</i>	96 days
<i>Clinostigma/Gulubia</i> sp.	55 days
<i>Orania sylvicola</i> (<i>O. macrocladus</i>)	227 days
<i>Pinanga</i> sp. (Thailand)	49 days
<i>Reinhardtia gracilis</i>	55 days
<i>Syagrus orinocensis</i>	75 days
<i>Thrinax Morrisii</i>	74 days
Undetermined palm (Thailand)	90 days
<i>Veitchia</i> sp.	33 days

* * *

Mr. R. N. Lyall, Botanic Gardens, Durban, South Africa, writes:

"Although *Cocos nucifera* flourishes and fruits fairly well here in Natal we are unable to grow them on our beach front.

"The local theory is that the plants will not survive because of the heavy salt-laden air and that during the year we have long spells without rain to wash away this salt deposit from the leaves.

"I should like to point out that these palms are existing in beach sand (broken down sandstone), anything from 15 to 30 feet deep (above sea level) and 400 to 500 feet from high water mark, with no natural seepage of fresh water; from this you can conclude that the sand is extremely dry.

"My contention is, that, if holes 5 cubic feet or larger were prepared with good soil, compost and a lavish supply of water to ensure a vigorous root system, these roots would eventually reach down and obtain moisture at sea level and that these palms would then survive despite the salt, winds, etc.

"Further along the coast *Cocos* are thriving under similar conditions, the only apparent difference being that the fall of the land toward the sea is sharp along the coast, with natural seepage of water, whereas our local beach front is built on a ridge of sand falling away gradually toward the sea on the one side and falling away towards the land on the other, without any natural seepage.

"After reading Beccari's 'Dissemination of the Coconut,' I feel that the local theory of salt-laden winds being the cause of our failure is an apparent myth.

"I wonder if The Palm Society could furnish me with advice on this matter? Trusting this problem may be solved and that in due course we may also have a palm-fringed shore, Yours faithfully, Bob N. Lyall."

* * *

Since the biennial convention, held in California in August, 1968, the Society has gained 56 new members. Some of these were recruited while a group of 18 Palm Society members were on a trip around the world immediately following the California meeting. We are always delighted to enlist members in foreign countries to help spread the growing interest in palms.

Everywhere the group of 18 went, they were met by Palm Society members or their friends, cordially welcomed and beautifully entertained. We could write a book about our experiences on this trip: our charming hosts and hostesses, their hospitality, the tour guides who took such good care of us in each place visited, the beautiful gardens, the way we scrambled on hands and knees picking up seeds, and on and on. The purpose of

the trip, aside from meeting as many of our foreign members as possible, was to visit some of the famous tropical botanical gardens of the world, and although our stays were far too brief, our visits to Foster Garden and the Lyon Arboretum in Hawaii, the small but interesting garden in Hong Kong, the old, impressive garden at Bogor, Indonesia and the gardens at Singapore and at Peradeniya, Ceylon were highlights of the trip. Seeds were industriously sought, and already some of them have germinated.

In Japan, Thailand and Malaysia we were wonderfully treated, entertained and helped in every way. Many pictures were taken, and now happy memories are refreshed as we look at them. We wish to express once more our sincerest gratitude to all who were so kind to us.

LUCITA H. WAIT

PALM LITERATURE

HARTLEY, C. W. S. The oil palm (*Elaeis guineensis* Jacq.). 706 pp., illustrated, Longmans, Green and Co., Ltd., London W 1, 1967.

The African oil palm has been the subject of much research and its planting has been much expanded in recent years. It is now written about by the former Director of the West African Institute for Oil Palm Research (today the Nigerian Institute for Oil Palm Research).

Fourteen chapters cover such subjects as the origin and development of the oil palm industry, the botany of the oil palm, the oil palm and its environment, growth factors, selection and breeding, treatment of seed, seedlings, the land,

establishment and care of plantations, nutrition, mixed cropping and use, diseases and pests, and products of the oil palm.

The book is well printed and illustrated with 18 color photographs, 82 black and white photographs, and numerous line drawings, graphs, and tables. Each chapter is accompanied by an extensive list of references so that the whole is of use and interest not only to the commercial grower but to the general student of palms, perhaps most particularly those chapters relating to botany and to pests and diseases.

H. E. MOORE, JR.

A Case of Transport of Palm Pollen in the Eighteenth Century

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Pollen of palms is often transported by surface and air mail. This is the case with pollen of the oil palm (*Elaeis guineensis* Jacq.), the coconut palm (*Cocos nucifera* L.) and the date palm (*Phoenix dactylifera* L.). For instance, pollen of the oil palm is sent by air mail from Nigeria to other African countries and Malaysia for breeding purposes. Within Nigeria the mailing of pollen took often two weeks without loss of viability. Similar cases are reported for the coconut palm. It would appear, however, that this is not entirely new.

A Case in 1767

In the *Rotterdamsche Courant* of Saturday, 24th of October, 1767 a report² (Fig. 1) is published reading (freely translated):

RUSSIA

"PETERSBURG, October 3. A DATE TREE is now seen in the Imperial Garden, whose fronds look like a fan. It bears fruit. The stem is (*about*) 280 cm high and its circumference is (*about*) 250 cm, the fronds are split and the length varies from 62.5 to 65 cm, and the breadth ranging between 75 and 80 cm. This tree is 150 years old, and was taken to

that place by Czar Peter I. Since 1717 the palm has flowered regularly and fruits were expected year after year. Unfortunately no fruit was formed as the tree is female. The Gardener, who realizes that this tree will not bear fruit, because they were not invoked by a male palm, left no stone unturned to obtain a male palm of the same species; however after a long search in vain he confined himself to only getting propagating pollen, which is found in the stamens of the flowers of a male tree. This was sent to him from Karlsruhe in the county Baden-Durlach; the quantity was (*about*) 44 mg, but in March he received another ± 22 mg.

On April 12th this date tree already bore 7 flowers, and some days later the characters of the female sex were clearly observed. Then the Gardener took a very fine brush and carefully put the pollen on the flowers of the palm; he repeated this three times a day till the end of April. He thought that there were still some signs of receptivity, but in May the effect was not clear yet, although the fruits were well developed. It was in June that the grains of the fruits clearly showed the effect of the propagating pollen. So the work of the Gardener proved to be successful.

The first powder had only a slight effect, but the use of some more resulted in over 600 dates; these have now the size of a walnut and it is believed that they will mature in October.

It is a wonder that although this powder covered 300 miles in intense

1. Formerly at the West African Institute for Palm Research, Benin-City, Nigeria.

2. The above report was republished in the issue of 28th of October 1967 in the *Nieuwe Rotterdamse Courant*. The editor of this newspaper advised me to contact the archivist of the Municipal Archives of Rotterdam. The latter provided me with a photograph of the 1767 report. I would like to thank both the editor and the archivist for their assistance.

Aⁿ 1767

ROTTERDAMSCH E

Saturdag



K U R K Y E N.
 KONSTANTINOPOLLEN den 15 September. Den 6de-
 zier is den 22^{de} of opperste Bevelhebber der Infanterij
 aigezet, en de Klaja of Luitensn Generaal in des-
 zelf's plaats tot Aga benoemd. Sedert 14 dagen is de
 befmetelyke ziekte, 200 hier als in den omtrek van deze Hoofd-
 stad, merklyk vermindert.

R U S L A N D.
 PETERSBURG den 3 October. Men ziet tegenwoordig in
 den Keizerlyken Tuin een DADELBOOM, welker bladeren de
 gedaante van een'waayer hebben en die vrugt daagt. De stem is
 9 en een half voet hoog, en deszelfs omtrek van 2 voet en 11 di-
 men; de bladvetelen hebben een lengte van 8 voeten 3 duimen,
 de bladen zyn gefleeten en 25 à 26 duimen lang, en van 30 tot
 35 duimen breed. Deze Boom is 150 jaren oud, en door Czar
Nieter de Groot herwards gebragt. Sedert 50 jaren bioeide de-
 zelve, en men verwagte van jaar tot jaar vrugten te zullen zien,
 dog te vergeefs, dewyl dezelve van het vrouweyke gelsigt is.
 De Tuinier, stiende dat deze Boom geen vrugt voortbragt, om
 dat dezelve door geen manlyke boom vrugtbaar gemakte wierd,
 deed sijn moeite om een manlyke boom van dat loort te verkry-
 gen; dog na dezelve langten tyd te vergeefs gezogt te hebben,
 welk in de helmen der bloemstelsjes gevonden word, van een
 manlyken boom magtig te worden. Dit wierd hem van Karel-
 rube in het Graafschap van Baden-Durlach gestuelt, het
 titreit beliep niet meer dan twee derde van een grein; dog in de
 maand Maart ontfing hy nog een derde van een grein. Den 12
 April had deze *Dadel- of Palmsboom* reeds 7 bloemen, en eenige
 dagen daar na ontdekten zig duydlyk de kentekenen van het
 vrouweyke gelsicht. Toen ging de Tuinier in het bevrugten op
 de volgende wyze voort: Hy nam een zoer Lyn penneel en streek
 het bloemstelsel drie maal daags tot op het einde van
 April. Hy geloofde toen eenige teekenen van vrugtbaarheid te
 ontsieken, dog in de maand van Mey was die uitwerking nog
 onvyslychtig, altoewel de vrugten vry ver gevorderd waren,
 naar in de maand Juny, toonden de korrels der vrugten, duyd-
 lyk de uitwerking van het voorreclend stofmel, en deden den
 Tuinier zien dat hy in zyne poging gelsagt was. Het eerste
 poeyer heeft weinig uitwerking gehad, maar het tweede meer
 dan 600 Dadel's voortgebragt; dezelve hebben tegenwoordig
 de groote van een Noot, en men meent dat dezelve in het laast
 van October hare volkomen wasdon zullen hebben. Het is ver-
 wonderlyk dat daar dit poeder 300 mylen ver, en in de grootste
 koude, met de post verzonden is, het niets van dierzelver
 voorreclende kragt verloorde heeft.

Het schynt ten v
 zal aanwenden, om
 Ryksdag tot een g
 DANZIG den 1
 dat alhier de tyding
 flad van het Rysfif
 groot gedeelte in d
 meer als 3 millioen

D U I T S C H I
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 ziekte van de Aart
 op den beitoemden
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 Koninkl. Hoogheid
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 Onderauschen I
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 men wyfijet niet
 dom toebehooren
 droevige ontfandj
 dat op alle plaats
 ongemeeke kotten
 het te Florence, J
 Schonbrun naar
 verblijf in de Burg
 met zyne Doort. G
 og Clement van S
 van Schonbrun na
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 Ryls Vice-Cancell
 heeft ontfangen.

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2. It is supposed that Czar Peter I had brought the palm there and that the palm was already 150 years old. This age is high, however; the story tells us that a palm was dug up somewhere and transplanted to Petersburg where it established and flowered since 1720 or so. It was not the only "impossible" thing this czar undertook to make Petersburg the fashionable center of his empire.

3. The newspaper report also states that the Gardener understood the dioecism of this palm species. He might have read the works by Koelreuter who had classified the palms into species depending upon wind pollination, and the work by Linnaeus who won a prize, awarded by the Academy of Science of Petersburg in 1759, for his study of sexuality in plants.

4. The first seven flowers of April 12th are quite early. The pollen was transported in severe cold and arrived at Petersburg in March. This pollen must have been obtained from a palm which flowered at Karlsruhe in late February or early March.

5. The reporter says that despite the severe cold the pollen remained (at least for a part) viable. If he had known the modern methods of freeze-drying and freeze-storing of palm pollen he would have written "owing to the great cold," because this cold must have preserved the pollen.

Summary

A case of the transport of pollen of a palm species from Karlsruhe to Petersburg in 1767 is described. It is concluded that the severe cold at the time of transport must have preserved the pollen.

1. A photograph of the report in the *Rotterdamse Courant*, 24th of October 1767.

cold, it had not lost its propagating power."

Conclusions

We can draw from the above report a few conclusions:

1. The appearance and measures of the palm at Petersburg, its dioecism, time of flowering and the growing sites of the two palms suggest that this palm was either a species of *Chamaerops* or *Trachycarpus*. At the time any palm was often called a date tree, while the date palm was named true date tree.