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Cover Picture

Pollen of *Nengella*, ×2,200. From Essig LAE 55167, photograph by M. V. Parthasarathy. For a photograph of *Nengella* itself, see pages 8, 13.

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Palm Collecting in Papua New Guinea. II. The Sepik and the North Coast

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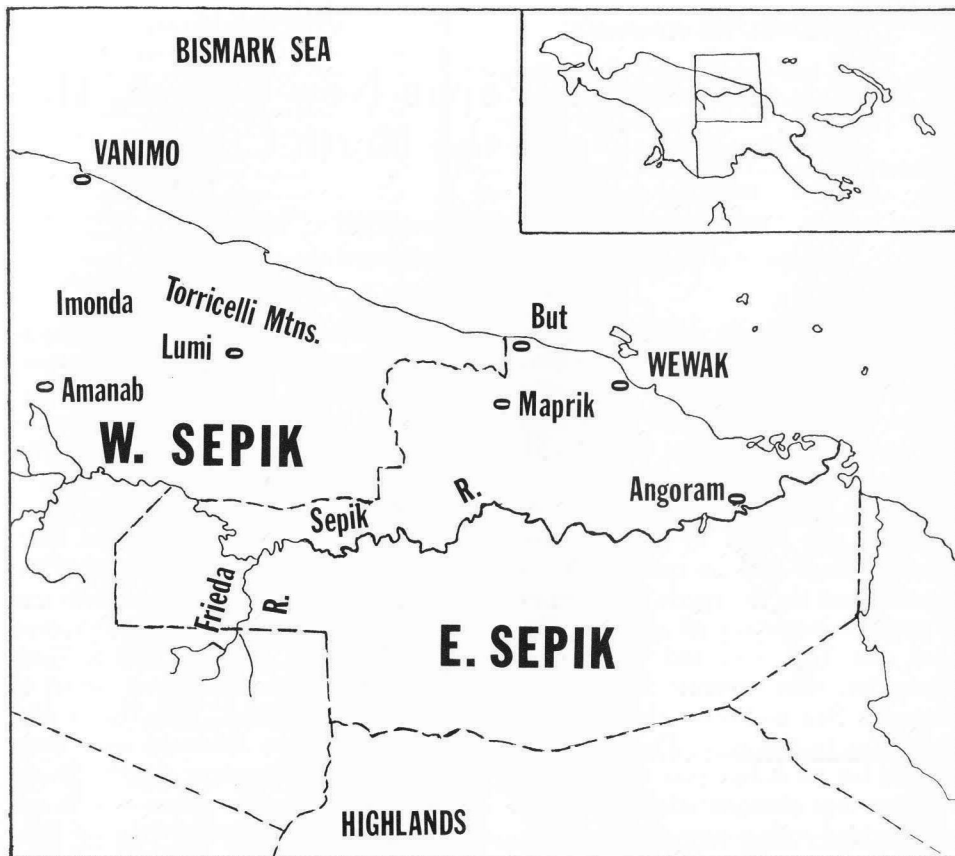
The northern part of Papua New Guinea is dominated by the Sepik River and its many tributaries. This river system forms a basin 250 miles long and up to 100 miles wide. Filled with jungles, swamps and savannas, it is a miniature Amazon basin. It is bordered on the south by the massive Central Range and the vast highlands beyond, and on the north by a series of ancient mountain ranges, the Bewani, the Torricelli, and the Prince Alexander, that separate it from the Bismarck Sea and force the Sepik to mouth far to the east. The region is famous for its indigenous art—masks and carvings that are richly painted and studded with cowrie shells, feathers and other ornaments—and for the steep-roofed *haus tambaran* (spirit house) found in every village.

The region has also proved to be extremely rich in palms, perhaps the richest in New Guinea. Many palms were discovered and named by the Germans during their brief colonial venture on the island around the turn of the century. Their specimens were rather meager, however, and for the most part were lost during bombing raids on Berlin during the Second World War. Although the Archbold Expeditions were exploring southeastern New Guinea during the 1920's and 1930's, exploration of the Sepik region did not pick up until the 1950's with the expeditions of the CSIRO from Australia and the Division of Botany in

Lae. It was evident then that, despite their teutonic thoroughness, the Germans had only scratched the surface. Peculiar specimens picked up in the 50's and 60's lured us to the Sepik for a first hand view of the palms there.

We made two palm hunting expeditions to the Sepik region, the first, in November of 1971, consisted of Essig, Paul Katik, and Heinar Streimann from Lae, and Nick Martin, a student from Australia. We flew first to Vanimo, in the far northwestern corner of Papua New Guinea, near the border with West Irian. Here we were most eager to see *Pigafetta filaris*, David Fairchild's favorite palm, which occurs no further eastward than Vanimo. There were several specimens in town, and we found many more in the forest west of town. These palms truly live up to their reputation. The trunks are a magnificent glossy green, resembling a giant bamboo. The crown consists of beautiful arching pinnate leaves. The petiole and sheath are lined with undulating, spiny ridges. The branches of the inflorescence hang in a single plane, like a fine beaded curtain. The fruits are small, somewhat larger than peas, and are covered by the small overlapping scales characteristic of the lepidocaryoid palms. Magnificent as they were, however, the *Pigafetta* were only the beginning of our exciting finds in the Sepik region.

As we headed down the road from



1. New Guinea and adjacent islands, with region visited enlarged.

Vanimo toward the border with West Irian, we passed several magnificent beaches: crescents of white sand lapped by crystal clear, blue water. We were only a few degrees from the equator here. Trees behind the beaches were loaded with bird's nest ferns and other epiphytes. In one small grove of trees, growing beside a stream that was just entering the sea, we spotted a clump of palms. It was a clustering *Ptychosperma* bearing dull reddish fruits. Experience with this genus had already taught us that dull red fruits become black-purple at maturity. So this specimen matched

several other black-fruited specimens that had been collected along the north coast, and the locality here was the closest approach yet to the original collecting site of *Ptychosperma schefleri* along Humboldt Bay just to the west of us. We were sure that we had found wild material of this long-cultivated species.

In the next two days, we collected fifteen different palm species, including a couple of *Licuala*, a *Cyrtostachys*, several rattans, *Hydriastele microspadix*, and *Areca*, a *Calyptracalyx*, *Actinorhytis calapparia*, and most notably, *Pinanga punicea*. Like



2. *Pigafetta filaris* rising above the forest near Vanimo.



3. A close-up view of the trunk and crown of the *Pigafetta*.

the genus *Pigafetta*, *Pinanga* is found no further east than the Vanimo area, though it is found at a corresponding longitude in the Fly River Basin to the south. *Pinanga punicea* is a tall, single-stemmed member of the genus. The fruit are red at maturity, but those on our specimen were unripe.

From Vanimo we took a small plane over the mountains into the Sepik Basin, to the outpost of Amanab. Almost immediately upon landing, we were struck by a very large palm growing on the perimeter of the post. It had very stiff, upright fronds, but we could see little else until the next day when we walked over to the palm and collected some material from it. It was an *Orania* that later proved to be a new species. Essig (1980) has given it the name *Orania glauca*, because the in-

florescence axes are devoid of scales and covered with a waxy bloom. This and other features distinguish the species sharply from all others known.

Aside from the *Orania*, Amanab was disappointing. We drove for several miles along a dirt road out of the settlement, but saw only poor secondary forest. The only other palm we found was a *Hydriastele microspadix*.

From Amanab we flew to another small patrol post, Imonda, in another part of the Sepik Basin. Here collecting was better. We found a *Licuala*, several species of *Calyptracalyx*, a *Nengella*, and a *Ptychosperma*. The latter was a small, solitary, undergrowth palm with reddish flowers and black fruit. It was later determined to be *P. cuneatum*, described many years earlier from the Lake Sentani



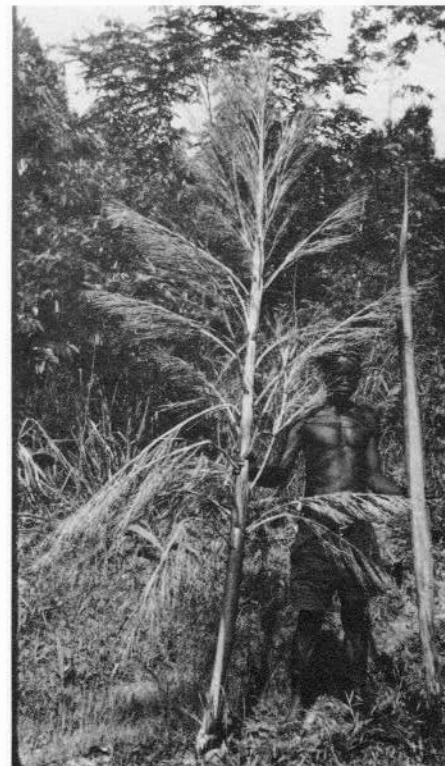
4. Our assistant holds the inflorescence of a *Cyrtostachys* collected near Vanimo.

area south of Humboldt Bay in West Irian.

We had to borrow some alcohol from the medical clinic at Lumi for use in preserving our specimens. We followed the standard technique used by the forestry botanists in New Guinea of bundling our freshly pressed specimens in plastic bags and saturating the papers with alcohol. The way we were moving around, it would have been impossible to dry out specimens in the field. Once doused with alcohol, they can be kept wrapped up for indefinite periods of time and dried back at the herbarium when convenient. The only drawback is the problem of maintaining a supply of alcohol in the field, because flammable materials cannot be carried on a plane with passengers.



5. *Orania glauca* thrusts its bold foliage above the surrounding vegetation near Amanab.



6. The inflorescence of *Orania glauca* dwarfs our assistant.

We usually had to have drums of alcohol shipped ahead of us.

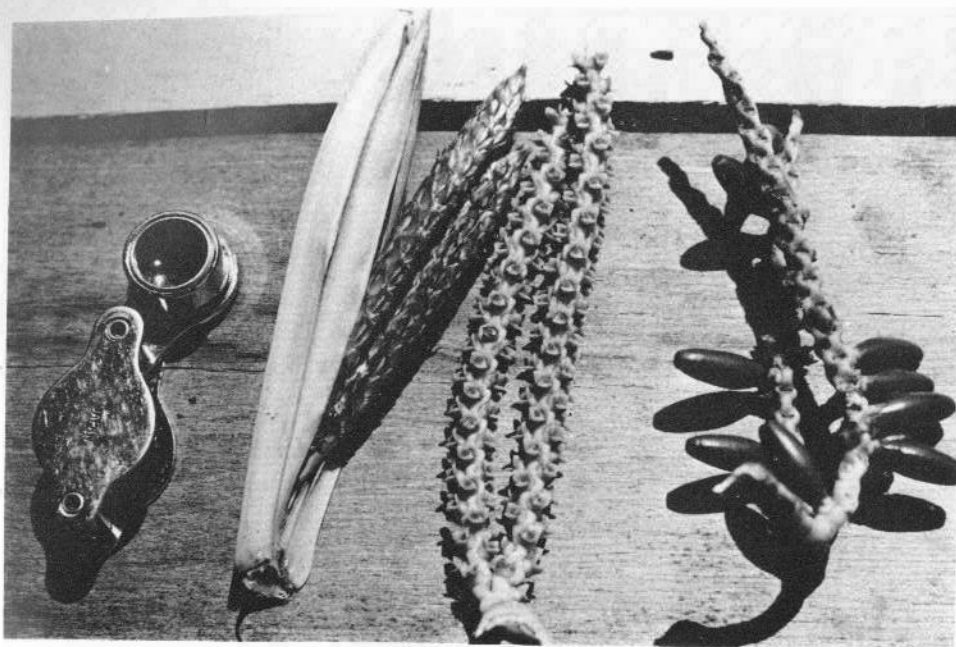
With our specimens all packed away, we boarded another small government charter plane and flew back to Vanimo. We had only a short stop-over there, however, before joining some other forestry officials on an inspection trip to Angoram near the mouth of the Sepik. While the foresters were inspecting a logging operation, we had a couple of hours to do some exploring. Setting off on the road leading out of the post toward the village of Gavien, we were fortunate to find a small patch of forest that was literally full of palms. Within half an hour we were able to collect specimens of five different species of



7. The fruit of *Orania* can be one-, two-, or three-seeded, as displayed here.

palms, and there were several rattans that we didn't have time for. We collected a small *Licuala* with bright orange fruits, *Brassiophoenix schumannii*, *Ptychosperma lauterbachii*, a small *Calyptrocalyx*, *Hydriastele microspadix*, and some fruit only from a *Ptychococcus*.

The last leg of our trip was back up to the north coast, to Wewak, a pleasant little town that had been a Japanese stronghold during the Second World War. Our first afternoon in town was spent touring the Japanese war memorial and taking a swim in the warm, clean Bismarck Sea. The next day we set off on the road leading out of town to the west. Our destination was the small village of But, where Roy Pullen, another botanist from Australia, had collected an interesting little *Ptychosperma* a few years back. Along the way we made collections of *Ptychococcus* (*elatus*?), *Gulubia costata*, and *Orania lauterbachiana*. At But, we hired some assistants who led us quickly to the population of *Ptychosperma*. The species, which has since been named *Ptychosperma pullenii* (Essig 1978), is a small, single-stemmed palm with wedge-shaped pinnae, similar to *P. waitianum* and *P. cuneatum* but with delicate, salmon-colored in-



8. The delicate inflorescences and fruit of a *Nengella* sp. from near Imonda. Pistillate flowers are at anthesis in the central inflorescence.

florescences, purplish flowers, and black-purple fruit.

We returned to Wewak that afternoon and the next day headed south in a forestry jeep toward Maprik, a major cultural center of the Sepik. We saw little forest and few palms on the trip, but we did find one little boggy patch of forest beside the road a few miles east of Maprik. Stopping to investigate, we were delighted to find a totally new species of *Ptychosperma*. This one was growing on little mounds of black muck rising from the flat swampy terrain, a unique habitat for *Ptychosperma*. The species, named *Ptychosperma vestitum*, has wedge-shaped pinnae and reddish inflorescences, so it belongs in the same section of the genus as *P. waitianum* and the others mentioned above. Its most distinctive characteristic is the coating

of unusual hairlike scales on the undersurface of the pinnae.

We returned to Lae quite happy with the many palms we had found, but knowing that if we could return to probe deeper, we would find many more.

In April of 1978, Essig and Young, accompanied by forestry botanists, Karl Karenga and Yakas LeLean, returned to the Sepik region for a more intensive probe of a small area. We wanted to get into the foothills of the central highlands along the northern rim of the Sepik, since the Germans had done some collecting here in the early days, to learn more about some of their poorly known species. We were extremely lucky to find that there was a mineral exploration camp along the Frieda River, a perfect location for our purposes, and that the owners of

the camp were quite hospitable to scientists. So we visited the Frieda River for about a week as the guests of the Carpentaria Exploration Company, a joint Australian-Japanese venture testing copper deposits in the area for their mining potential. The area is rough and would have been nearly inaccessible without the resources of Carpentaria. We would have had to come in the way the Germans did, by canoe and foot, and it would have taken us months.

We were flown in to the lower Carpentaria camp by the company plane and learned almost immediately what kind of treatment we would have as we sat down to lunch. We were treated to cold fruit juice, fresh meat and vegetables, and had ice cream for dessert! We were then shown to very comfortable quarters, with real beds and hot showers. When we later learned that the company helicopter would be available to take us to any of the dozens of landing pads the company had built in the surrounding area, and that their boat would take us anywhere along the river, all at no cost to us, we realized that we had reached botanist's heaven.

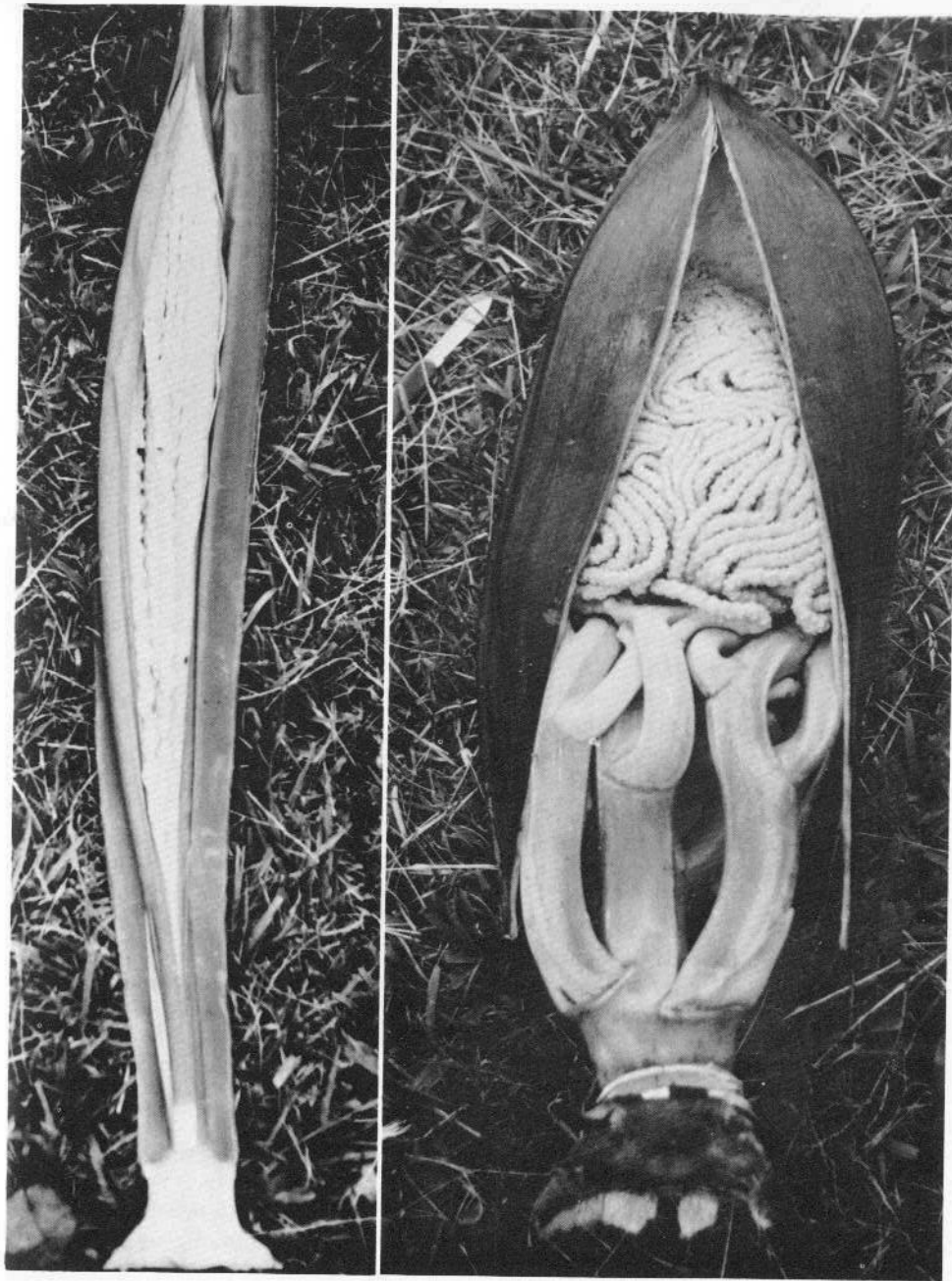
The airstrip camp is located beside the Frieda River at nearly its uppermost navigable point. Steep mountains descend to the river, which is about 60 meters in elevation here, on both sides. We did our first collecting in the secondary forest near the airstrip, where we found a caespitose *Calyptracalyx*, and a small, solitary *Licuala* with orange fruit that proved to be common along the streams of the area. Also of note on that first day was a rather tall ginger with a panicle of blue fruit. It was the first of many odd gingers we were to see in the area.

The next morning, we headed upstream in the company jetboat to where a clear stream enters the muddy

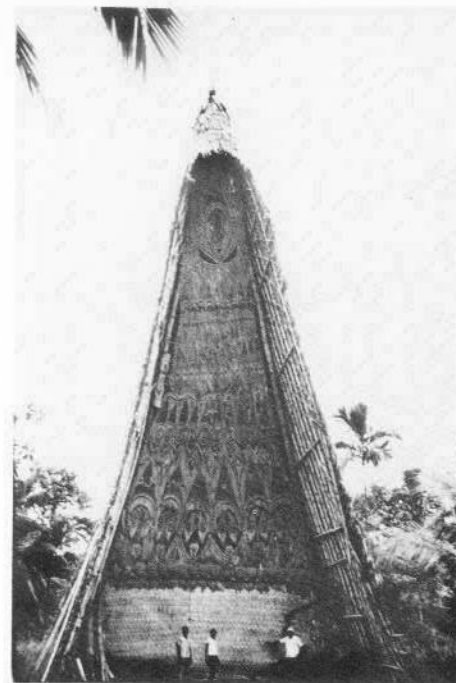


9. An undetermined *Gulubia* growing near Lumi.

Frieda several kilometers from the camp. Along the way we saw the beautiful New Guinea flame vine, *Mucuna bennettii*, with its hanging racemes of brilliant scarlet blossoms. As the native driver roared into the crystal clear water of the side creek, the first striking sight was an attractive *Calyptracalyx* growing along the bank. The palms had slender, solitary stems and



10. Contrasting forms of packaging in palm inflorescences. That on the left is of the *Gulubia* sp. pictured in Figure 9. That on the right is of a species of *Rhopaloblaste* growing in the same area.



11. An example of a "haus tambaran" standing near Maprik. This spirit house can be entered only by men.



12. *Ptychococcus* cf. *elatus* growing near Lumi.

were about 5 meters tall. The two-meter-long leaves were dark red upon emergence and the pinnae were irregularly arranged. The infructescences each consist of six elongate spikes covered with red fruit. Adjacent to the creek the terrain was swampy, and we found a *Nengella* similar to that found throughout northeastern New Guinea, and a fairly large *Licuala* with orange fruit.

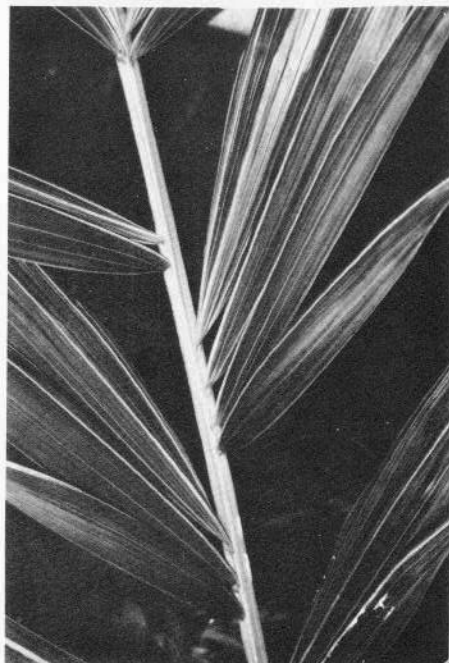
On the south side of the creek, the swampy ground gave way to a gentle slope, upon which we found an attractive *Cyrtostachys*, growing to about 20 meters in height, and possessing a pale green, slightly glaucous crownshaft. Specimens of *Hydriastele microspadix*, which seems to be almost everywhere in northern New Guinea, were common, as were specimens of

what appears to be *Rhopaloblaste ledermanniana*. Our most surprising discovery, however, was a totally new species of *Orania* growing on the slopes. The species has been named *Orania parva* (Essig 1980) because of its rather small dimensions. The tallest individuals were no more than four meters in height and the stems about eight centimeters in diameter. The small, glabrous, simply-branched inflorescences were in early fruit in all the specimens we could find.

The slope ran abruptly into a rather steep ridge that appeared to consist of a pile of limestone boulders covered with tree roots and moss. Footing became treacherous as we moved upward. An attractive pitcher plant (*Nepenthes*) was common, but palms were few on the steep slope. Our efforts were well rewarded, however, when



13. Brad holds a leaf and an inflorescence of a *Calyptrocalyx* sp. growing near the Frieda River airstrip.



14. The leaf of another species of *Calyptrocalyx*, in which the pinnae are clustered.

we found a very different-looking *Nengella* growing in full sun on the exposed ridgetop. This species had a single trunk, and leaves with more numerous and more elongate pinnae than the common lowland form. Also, the flowers were lavender and white, as opposed to the bright pink flowers of the other known species.

On our last day at the airstrip camp, we took the jetboat downstream into the swampy forest of the Sepik floodplain. We found *Gulubia costata* and the same *Licuala* as the day before. There were some interesting gingers and other herbaceous monocots, but no new palms.

The next day, we moved by helicopter up to the main Carpentaria camp, where conditions were even more comfortable. This camp was several

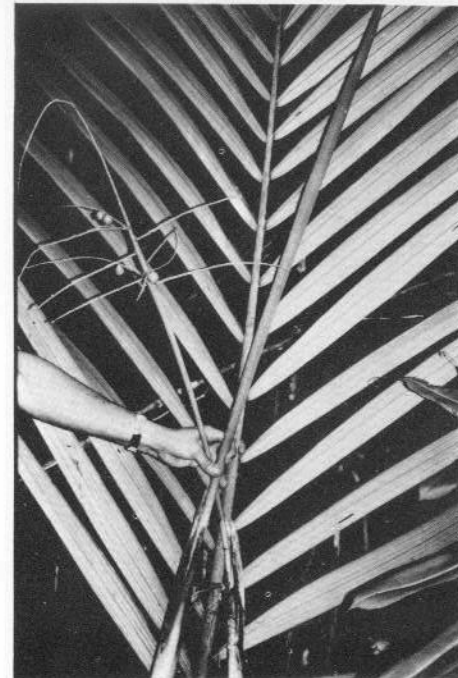


15. A pitcher plant of the genus *Nepenthes* is abundant on the rocky slopes east of the Frieda River.

kilometers south of the airstrip camp and had been built and supplied entirely by helicopter. We will not soon forget the view of the river and the un-



16. An undescribed species of *Nengella* growing on exposed ridges above the Frieda River.



17. A young infructescence of *Orania parva*, a new species discovered near the Frieda River.

touched blanket of rainforest we had on our first helicopter trip that morning. We explored the area immediately around camp that afternoon and made plans for the next day's collecting trip.

In the morning, we were ferried up to the helicopter pad on Antap Mountain at an elevation of 1,390 meters. The four of us from Lae were joined by two guides from the company. We were instructed to descend to another helicopter pad a few kilometers away by 6 that evening. Near the pad the forest was wet and mossy. The first palm encountered was a dainty pencil-thin rattan (*Calamus*) that unfortunately bore neither flowers nor fruit. Descending into the montane forest via a rocky creek bed, we encountered an astonishing abundance of palms. One



18. The Carpentaria Company helicopter ferries part of our party up to a mountaintop landing platform.



19. *Gulubia* sp. growing in the mountains above the Frieda River.

species after another greeted us as we moved down the creek. First was a small single-stemmed *Heterospathe*, flowering and fruiting within arm's reach. There were two or three species of *Calyptrocalyx* along the way, a form of *Areca macrocalyx*, and a large *Licuala* with orange-red fruits the size of ping pong balls. We found also some specimens of *Orania lauterbachiana* in which the inflorescences are densely red-brown-tomentose. We hunted for specimens of a large *Livistona* bearing red fruit that we had seen from the helicopter, but found only a few sterile individuals. It took us some time to find the lower helicopter pad, as it had become overgrown with weedy vegetation and young trees. With visions of having to spend the night there, we set to work furiously to clear the pad before the helicopter



20. A juvenile specimen of the mysterious *Livistona*, of which mature, red-fruited specimens were spotted from the air.

arrived. A brief rainstorm dampened our hopes of getting back to our luxury accommodations that night, but the helicopter pilot did manage to find us just before it became too dark.

The next day, we were dropped off at helicopter pad number K-27 on a ridge 1,000 meters in elevation. Our goal this time was to walk from here back to the camp. From the helicopter pad we could see many individuals of a *Gulubia* species with very slender trunks and strongly arched leaves. It was in all stages of flowering and fruiting, so we were easily able to collect good specimens. The fruit were bright red, globose, and the size of peas. It appears to be the *Gulubia crenata* described by Beccari from the German collections of many years ago. Also, along these ridgetop areas we found again the single-stemmed, lavender-flowered *Nengella* that we had found earlier. We made our way back to camp with little incident, but found no other palms of interest. We occupied

ourselves that day by collecting gingers, of which there were many, including some dainty epiphytes.

Our time at Frieda was over the next day, so we bid farewell and boarded the Carpentaria plane for a flight back to Madang and Lae. On the way we had exceptional views of much of the Sepik basin. The foothills were covered with virgin forest and largely uninhabited. The lowlands were largely swampy and filled with vast populations of the sago palm, *Metroxylon sagu*. The large terminal inflorescences of these palms looked like a field of daisies from the air.

Another brief foray into the Sepik had ended, but we knew that this re-

gion would be fertile hunting ground for palms for many years to come.

Acknowledgments

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