

2, 42: 74, 78. 1935. The name is a *nomen nudum* since it is neither accompanied by a description nor does it refer to a description, only to a possible misidentification in some of Beccari's ear-

lier writings of some fruits collected on the Fly River by d'Albertis. It is likely that these fruits are referable to *P. Archboldianus* Burret of the Fly River region in New Guinea.



5. The tree from which type specimens of *Ptychococcus lepidotus* were taken still may stand in the mountains of New Guinea (Moore & Millar 9259).

Palm Hunting Around the World

HAROLD E. MOORE, JR.

Introduction

If palms were as small as mosses and could be fitted in entirety on sheets of paper or in vials for study and preservation in museums and laboratories, there might be no need to write about hunting them through the tropics. Very many of them, however, are so large

and difficult to collect for study that botanists and explorers have tended to neglect them or to collect only fragments of leaf and inflorescence. Thus, though one may examine the whole of many plants from museum specimens, there are remarkably few palms for which this is true.

For the past fifteen years and more, your guide on the journey that follows has been attempting to understand the palms. The particular trip to be described was taken to provide information and materials for a study of palm genera and materials for several colleagues who are studying the anatomy, cytology and pollen of palms. Grateful acknowledgment is made for support of this travel as part of National Science Foundation Grant number GB-1354 and for the assistance of foresters, botanists, and others wherever I went. Perhaps a word of explanation is due about photographs. Photography is not a strong point with the writer and results usually reflect this weakness. Working on the basis that a poor photograph of a palm is better than none, some have been included that ordinarily would not be reproduced.

I. Madagascar to Malaya

One flies to Madagascar by way of Paris. On September 30, 1963, then, I set off from New York by the night plane to London, thence to Paris, stopping enroute for some last-minute checking of specimens and localities at the Royal Botanic Garden, Kew, the British Museum (Natural History) in London and the Laboratoire de Phanérogamie in Paris, where Monsieur Capuron, the forest botanist for Madagascar, was finishing a period of study and making plans to return, alas, only when my own time on the island was to end. Armed with some words of advice and further letters of introduction, I boarded plane again at Orly Airport in mid-afternoon of October 4th.

The flight to Madagascar was broken by a sunset stop at Marseille, an hour under a full moon at Athens, and an hour in the warmth of Djibouti where the sky flushed with the incredible red of an African dawn as we

boarded for the last stage to arrive, finally, at 9:30 on a brilliant spring morning at the international airport some miles from Tananarive, capitol of the Malagasy Republic.

Tananarive, a city of hills, stands high on the central plateau of the island where the temperature drops to uncomfortable levels in winter. With the un-failing courtesy of hotel and government personnel, and aided no little by the fleet of inexpensive taxicabs, letters of authorization to collect were obtained from forestry officials, contacts were made at the Institut de Recherche Scientifique de Madagascar*, last minute purchases of needed supplies were gathered, and I wakened very early on the morning of October 10th to breakfast continental style and dash for the narrow-gauge train that departs at 7 o'clock for the winding trip from Tananarive to Tamatave on the east coast. My destination was not so far, for the trains, ascending and descending, stop for a luncheon break at the railroad hotel and restaurant at Perinet, close to the forest of Anamalazoatra. This is a classic palm locality for the island where, at least formerly, some 19 species in nine genera had been collected. Here I threw off the train for the first time the canvas sacks that were to touch ground in so many places over seven and a half months and made my way into the confusion that always surrounds the

*Without the help of a number of persons, field work in Madagascar would have been less successful. I should like here to acknowledge the assistance of M. Georges Ramanantsoavina, Inspecteur Principal des Eaux et Forêts, and his forestry staff, of M. Roederer, Director of the IRSM, of M. Bosser and Mme. Toilliez-Genoud in the botanical section of IRSM who arranged for much of the drying and shipping of specimens and other individuals mentioned by name in the text as well as Mrs. Alison Bishop Jolly and Mr. Preston Boggess for earlier preparation.



6. *Neophloga lanceolata* in the forest of Anamalazoatra (Moore 9000)

arrival of a train to make arrangements for a brief stay in Perinet.

The forest of Anamalazoatra is certainly much diminished over its former extent, but on inquiring for the local forest officer, I found him engaged with a group of visiting foresters to whom

I was soon attached for a quick survey of the region and an introduction to that part of the forest which still persists largely untouched. Fortunately, this area is only an hour by foot from Perinet so for three days I roamed the trails and slopes of the forest. The re-



7. *Dypsis Louvelii* has velvety green leaves and bright red fruits (Moore 9004)

sults, admittedly, were disappointing, for despite the best predictions I had been able to make from the information of previous collectors, I found myself here, as elsewhere on the island, a month or more in advance of the best flowering season and the palms fewer than hoped for.

Nonetheless, *Neophloga lanceolata* was in flower, forming clusters of slender canes to ten feet high by a streamside, the delicate pinnate leaves and whole aspect reminiscent of some of the New World *Chamaedorea* species (Fig. 6). Slender green inflorescences emerge from among the leaves and bend abruptly at the top of the upper bract so that the top of the peduncle and the few flowering branches become pendulous. Small orange-yellow male flowers contrasted with the green branches but nowhere was there evidence of the red fruits characteristic of *Neophloga*. A

second species, *N. concinna* var. *triangularis* with undivided leaves, was seen in only one location about two kilometers from the town on the slopes of the river that flows through Perinet.

More abundant than either of the foregoing, *Dypsis Louvelii* (Fig. 7) was seen with some frequency along the trails and near the stream that flows into a fish hatchery in the preserve. Its narrow, deeply bifid leaves are a lovely velvety green and the blades deeply pleated; the very few fruits seen were bright red on a creamy inflorescence. A single seedling is now still alive in Florida, hopefully to produce seed for propagation in cultivation.

The forest surrounding the fish hatchery contains at least two other palms, *Vonitra utilis* and *Ravena robustior*. Except for one clump planted or left in a dooryard at Perinet (Fig. 8), the *Vonitra* was seen only at the edge of a



8. This clump of *Vonitra utilis* grows in a dooryard near the station at Perinet.

small stream, sometimes with its roots in the water, and usually with several stems in a tuft. Nor were mature specimens frequent in the forest. With all my searching, only two were located mature enough to flower and fruit. And with the finding of these came a real surprise, for in both instances the stems had branched dichotomously, as in *Hy-*

phaene thebaica, to produce a dense head of arched leaves which twist through an angle of 90° toward the tip to give the effect of a rooster's tail feather (Fig. 9). From among these leaves and their fibrous-margined sheaths, long-petioled inflorescences arch out to bear many pendulous rosy flowering branches (Fig. 10) which change



9. The crown of *Vonitra utilis* in the forest (Moore 9005).

from a beautiful coral-pink in bud to yellow-green when first expanded then deep almost blackish green as the flowers approach maturity. The only fruits seen on a second tree were unobtainable by climbing and, hanging over a stream, were swept away when knocked down with a stick.

Far more abundant, and framing the fish hatchery catchment basin, were trees of *Ravenea robustior* (cover) with great brown trunks to 60 feet high, 17-18 inches in diameter, capped by a crown of stiff ascending leaves. In October, there were neither flowers nor fruits evident on any of the many individuals I saw and at first I hoped that they might, in fact, prove to be the much desired genus *Louvelia*. It was not until

a month later on November 9th that the true identity became clear for then, on the last day of active field work on the island, inflorescences had emerged from among the leaves of several trees and clearly bespoke *Ravenea*. Having arrived on a Saturday afternoon when all the labor force had dispersed and rain was falling, the obtaining of specimens had to be left to the kindness of M. Lefevre of the forest office who later was successful in forwarding material to Tananarive which verified the identification.

Returning from this delightful spot on October 13th to the usual delay of



10. Flowers of *Vonitra utilis* are borne on ropy pendulous branches.



11. *Raphia farinifera* greets the palm enthusiast at the Maroansetra airport.

processing materials, Tananarive was base again until, on October 16th, the early dawn was again broken by rude rappings at the door and it was time to depart for the 7 o'clock plane to Tamatave and transfer, after some hours, to the small plane that flies weekly up the coast to Maroansetra on the Baie d'Antongil.

The airport at Maroansetra is a grassy stretch cut into the littoral forest and almost the first view one has on climbing from the five-seated plane is a line of *Raphia farinifera* (Fig. 11) along the opposite side of the nearby river. Elsewhere in the vicinity of Maroansetra one sees this palm both wild and cultivated, chiefly in dooryards. From the airport a battered truck transports passengers over a narrow sandy road to the simple but pleasant accommodations of the Hotel d'Antongil.

Maroansetra is far enough away from centers of population to have escaped much of the destruction of forest so evident as one flies along the coast and fortunately so, as transport is expensive and not easy to obtain. On the advice

of M. Vadon, a retired school teacher and entomologist by avocation, and of M. Zavah, the local representative of the forestry service, I first spent two days working in the littoral forest where palms had been evident on the ride into town. Here I made the acquaintance of *Vonitra Thouarsiana* (Figs. 12, 13) which, like *V. utilis*, often clusters but which has much more slender shorter gray trunks covered with fibers when young. The leaves are red when first produced and at maturity are nearly flat, not twisted at the tip. Flowers are produced when the plants are still young but are apparently more frequent when the trunk has forked for the first time. Its inflorescence, too, is more slender. This same species was later encountered in the Royal Botanic Garden at Peradeniya, Ceylon, where it was labelled *Dictyosperma album* var. *fibrosum*.

The most exciting event was the discovery of a tree of *Ravenea madagascariensis* in flower along a logging track. This, known locally as *anivona*, was about 20 feet high and impossible to photograph, but from a sterile plant



12. A young plant of *Vonitra Thouarsiana* near Maroansetra.

(Fig. 14) one can see the crown of arching leaves with pinnae borne at an angle of about 45° to the rachis and bent over at the tip. The inflorescences are borne among the leaves and in male plants five or six arching long peduncles are subtended by a single low bract in a leaf axil, each peduncle also sheathed by four bracts, the upper two of which are white woolly outside, yellow-orange inside, and as long as the inflorescence. The flowering branches are creamy-white and densely covered with fleshy white flowers. Several days later, in another locality on the road to Rantabe, a female plant with the inflorescences soli-

tary in the leaf axils, was located in flower and young fruit but unhappily no fruit was ripe.

Other palms of this forest were *Neodypsis Lastelliana* (Fig. 15), what may be *Dypsis gracilis*, and *Chrysalidocarpus lutescens* (Fig. 16), all sterile. Later, however, with a rented truck and guide and accompanied by M. Zavah, we discovered both the *Neodypsis* and *Chrysalidocarpus* in forests on the road to Navana. Here *Neodypsis Lastelliana* had trunks to 40 feet high and more, 8 inches in diameter, standing out on a steep hillside. To reach, fell, make notes, select material, and see it transported to the truck was not a matter of minutes but the climb resulted in good specimens. Most striking is the dense coat of red woolly scales on the leaf sheaths accounting for the common name of *menavozona*, which translates to *col rouge* in French or "red neck" in English. The bud or cabbage of this palm is avoided as poisonous by the local people who do, however, eat the bud of *Ravenea*.

13. An older plant of *Vonitra Thouarsiana* (Moore 9009).



Chrysalidocarpus lutescens, or *lafaza* locally, formed much more accessible clumps near the road where the clustered stems were 10 to 12 feet high and easily seen because of the yellow-orange petioles which make this palm so desirable in cultivation. Equally at home in the sandy seaside forests or on the slopes of the low hills about the bay, it is easy to see why this palm has adapted so well to cultivation.

A stop at the forestry station along this road brought us to a few of the undergrowth palms belonging to the genus *Dypsis* which tend to resemble each other superficially but to differ in details that are still being studied.

The last day of residence in Maroansetra had been set for a trip to Nossi Mangabe, a small island rising steeply from the waters of the bay. But the best arrangements can (and only too frequently do) go wrong and much of the morning was lost in finding a replacement for the boat so faithfully promised but so faithless to its owner that no cajoling could induce it to run. By the time a larger and disproportionately more expensive craft was found, our party had grown with the addition of Mme. Zavah and the youngest of a large family who were equipped with picnic lunch and numerous bottles for the clear water that emerges from a spring near the landing place—water that was refreshing indeed after the steep climb to the summit and return. For all the fun, the palms were disappointing. Only a *Dypsis* with slender clustered stems and variable leaves was in collectable condition, though *Vonitra* and another *Dypsis* were seen here and there on the slopes.

When the plane service is weekly and the seats are five, one plans accordingly, so on October 24th at 6 a.m., botanist, baggage and formaldehyded specimens



14. *Ravenea madagascariensis*, a young plant near Maroansetra (Moore 9010).

were flown back to Tamatave, thence to Tananarive where began the inevitable routine of packaging and mailing preserved materials, of drying specimens, and preparing for the next venture to the northwest of the island and to Nossi Bé on the 28th.

15. The red collar of *Neodypsis Lastelliana* is obscure against the dark background of the littoral forest at Maroansetra.





16. The stems of *Chrysalidocarpus lutescens* are usually clustered but here one overtops any suckers (Moore 9012).

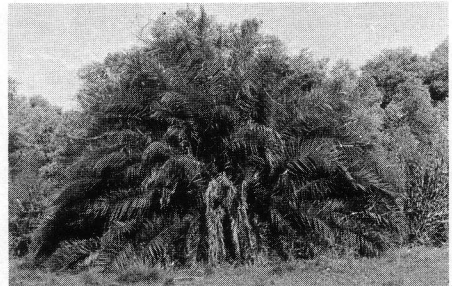
Flights to Ambanja and Nossi Bé go by way of Majunga on the west coast. On leaving Tananarive, the plane flies over the adjacent rice fields, at that time green with new rice, to the dry, barren, often eroded central plateau with only gallery forest visible along some of the streams and then the dry but palm-studded coastal zone where the pale leaves of *Bismarckia nobilis* and clusters of *Hyphaene Schatan* stand out from the plane and the *Bismarckia* is particularly abundant about the airport. North from Majunga,



17. The hotel at Ambanja provides simple but welcome accommodations.

these palms are prominent for many miles but the vegetation changes as Ambanja is approached. There, unfortunately, the forestry vehicle was in disrepair, good collecting grounds were not within ready access by foot or standard vehicle, so after an overnight stop (Fig. 17), I "hopped" by plane to the island of Nossi Bé off the coast where some original forest is retained in the Lokobe Forest Reserve.

M. Abdullah of the forestry department served as guide for an inspection of the island on which *C. madagascariensis* var. *lucubensis* or *Chrysalidocarpus lucubensis* and *Phoenix reclinata* (Fig. 18) are the palms one sees occasionally in second-growth forest or persisting (*Phoenix*) in pastures. The forest reserve itself occupies part of one end of the island and is entered from the Poste Forestiere at Ambalafary. To reach



18. *Phoenix reclinata* often persists in pastures on Nossi Bé (Moore 9023).



19. A striking association of *Ravenala madagascariensis* (left) and *Chrysalidocarpus madagascariensis* var. *lucubensis* (center) along the shores of Nossi Bé.

good palms it is necessary either to scramble along the boulder-strewn coast at low tide or to go by canoe to suitable points for climbing into the forest. After a trial of the first method, M. Abdullah arranged for a canoe which delivered us early in the morning of October 31st at a small beach where a streamlet debouched. Paddling along the coast, we had seen *Chrysalidocarpus* in abundance, often with the traveler's palm, *Ravenala madagascariensis* (Fig. 19), but in one tangled ravine a few palms of different aspect caught my attention. Field glasses showed them to be sterile, lacking the crownshaft of *Neodypsis* and possibly, I thought, *Von-*

itra nossibensis. Almost at once on landing, however, we located the same palm in young fruit which immediately revealed it to be a species of *Ravena* (Figs. 20, 21) not before reported for the island. The 40-foot stem with a crown of arcuate leaves had to be felled to obtain specimens which yet remain unidentified to species for lack of male flowers and inflorescences. The last, as later seen in very old dried state on a distant tree, appear to be solitary in the leaf axils. Better luck attended the sampling of *Chrysalidocarpus* (Figs. 22, 23) which was in good flower though not in fruit, and of *Neodypsis loucoubensis* (Figs. 24, 25) which occurs



20. Early in the morning, *Ravenea* sp. is difficult to photograph on Nossi Bé.



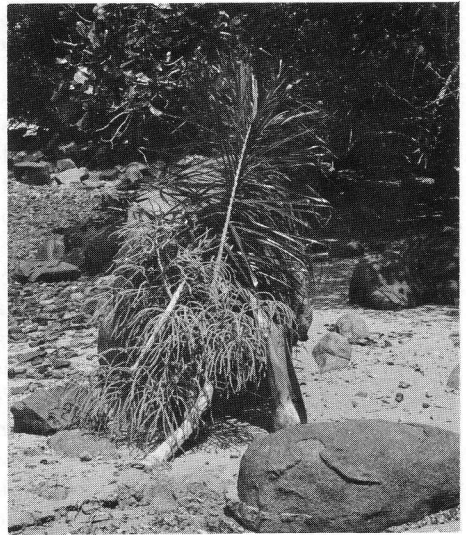
21. *Ravenea* sp. ready for sectioning for specimens (Moore 9024).

high on slopes away from the sea in company with *Dypsis sambiranensis* (Fig. 26). The leaf sheath of this *Neodypsis* is a silver green, quite in contrast to the red of *N. Lastelliana* but no less handsome, and creamy male flowers were open on short fleshy branches of a spreading inflorescence borne below the leaves.

The last destination in the region of Madagascar was Grand Comore, larg-



22. Obviously a good palm for seaside planting — *Chrysalidocarpus madagascariensis* var. *lucubensis* in the Lokobe Forest on Nossi Bé (Moore 9026).



23. The tree in figure 22 reduces to workable size when specimens are made.

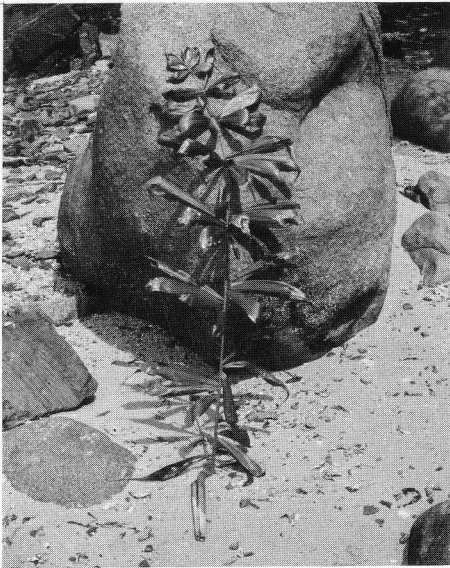


24. *Neodypsis loucoubensis* grows on the slopes of hills in the Lokobe Forest (Moore 9025).



25. *Neodypsis loucoubensis* ready for the botanist's plant press.

est and highest of the Comores Islands which lie off the coast of Mozambique. *Ravenea Hildebrandtii* is native on this island and when collected proved identical to puzzling specimens collected earlier in young fruit by Dr. Harold St. John. This *Ravenea* is a most handsome palm which grows on old lava rock at an elevation near 2,000 feet. The trunks reach 60 feet or more in height, more than 10 inches in diameter, with a crown of numerous leaves from which hang

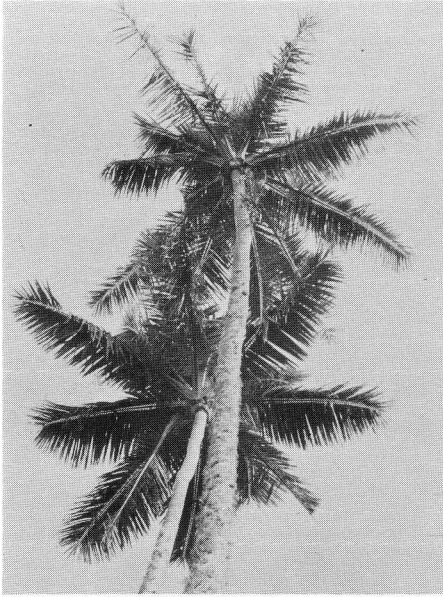


26. Only the leaf of *Dypsis sambiranensis* was taken since there were no flowers (Moore 9027).

long-peduncled inflorescences (Figs. 27, 28). At the time of my visit, only fruit was seen (Fig. 29). This, brilliant orange and $\frac{5}{8}$ inch in diameter, made a striking contrast with the deep green foliage and waxy white undersurface of the leaf rachis. Abundant seed was collected so hopefully this species will again be seen in cultivation as it was during the past century.

Two other palms, *Chrysalidocarpus Humblotianus* and *C. lanceolatus*, were once native in the forest of Combani high on the volcanic cone, but today they are apparently very rare indeed. Fruit of neither is known and I had been hopeful of obtaining fruit to eliminate any question as to possible identity with *C. Cabadae* described from cultivation. Not only did I fail in this, but by an unhappy coincidence, a further question has been raised. Flying in to Grand Comore, I saw only coconuts which are cultivated everywhere, but on leaving the island, the plane flew over a large area of lava near the airport where, looking down, I saw to my anguish clumps of an unmistakable *Chrysalidocarpus* far from any reported locality and in aspect resembling *C. lutescens* or *C. Cabadae*. The former is cultivated about a house in one village near the *Ravenea* locality but has not spread beyond the planted clumps there and certainly was not much in evidence elsewhere. There is, then, the possibility that this coastal palm is an escape, but equally that it is native. For the next Palm Society member to visit Grand Comore, I have an errand → to locate and collect this palm!

With this heart-breaking farewell to the Comores and after a quick return to Perinet for flowers of *Ravenea robustior*, time and schedules called for final packing, arrangements for shipping specimens, and departure for Af-



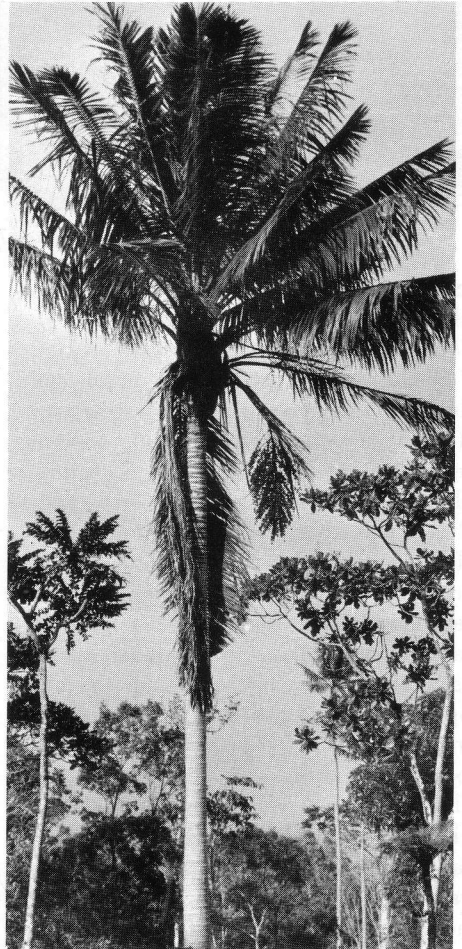
27. Looking up at the crowns of *Ravenea Hildebrandtii* on Grand Comore (Moore 9028).

rica, the island of Pemba and thence to Asia.

Pemba is now part of Tanzania lying beyond Zanzibar and reached from Dar-Es-Salaam by a small plane which makes a round-trip to Tanga with stops on the way. Thanks to the help of Mrs. Helen Faulkner and Mr. Selby of the Department of Agriculture on Zanzibar, arrangements had been made for a one-day visit to the Ngezi Forest which lies among the groves of clove on Pemba. The island was once noted for its "witch-doctor college" and though little evidence of such activity is to be seen today, I cannot help but feel that some malevolent spirit was at work on November 13th. Firstly, I was aroused in the dark morning hours long before scheduled departure time by an overeager and misinformed airline driver and when the plane did depart, early enough, rain clouds were building up off the coast. After a brief stop on Zanzibar, where I had the pleasure of meet-

ing Mrs. Faulkner at the airport, we continued on to find Pemba enveloped in a series of blinding rainstorms which required two tries on the part of the pilot before the airstrip could be located and landed on.

Despite the rain, Mr. Jabir Uki, Forest Officer, was ready to try the road to the forest, so after paying formal calls on island officials, we transferred to a landrover for a trip over a track more river than road to the edge of the forest. How often distance magnifies problems! Instead of the envisioned



28. Inflorescences of *Ravenea Hildebrandtii* appear among the leaves at right.



29. The ripe fruits of *Ravenea Hildebrandtii* are brilliant orange.

scramble through a dense and inaccessible forest to reach the *mpapindi* palm, *Chrysalidocarpus pемbanus*, we easily, if wetly, walked to several handsome clumps. The green stems rise often to 20 feet, sometimes to 60 feet, and in general much resemble *C. Cabadae*. Though only immature fruit was available, I was able to collect a good series of flowers which were the most desired item and arrangements were made to have ripe seed forwarded at a later date. Preparing specimens under a partially sheltering thatch shed in the village of Kiuyu Ngezi attracted the usual onlookers and of course as soon as the job was done the rain began to let up. Thus the plane was able to land again with less difficulty. In late afternoon, passenger with specimens was on the way to Dar-Es-Salaam. Regretfully, though, no photograph of the object of this visit was made to illustrate a very handsome palm.

The palms of Africa are centered on the west coast and had to be left for a later venture. A layover in Nairobi permitted a visit to the East African herbarium and a day in the famous game park at Amboselli after which it was time to head eastward via Aden and Bombay to Colombo, Ceylon, where Mr. Jayaweera was waiting to carry me to the Royal Botanic Garden at Peradeniya of which he is superintendent.

Palms at the garden have been described earlier (*Principes* 5: 53-59, 1961). As the principal object in visiting Ceylon was to see *Loxococcus rupicola*, Mr. Jayaweera had arranged for transport. In company with Dr. Leslie Garay of Harvard, we set off for a rugged area of dwarf mossy forest at Corbet's Gap 10 miles east of Rangalla. As luck would have it, *Loxococcus* was bearing greenish-yellow ripe fruits (Fig. 30) but one plant yielded an unopened



30. *Loxococcus rupicola* deserves its name, here growing on the edge of a high cliff in Ceylon (Moore et al. 9031).

inflorescence with nearly mature flowers. This unusual palm well deserves its name of *rupicola*, or rock dweller, for it always occurs on or near rocks or ledges, in our locality very steep and difficult of access. By the use of ropes, however, specimens were obtained from a few reachable plants. The trees are not large, reaching a height of about 10 feet where we saw them, with stiff crowns of dark green leaves about four feet long.

Another day was spent collecting and preserving flowers of *Lodoicea maldivica* and a few other unusual palms in the garden, including *Vonitra Thourisiana* far from where I had last seen it. A second day in the field with Mr. Jayaweera and Dr. Garay brought to a close an all too short stay.

From Ceylon, the air road led via Jaffna and Madras to Calcutta, a flight not to be forgotten because in the air between Colombo and Jaffna the head-

lines of a newspaper brought the jolting news of President Kennedy's assassination. Everywhere in the next few days, the travelling American was greeted with words of sympathy. In India, a national day of mourning accompanied the funeral which was observed in Calcutta by a memorial service at the American Consulate.

The Botanic Garden at Calcutta is located at some distance from the city proper in the suburb of Sibpur and like Kew is set out along a river, the Hoogli. Palms are abundant in the garden but the rarer sorts for which I was looking had mostly disappeared. In recompense, the herbarium is rich in dried specimens which kept me busy until time to continue onward, stopping for a day in Bangkok where the canals are often lined with *Nypa fruticans* and thence on to Kuala Lumpur, capitol of Malaysia, where begins another chapter in the palms of Asia and Oceania.