ly acute, often markedly asymmetric, the petals scarcely twice as long as broad, sepals thickened basally; fruit 10-12 mm. in diam.; pinnae lacking prominent membranous scales on the midnerve below but sometimes with ferrugineous scurfy scales near the base; crownshaft developed or not.

2. Crownshaft not developed; trunk solitary (always?); petiole elongate, 7.5-9 dm. long; pinnae 35-40 per side. *P. sejuncta*

2. Crownshaft prominently developed; trunks usually clustered; petiole short, ca. 2.7 dm. long; pinnae ca. 50 per side. *P. Allenii*

It is unfortunate that complete comparisons cannot be given owing to lack of information on the crownshaft of *P. roseospadix* and flowers of *P. sejuncta*. The presence or absence of a crownshaft has been used as one of the criteria to separate *Euterpe* and *Prestoea* and has, in general, been considered a constant generic characteristic. In *Prestoea*, as also in *Pinanga*, the leaf-sheaths may either be closed, forming a crownshaft, or split and not forming a crownshaft, depending on the species, but at the specific level the type of sheath does appear to be constant at maturity. Thus I do not hesitate to separate *Prestoea Allenii* and *P. sejuncta* on this basis despite the lack of flowers of the latter. A very similar palm which I have seen only in sterile condition, grows also in Costa Rica above Finca La Florita some 85 kilometers from San José on the road from Cartago to El General at an altitude of 2,450 meters. From the verbal description, Paul Allen thought that the palms from Costa Rica and Chiriquí might be the same but only an adequate collection of the Costa Rican palm will provide an answer.

Palms at Lancetilla

W. H. HODGE*

To Central American woodsmen, the name *lancetilla*, meaning "little lance," refers to a small slender palm, *Astrocaryum mexicanum*, which is abundant in the wet hillside forests of the north coast of Honduras and Guatemala. The colloquial name is well given for the trunks, and indeed most parts of this species, are covered with a dense armature of sharp blackish spines. These two-edged "little lances," which easily penetrate the flesh, are a constant menace to anyone tramping woodland trails where this palm abounds. To botanists and horticulturists familiar with Central America the name "Lancetilla" means something else. It brings to mind an outstanding tropical garden located in a small valley of the same name on the northern Honduras coast. Garden and valley share the same name which derives from the abundant *lancetilla* palms to be found on the surrounding hills.

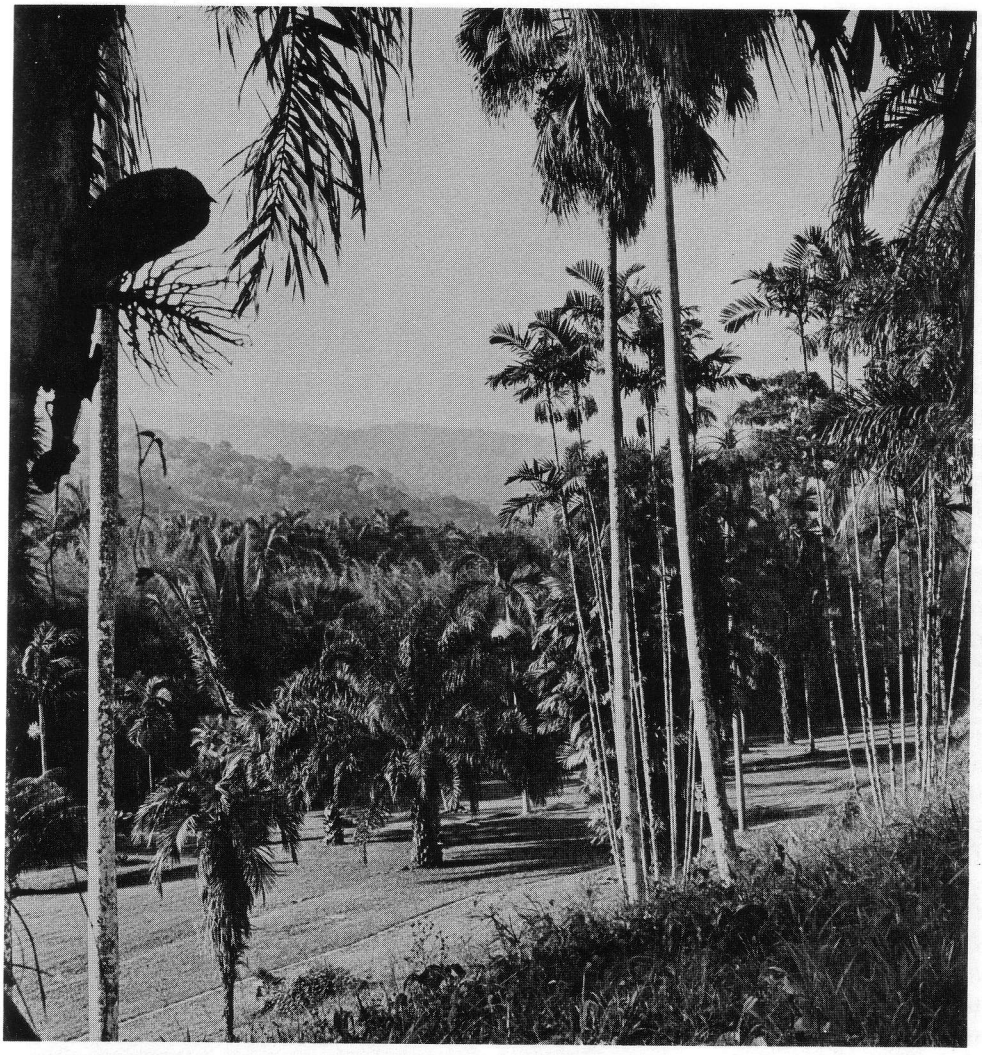
For two reasons it is especially fitting to devote a few pages of this memorial issue of PRINCIPES to the Lancetilla Valley and its garden. First of all it was Paul Allen's last base of operations. He was Director of this garden at the time of his passing. Secondly, the garden has (besides its outstanding collection of other economic plants) a notable collection of palms. These, together with the numerous native species—which inhabit the neighboring forests,

*The writer wishes to thank the United Fruit Company and especially those of its officials without whose aid, numerous courtesies and hospitality this article could not have been written.

59. Aerial view of Lancetilla Experiment Station in the Lancetilla Valley. Photograph is looking north to Caribbean Sea (top) with Tela in distance. The Lancetilla Garden plantings occupy the flatter land in center foreground. The royal palm allee may be seen in center foreground while above it is guest house with lawns and employee housing and propagation area to right. Photo courtesy United Fruit Company.

savannahs and swamps—make this spot an alluring one for all those interested in these wonderful plants. For at Lancetilla one can combine the pleasure of seeing and studying mature cultivated specimens of some of the outstanding palm genera of the tropics with the pleasure of tramping trails in permanently protected rain forests where palms occur ranging from the giant *cohune* or *manaca (Orbignya Cohune)*, described as "the finest and most imposing of all Central American palms," to insignificant though highly ornamental species of the shaded forest floor.

The Lancetilla Valley and its garden lie just south of the port of Tela, one of the main Honduras bases of the United Fruit Company. Tela is a town whose inhabitants, like many others in this part of Honduras, depend mainly on the production and shipment of bananas for their livelihood. From the port various spurs of the Tela Railroad, the local operating subsidiary of the Fruit Company, radiate out into the flatter coastal plain. Running due south from the town is the Tela River, a small stream whose clear headwaters serve as the source of the local water suply. A spur of the railroad winds three miles through mature test plantings of exotic tropical trees to the Lancetilla Experimental Station, which has been since 1925 the main base for plant introduc-



60. General view of palm collection with rain-forested hills beyond. Photo W. H. Hodge.

tion and associated testing activities of the United Fruit Company.

The Lancetilla Garden, as it is more familiarly known, is neither a show or display garden nor a true botanical garden, but rather a living germplasm collection of economically important tropical plants, including ornamentals. It is safe to say that during its lifetime Lancetilla has been the major source of foreign plant introductions not only for Honduras but for most of the adjacent Central American republics as well.

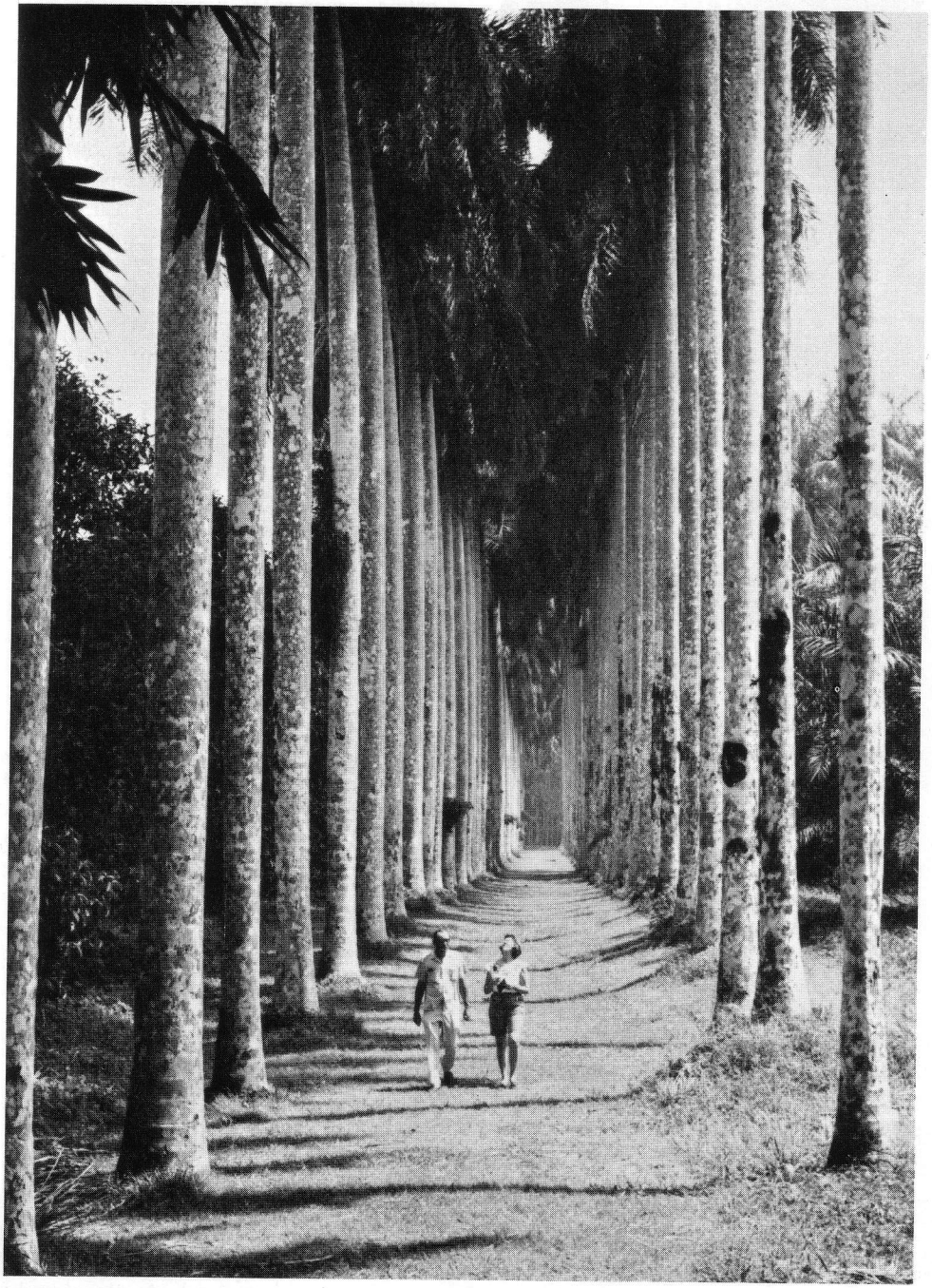
It was in 1925 that the Garden was first established. The prevalence of the destructive Panama disease among the Gros Michel bananas, then widely planted in the lowlands, forced officials of the Fruit Company to consider the possibility of growing other economic crops on either a rotation or replacement basis on the abandoned banana lands. Before

any large scale investment in a potential new crop can be made, it is necessary to determine the crop's suitability in a new area by initial test plantings. These new crops have to find the rather uniform local climate a congenial one, which in terms of the Lancetilla Valley means a heavy but haphazard annual rainfall (126-172 inches), uniformly high relative humidity (seldom less than 80 per cent), and a mean temperature running between 70° and 80°F. Thus was Lancetilla born—for the cultivation, observation, and study of a wide variety of tropical economic species that might have potential local agricultural use. These include edible fruits, timber trees, oil producing plants, and the like.

The United Fruit Company was fortunate in finding for Lancetilla a plantsman with outstanding experience in the field of plant introduction. This first director of the Garden was Wilson Popenoe, who was brought to Honduras as a skilled agricultural explorer from the United States Government's foreign plant introduction unit, then headed by David Fairchild. During the first five years of his stewardship the Lancetilla Garden came into being, complete with nurseries, an arboretum, young orchards, forest plots, ornamentals, and test plantings of dozens of potentially useful species. Initially several hundred different tropical plants were assembled from all over the world. During the forty odd years that have passed since those first plantings in the late twenties, the arboreal species have developed into outstanding specimen plants. Indeed, in this respect, this garden is a mature one and as such is the finest in Central America and one of the best in the New World. Moreover, the variety of species grown has steadily increased so that the 1964 Garden inventory lists some 873 species (including horticultural varieties or clones), in 406 genera, and representing nearly 100 different families of plants. Of this total one group of plants is dominant. This is the palm family, representatives of which comprise about a tenth of all the species grown at Lancetilla. All in all there are presently 101 species and varieties of the Palmae to be found in that section of the garden devoted to these plants. At least twenty additional native palms may be found close by, mainly in adjacent undisturbed watershed forests.

Scientists or visitors who are garden *aficionados* are always welcome at Lancetilla. However, one must make prior arrangements with United Fruit Company officials at Tela for a visit, because there is no road up the valley to the garden. Instead there is a three-mile-long rail spur served by one of the numerous auto ferrils, serviceable open-sided hybrid cars with automobile engine and flanged railroad wheels. These are the normal means of transport for Company personnel using the Tela Railroad system. The ten-minute rail ride carries one somewhat noisily but enjoyably along the small Tela River. One passes first through mature plantings of tropical timber trees which, except for their well lined up rows, gives one the feeling of being within lowland rainforest. Towards the end of the line the car suddenly plunges into a green tunnel, a hundred yards long, of the giant spiny bamboo (*Bambusa arundinacea*) and as suddenly is ejected into the main portion of the Garden with its rolling green lawns and park-like atmosphere. Almost immediately the rail line ends. The car is swung around with a turntable and you are at Lancetilla. It is at this very point that the palm collection begins.

Except for a few special plantings, Lancetilla's palms are limited to several



61. The fine allee of Cuban royal palms at Lancetilla, inspired doubtlessly by a similar allee of Caribee royals to be seen in the Botanic Garden at Rio de Janeiro which was known to Wilson Popenoe. The trunks of this series of palms are mottled with colorful lichens, some bright orange in hue. Phto W. H. Hodge.

62. The Lancetilla Garden palm collection as seen from the end of the narrow gauge rail line which runs from Tela. An autoferril is being turned on the turntable. Photo W. H. Hodge.

acres of mostly flat land lying on the valley bottom just south of the terminus of the rail line. The best over-all view of the collection is from an old river terrace which lies above the collection to the west. On the same terrace, a hundred yards distant, is situated the Garden's guest house, and a spacious lawn runs from it southeasterly towards the palms. The cool of the morning, when the sun angles low through the boles—across the green palm glade—is the best time to enjoy these plants. The only better moments are during moonlight when all is quiet save for the occasional rustling of giant leaves and the exotic animal noises of the tropical night.

The palms are mostly planted as specimen plants in botanic garden style. Their presence here is to demonstrate their growth potential in the Lancetilla Valley environment. Although most of the palms are ornamental—even the economic species — these cannot be called ornamental plantings. The connoisseur of palms, especially if he is from the north, will be attracted to those species native to the deep tropics. These normally do not thrive in strictly sub-tropical gardens. He will know from the appended list which palms to seek out—on the edge of the old river terrace the handsome cane-like clumps of the slender cluster palm, *Ptychosperma Macarthurii;* the heavier spiny clumps of the utilitarian peach palm, *Bactris Gasipaes;* the stemless ivory-nut palm or *tagua, Phytelephas macrocarpa* with its curious elephant-trunk-like inflorescences and heavily armored fruits; several interesting oncospermas; the East Indian sealing wax palm, *Cyrtostachys Renda* with its unbelievable red leaf sheaths; and many more.

One outstanding ornamental planting of palms does exist in the Garden though it is somewhat apart from the main collection. This is a mature *alleé* of Cuban royal palms (*Roystonea regia*), planted in the late twenties along the east side of the orchard of mangosteens. The impressive 800-foot-long, grassy avenue—which roughly parallels the north-south valley axis—contains upwards of 110 palms, each planted about 15 feet apart. These are presently about 75 feet tall.

Apart from the ornamental palms, many of which have entered Central American gardens by way of propagations from Lancetilla, the most important economic palm to have "graduated" from the Garden's ranks is *Elaeis guineensis*, the African oil palm. Some two dozen clones—mostly Javanese and Sumatran selections — of this highly important seed-oil producer are maintained as a reservoir of germplasm for breeding purposes at the garden. Here also is the oldest stand of oil palms in tropical America, the grandparents, you might call them, of thriving and pro-

ductive plantations in Central America. The discovery of agricultural "pay offs" of this type, to be grown on former banana lands abandoned because of disease problems, was (the reader will recall) one of Lancetilla's original reasons for being. When one sees the thousands of profitable acres of oil palms and the Fruit Company's modern oil extraction plant at nearby San Alejo, one can be happy that the palms have paid their part, as it were, for the operation of Lancetilla.

Any description of Lancetilla's palms would be incomplete without brief mention of the wild species inhabiting the nearby forests. Few gardens anywhere can boast of a site which lies, like this one, adjacent to protected natural rainforest. Yet for the Garden's 1050 acres there are 4000 protected acres of forested watershed, largely untainted by man. Luckily the valley flora has been rather carefully studied and is probably better known than any like tract elsewhere in tropical America. Thanks are due that Nestor of Central American botanists, the late Paul C. Standley, whose *Flora of the Lancetilla Valley, Honduras* is still the Bible for the botany of the area and essential to all scientific activity dealing with the natural history of this part of the Honduras coast. Wilson Popenoe encouraged Standley to use the new garden during the winter of 1927-28 as a base for botanical activity in the valley. The flora was published in 1931 and, because of Standley's fine descriptive style, is recommended reading (especially the introduction) for any visitor interested in either the local flora or the garden.

Speaking of the palms, Standley writes, "Palms are abundant in the Lancetilla region as to both species and individuals, and there are represented here most of the groups which grow in Central America. The number of species is, of course, not so great as might be found in an area of similar size farther southward." He then goes on to describe in detail the following species, only one of which, the coconut, is an exotic cultigen: *Acrocomia mexicana, Astrocaryum Cohune* [= *A. mexicanum*]*, *Attalea Cohune* [= *Orbignya Cohune*], *Bactris hondurensis, Bactris major, Bactris* sp., *Chamaedorea Arenbergiana?, Chamaedora geonomaeformis, Chamaedorea graminifolia, Chamaedorea Pacaya, Cocos nucifera, Desmoncus polyacanthos,* [*Desmoncus* sp.], *Geonoma binervia, Geonoma glauca* [*Calyptrogyne glauca*], *Geonoma trifurcata* [*Asterogyne Martiana*], *Guilielma utilis* [*Bactris Gasipaes*], *Iriartea dur-*

63. Main palm collection with *Ptychosperma Macarthurii* in foreground. Photo W. H. Hodge.

*Some of the names used by Standley are now incorrect in which instance they have been followed by the correct name in brackets. Ed.

issima? [*Socratea durissima*], *Malortiea gracilis* [*Reinhardtia gracilis* var. *gracilis*], *Oreodoxa oleracea* [*Roystonea Dunlapiana*]. Additional wild species are doubtless now known from the area.

Inasmuch as Standley has written as well as any about the local upland forests and their palms, it seems fitting to close this account of the palms of Lancetilla with some brief excerpts from his volume:

"The hills rise to a maximum elevation of 600 meters (2,000 ft.), and . . . are covered with heavy primeval forest. Their slopes are very steep, and the vegetation so dense and tangled that progress over them is difficult except where trails have been opened. The forest usually is dripping wet, and the atmosphere beneath it is much like that of a northern hothouse.

"Leaving the office at Lancetilla, one goes southward across some of the plantings and in five minutes comes to the Tela River, a shallow stream ten yards wide, flowing over a bed of rounded white stones and coarse gravel, across which one may hop from stone to stone if the water is low . . .

"Across the river one walks for a few minutes through some abandoned bananas . . . In a moment one passes . . . to the open trail and the deep shade of the tall forest . . . One notices immediately the stillness. Great blue butterflies float silently across the path.

"The customary silence of this great forest and the dimness of the light give it a dreary and foreboding atmosphere much the same as that pervading the deep Douglas fir forests of our own Rocky Mountains. The trees are exceedingly tall, rising to 100 feet or more, their tops so far above one's head that the leaves are indistinguishable . . .

"Looking about in this dense forest, we note that there are two principal levels of foliage: the tops of the tall trees, and also a very considerable understory at a comparatively low level. This understory consists of smaller trees that seem to delight in the darkness. Many of them are species of such a nature that apparently they cannot exist in full sunlight.

"The understory is composed very largely of palms, and of these the most abundant and conspicuous is the cohune or corozo (*Attalea cohune* [*Orbignya Cohune*], Which here attains its best development. There are cohunes also in the lowlands, even in rather swampy ground, but they are most plentiful on the lower hill slopes. When this forest is viewed from a distance, the cohunes are not at all or scarcely visible, their foliage being concealed by the taller trees under which they grow. On the slopes they stand closely together and very successfully shut out what light filters through the trees above. Their huge leaves, frequently thirty feet long, wither after they fall to the ground and make a thick mulch over it. The nuts germinate freely and form vigorous beds of seedlings.

"Other palms, but lower ones, grow with the cohune. The most noticeable is the lancetilla (*Astrocaryum cohune*) [*Astrocaryum mexicanum*], with its offensively armed stems, which has given the name to the valley. There are also *Bactris* species, two handsome Geonomas, and several graceful species of *Chamaedorea*. One of the neatest of the palms found in such situations is *Malortiea gracilis* [*Reinhardtia gracilis*]. It is cer-

tain to attract attention because of its airy habit and especially on account of its cross-shaped leaves with rows of perforations or 'windows' close to the midrib. A palm of less admirable characteristics is the balaire (*Desmoncus*). It is a clambering vine, and possesses pinnate leaves whose midrib is prolonged and whip-like and provided with abruptly refracted spines. These tips grope blindly in all directions, and grip any passing object, ripping it mercilessly . . .

"The forest of these hills has every evidence of being perfectly primeval. There are all the marks that are supposed to furnish reliable criteria upon this subject — giant forest trees in great variety, an abundance of corozos and other tall palms, and a great profusion of the more significant small palm species, tree ferns, and many other plants that never are known to exist in second growth forest."

64. Pejibaye palms (*Bactris Gasipaes*) in the collection at Lancetilla. Photo W. H. Hodge.

Palms Growing at Lancetilla

Acoelorrhaphe Wrightii
Acrocomia Totai
Aiphanes caryotaefolia
Archontophoenix Alexandrae
Areca Aliciae
Areca Catechu
Areca triandra
Arecastrum Romanzoffianum
Arenga pinnata
Arenga Wrightii
Arikuryroba schizophylla
Astrocarym alatum
Astrocaryum mexicanum
Astrocaryum Standleyanum
Attalea sp.
Bactris Gasipaes
Bentinckia nicobarica
Borassus aethiopum
Borassus flabelliformis
Caryota Cumingii
Caryota mitis
Caryota urens
Cocos nucifera
Corozo oleifera
Corypha umbraculifera
Cryosophila albida
Cryosophila Warscewiczii
Cyrtostachys Renda
Chamaedorea elegans
Chamaedorea sp.
Chrysalidocarpus lutescens
Chrysalidocarpus madagascariensis
Daemonorops fissus
Dictyosperma aureum
Drymophloeus sp.
Elaeis guineensis
Euterpe edulis

65. A male plant of *Phytelephas macarocarpa* in flower at Lancetilla. Photo W. H. Hodge.

Euterpe oleracea
Heterospathe elata
Latania lontaroides
Licuala grandis
Licuala peltata
Livistona rotundifolia
Livistona Saribus
Livistona sp.
Manicaria sp.
Mauritia setigera
Metroxylon sp.
Nephrosperma Vanhoutteanum
Oenocarpus panamanus
Oncosperma tigillarium
Orbignya Cohune
Phoenix canariensis
Phoenix Roebelenii
Phytelephas macrocarpa
Pritchardia pacifica
Ptychoraphis augusta
Ptychosperma Macarthurii
Ptychosperma sp.
Raphia vinifera
Roystonea Dunlapiana
Roystonea regia
Roystonea sp.
Sabal texana
Salacca edulis
Syagrus orinocensis
Veitchia Joannis
Veitchia Merrillii
Veitchia Winin
Welfia Georgii

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