PRINCIPES

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THE PALM SOCIETY

A non-profit corporation primarily engaged in the study of the palm family in all its aspects throughout the world. Membership is open to all persons interested in the family. Dues are $10.00 per annum payable in May. Requests for information about membership or for general information about the Society should be addressed to the Secretary.

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PRINCIPES

JOURNAL OF THE PALM SOCIETY

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Cover Picture

The recently expanded leaf of *Bismarckia nobilis* retains scales on petiole and midribs. Photo by M. V. Parthasarathy.

PRINCIPES

JOURNAL OF THE PALM SOCIETY

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Ptychosperma waitianum (Palmae)

FREDERICK B. ESSIG*
L. H. Bailey Hortorium, Cornell University, Ithaca, New York 14850

In 1956, the late Leonard J. Brass, a prodigious collector of New Guinea plants, sent to Florida some seeds of a palm from Modewa Bay in southeastern Papua. The seeds germinated at the Fairchild Tropical Garden and the plants proved to be an unusual and very attractive little *Ptychosperma.* Palm enthusiasts visiting the garden over the years have been intrigued by the palm but it has remained unnamed. I have been in New Guinea now for over five months, studying the genus *Ptychosperma* in its native haunts and have made a thorough review of the literature on the subject. As my understanding of this large and complex genus has crystallized, it has become clear that the little palm growing at Fairchild represents a new, undescribed species.

I am naming the new species *Ptychosperma waitianum* in honor of Lucita H. Wait, whose tremendous efforts as Executive Secretary of The Palm Society and manager of the seed bank need no description here. The recent retirement of Mrs. Wait from the position of Executive Secretary adds new significance and timeliness to the dedication of the new species.

Ptychosperma waitianum F. B. Essig, *sp. nov.*

Palma humilis; caulis solitarius, 1.2–2.0 cm. in diam.; folia 73 cm. longa, pinnis late cuneatis utrinque 8–9 in nervis abaxialis ramentis numerosis elongatis convolutis gerentibus; inflorescentia rubra et dense fusco-furfuracea, simplicter ramosa vel ramis infimis furcatis vel ramosis; flores dense fusco-lepidoti; fructus niger, 1.7–1.9 cm. longus; semen leviter 5-sulcatum albumine aequabili.

A very small palm with solitary stem 1.2–2.0 cm. in diam., to 5 m. high, internodes farinose and brown-lepidote-punctate when young.

Leaf sheath 18–21 cm. long with a ligular appendage 5–7 cm. long at the apex opposite the petiole, sheath surface minutely lepidote-punctate and at the apex coarsely dark-furfuraceous; petiole 25–33 cm. long, glabrous but sparsely and minutely puncticulate; rachis 40–47 cm. long bearing 8–9 pinnae on each side; pinnae at middle of leaf broadly cuneate and deeply concave-indentate, 11.5 cm. long on the midrib, 19–21 cm. long along the margins, the upper margin somewhat more attenuated than the lower, abaxial surface near the base with numerous, elongate, twisted, membranous scales on the midnerve and prominent secondary nerves; apical pinnae 4–5-costate, to 25 cm. long and 11 cm. wide at apex.

Inflorescence 23 cm. long, simply branched or the lowest one or two branches furcate or once-branched with ca. 3 rachillae; bracts subtending the lower branches well developed and conspicuous, though variable in size; peduncle flattened, 2 cm. long, 7 mm. wide and 3 mm. thick; rachillae 5–12, 16–18 cm. long and about 2 mm. thick; all axes densely dark-furfuraceous at anthesis (*Essig 710121-1*), red, nearly glabrous in fruit but remaining thickly dark-furfuraceous in protected parts.

* From work relating to National Science Foundation Grant GB-20348X.

1. *Ptychosperma waitianum*. a, leaf × 1/5; b, lower surface of a pinna to show scales × 1/3; c, infructescence × 1/3; d, triad of two staminate flowers and a pistillate bud × 3; e, seed in cross-section × 3. a, b, d from *Essig 710121-1* (BH); c, e from *Brass 28882* (A).

Flowers densely dark-lepidote; staminate flowers 6–7 mm. long, sepals 2–2.5 mm. high, densely red-black furfuraceous with deciduous branched hairs, sometimes becoming only dark-lepidote with ciliate margins, petals with prominent red-brown membranous scales outside, yellow and glabrous inside, stamens about 20, equalling the slender pistillode in length; pistillate buds at staminate anthesis ca. 3.5 mm. high, red-brown lepidote, the perianth moderately lepidote in fruit, sepals then ca. 3 mm. high, petals ca. 8 mm high.

Mature fruit "black, soft and fleshy," 1.7–1.9 cm. long when dry, rostrum 2.5 mm. high and 2.5 mm. thick at the base, staminodes 3–5, narrow and pointed or sometimes laterally fused into broader segments within the perianth; seed shallowly 5-grooved, 6 mm. in diam., endosperm homogeneous.

Distribution: in rainforest on coastal hills of the southern Milne Bay District, Papua New Guinea.

Specimens examined.

PAPUA NEW GUINEA: MILNE BAY DISTRICT; rainforest of hills, Modewa Bay, Modewa, alt. 20 m., 13 July 1953, *L. J. Brass 28882* (LAE, holotype; A, isotype); hills above Kaporika Village, Lat. 10:20 S., Long. 150:15 E., alt. 250 ft., 4 June 1964, *E. E. Henty N.G.F. 16933* (LAE). CULTIVATED. UNITED STATES: Florida; Fairchild Tropical Garden, Miami, acquistion no. F. G. 57-22, 21 Jan. 1971, *F. B. Essig 710121-1* (BH).

Ptychosperma waitianum falls into the subgenus *Actinophloeus* because of its homogeneous endosperm and the conspicuous bracts subtending the lower branches. Of the species previously described, only *P. montanum* and *P. cuneatum* appear to be closely related. These, however, have glabrous or nearly glabrous flowers in contrast to the densely dark-lepidote flowers of the new species, and the inflorescences of both are large and much-branched.

There is some variation among the collections examined. *Essig 710121-1* is material cultivated in the Fairchild Tropical Garden, the seed of which came from the type collection (*Brass 28882*). It is somewhat more robust than the wild material. Another specimen, *Henty N. G. F. 16933*, from the Alotau region north of Modewa Bay, fits well into the new species but shows some minor differences from the type. The inflorescences are smaller and strictly simply branched, the bracts subtending the lower branches are somewhat smaller, the staminodial segments somewhat broader, and the twisted scales on the lower surface of the pinnae less abundant.

The Carnauba Wax Palm (Copernicia prunifera). II. Geography

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The natural distribution of carnauba in northeast Brazil is quite well known. To a large measure this is due to the ease with which it can be distinguished from other native palm species, for it alone has fan-shaped leaves. In such a situation, written accounts of the presence of carnauba in a given area can be used with greater assurance than is the case with many palm species.

The first comprehensive vegetation study of northeast Brazil was that completed by Luetzelburg (1922–1923). In it he included a map of natural vegetation formations and identified areas where carnauba was present. In 1935 additional data were provided by means of an aerial survey of carnauba stands led by H. F. Johnson, Jr. The manuscript map of carnauba distribution from the survey and reports of sightings taken from the literature were the basis for the distribution map of *C. prunifera* by Dahlgren and Glassman (1961). A modification of that map is presented in Figure 4.

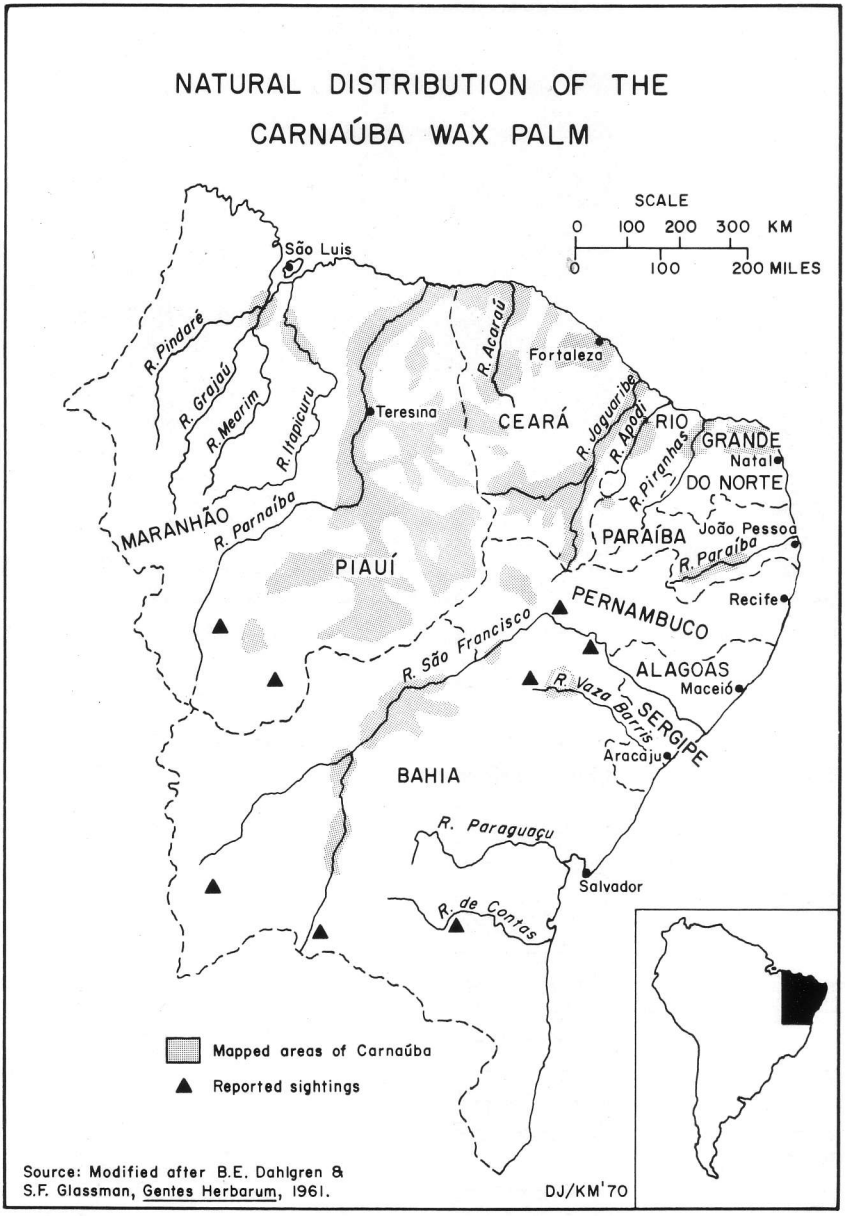
Ceará and Piauí are, as the map clearly shows, the core of the carnauba area; the states of Rio Grande do Norte, Maranhão, Paraíba, and Bahia accounting for the remainder. Reports of carnauba occurring elsewhere cannot be substantiated. The references to these palms being found in the Brazilian state of Mato Grosso, as well as in Paraguay and Argentina, are unfounded and refer to *C. alba.*

The question as to the number of specimens of carnauba growing in Brazil is often raised. Some idea of the numbers involved in the natural stands may be derived from a consideration of production statistics for the period 1936 through 1945. This is the period just prior to any significant plantation production, and is also a period of high carnauba wax prices which probably stimulated maximum exploitation. Over this ten-year period the average annual production was 10,550 metric tons. It is estimated that an average tree yields 100 grams of harvestable wax per year therefore suggesting that 105 million trees would have been required for that level of production.

Habitat

The harsh environment in which carnauba occurs is one that has precluded the growth of almost all other trees. Because of its size and the fact that it commonly occurs in pure stands, the species gives a very distinctive appearance to the local scenery. This is especially true during the dry season when the deciduous shrubs and low trees of the *caatinga* or thorn forest are without leaves. That the carnauba is able to survive the long dry season without any seeming inconvenience is a matter of both pride and wonder to the residents.

Climate. The climate over the area under discussion can be described as hot



4. Natural distribution of the carnauba wax palm.

and semiarid. Temperatures remain high the year around, making the amount of precipitation the critical factor limiting plant growth. Annual rainfall averages vary widely, from over 75 inches in the area of São Luís, Maranhão in the north, to under 15 inches in the Rio São Francisco Valley in the south. The dry and

5. Carnauba palms can tolerate extended periods of partial submergence. Photo courtesy S. C. Johnson & Son, Inc.

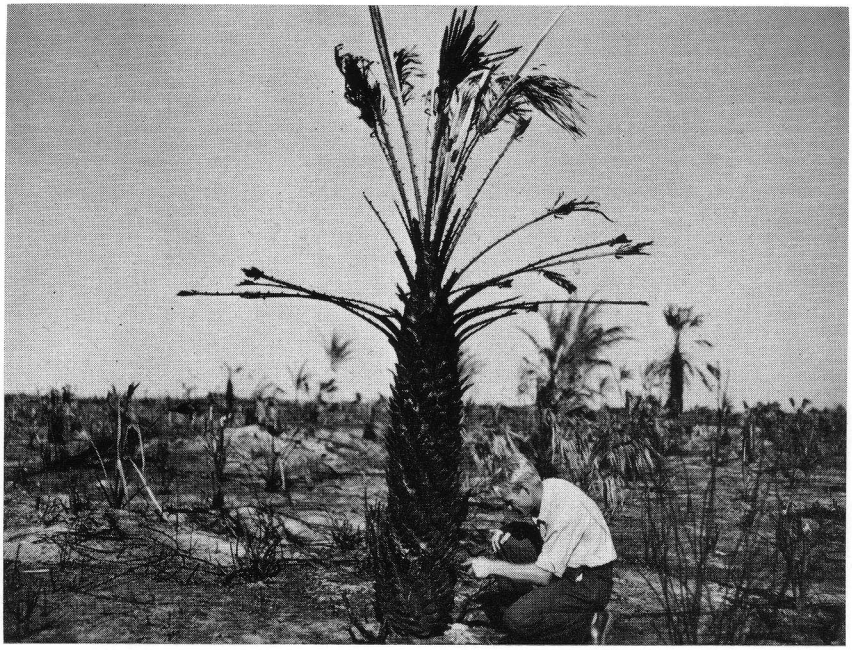
wet seasons are very distinct, and this has led to the rainfall regime being described as "flood-drought."

The carnauba is very closely adapted to this native habitat as far as temperature is concerned; it has no frost tolerance. This was well exemplified in 1962 in Daytona Beach, Florida, where seven species of *Copernicia* were being grown. All were subjected to a hard freeze with temperatures below 30°F. for three consecutive nights. The *C. prunifera* was killed outright, while other species suffered some frost damage but recovered (Smith, 1957, 1964).

Topography. The distribution pattern in Fig. 4 shows a concentration of carnauba palms in river valleys. In altitude, these valleys range from sea level to nearly 1,500 feet. There are a few coastal areas where environmental conditions found in the river valleys are almost duplicated in terms of soils and annual flooding, and which support extensive carnauba stands. This is the case in northern Piauí and Ceará, between the Rio Parnaíba and Rio Acaraú, and also in the general area around Fortaleza.

The river valleys of the northeast, especially those of the north coast, are broad and have extensive floodplains. Wide areas remain submerged for a few months of each year during the rainy season. The palms there appear to be little affected by such flooding. There are reports of carnauba palms that have been partially submerged for a number of years due to the interruption of normal drainage by roadbuilding (Fig. 5).

Soil. On the floodplains where carnauba occurs, Gomes (1945) found that in the lowest portions of the valleys, sandy-clay soils predominated; toward the edge of the floodplain the proportion of clay increased until it became dominant. The carnauba favors the deep alluvial soils near the main channel of the river, and decreases in number as the



6. Example of burned carnauba palm which recovered and produced harvestable leaves the following year. Photo courtesy S. C. Johnson & Son, Inc.

amount of clay in the soil increases. The generalization is also made that the soils of the north coastal plain are of a clay-sand mixture favorable to the growth of carnauba.

Fires. Northeast Brazil is similar to a savanna grassland area in that fire is a significant ecological factor. The carnauba appears to be well adapted to these conditions as well. The degree of burning to which it can be subjected and still survive is dramatically shown in Fig. 6. The plant recovered completely and leaves were harvested from it the following year.

The residual leaf bases of the carnauba may serve as protection against serious damage by fire, in addition to functioning as water-storage tissue (Fig. 7). Young plants not yet protected by a trunk of these attached petiole-bases are quite easily killed by fire.

7. Cut through an old attached petiole base exposing living tissue. Photo courtesy S. C. Johnson & Son, Inc.

8. Natural stand of carnauba near Fortaleza, Brazil.

Vegetation Associations

Modern vegetation maps of Brazil generally give a separate designation to the river valleys where carnauba predominates. The term "gallery forest" is often used, and an examination of aerial photographs or an airplane flight over the area supports this designation. The carnauba stands in general are pure although comparatively sparse. An aerial view of a natural stand in the Rio Cocó Valley near Fortaleza is presented in Fig. 8. A close-up view of a stand in the Rio São Francisco Valley taken more than 60 years ago is also presented in Fig. 9. The palms in the latter picture exhibit luxuriant crowns indicating that they were not being harvested for leaves.

Annual flooding eliminates competition from most other tree species as well as undergrowth, allowing the carnauba to be dominant in the river valley sites. The importance of annual flooding in keeping out other plant species is very evident when this palm is grown away

9. A stand of carnauba along the Rio São Francisco, Brazil. From Karsten and Schenck (1908).

from the flood plains on plantations, for control of brush is a major problem.

While carnauba predominates on the flood plains, it is by no means the only tree found there. Three other evergreen trees are commonly found bordering the carnauba stands on either side of the valley and usually occur in association with a growth of underbrush. These are the *juazeiro* (*Zizyphus joazeiro*), *quixaba* (*Bumelia sertorum*), and *oiticica* (*Licania rigida*). The latter is economically important as a source of drying oil derived from its seeds.

In Maranhão and Piauí, the carnauba occurs both in river valleys and in coastal areas subject to flooding, while on the sites above high water the *babaçu* palm (*Orbignya speciosa*) is dominant. The *babaçu* represents another important resource of the region because of the valuable edible oil its seeds contain. These two palm species form what is termed a transitional zone between the tropical rainforest of the Amazon Basin and the thorn forest of the northeast; the designation "palm forest" has been applied to this particular formation.

Foreign Introductions

The historical geography of economic plants is replete with interesting accounts of proposals which might well have altered the present list of major tree crops. Carnauba is no exception. The rise in industrial importance of carnauba wax around the turn of the century, during the same period in which rubber was successfully taken out of Brazil and established as a plantation crop in Southeast Asia, led to speculation that carnauba might possess similar potential. The following information on carnauba introductions was obtained through personal communication except where otherwise noted.

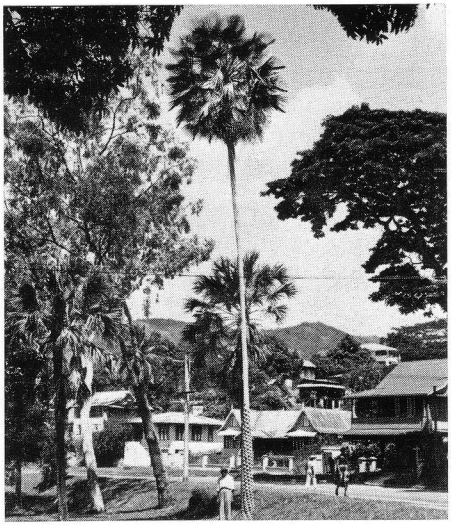
Beginning in the nineteenth century the carnauba was introduced to a number of locations and grown in botanic gardens. Within Brazil, it was taken to botanical gardens in Rio de Janeiro and Belém. Outside Brazil, the first recorded introduction took place sometime in the mid-nineteenth century, for the palm is on an 1863 plant species list of the Royal Botanical Gardens in Mauritius. Details concerning the introduction are not available, which is not surprising since carnauba does not appear on a 1938 species list for that garden.

Ceylon appears to have been the second location to receive carnauba seed, with some coming from a private source in 1882.

The Kew Gardens was involved in the largest documented distribution of carnauba seed. This came from the British Consulate at Recife, Brazil, which shipped a large bag of seed to Britain in 1889. That same year the Kew Gardens distributed five-pound packets of seed to 18 locations around the world. Information on these seed shipments was sought from the respective botanical gardens and institutions. Ten replies were received but only Ceylon had a record of having received their shipment.

The Singapore Botanic Garden could provide no information on the 1889 shipment, but it is known that they received carnauba seed from some other source in 1902 (Burkill, 1935). Although the Trinidad Botanic Garden could likewise provide no record of the seed shipment, a case may be made that it was successful. A photograph taken in 1952 of a carnauba at the St. Clair Research Station, which is adjacent to the botanic garden, shows a tree which at that time was reported to be over 50 years old (Fig. 10). This fine specimen could well represent a successful germination from the 1889 seed shipment.

In subsequent years the record of introductions becomes more difficult to follow. It is known that 25 kg. of seed



10. Carnauba palm at St. Clair Research Station, Port-of-Spain, Trinidad. Photo courtesy S. C. Johnson & Son, Inc.

were received by the Institute of Biology and Agriculture at Amani, Tanzania (Tanganyika) in 1907 and successfully germinated. The intention was to establish the palm as a plantation crop for wax (Zimmermann, 1906, 1907). In the same period a German seed merchant undertook to promote carnauba planting both as a source of wax and as a shade tree for other crops such as coffee or rubber (see *Tropical Agriculturist*, 41: 527. 1913). World War I, however, intervened before these schemes could be carried forward.

In the 1920s the Dutch gave some consideration to carnauba as a plantation crop in Java, but again nothing tangible appears to have been done (Heyne, 1927).

Within the United States there are records of several recent introductions. Carnauba was taken to Hawaii in the 1930s and there has become a popular ornamental. The U.S. Plant Introduction Garden, Miami, Florida, has had several introductions, the first in 1936. The Fairchild Tropical Garden, also in Miami, received their first carnauba seed in 1937. A number of specimens from these introductions are presently in the collections of the two gardens.

Any of the introductions into areas of favorable climate could potentially have led to the establishment of this species as a plantation crop, but there is no evidence that such an attempt was actually made. It appears that there has never been sufficient world demand for carnauba wax to support such a venture, and the carnauba has remained economically important only within its native area.

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Lethal Yellowing of the Coconut

The discovery of lethal yellowing disease of coconuts in Dade County, Florida, in 1971 has prompted several reports in Miami newspapers, and a filler item in the January issue of PRINCIPES prompted a letter from the Director of Research for the Coconut Industry Board in Jamaica. This letter, followed by extracts from a letter addressed to the Editor of the *Miami Herald* on November 26, 1971, by Mr. Romney and by a news release, suggest courses of action and tell the story of the discovery of micro-organisms that appear to cause the disease.

COCONUT INDUSTRY BOARD
JAMAICA, WEST INDIES
29 May 1972

EDITOR, PRINCIPES,

I have just read page 33 of the January 1972 issue of PRINCIPES. Your article on "Coconut Disease" states the facts as they were in 1968. Subsequent to that, however, a large-scale experiment by F.A.O. Expert/Entomologist, Professor K. Heinze, attached to this Research Department has failed to substantiate the indication of a possible link between lethal yellowing disease and whitefly as obtained by Grylls in the course of his work here from 1965–1968. The finding in late 1971 of a mycoplasm in diseased coconut palms (see attached news release) eliminates for all practical purposes whiteflies as possible transmitters of the disease since mycoplasms associated with plant diseases are carried only by insects which feed in the phloem, i.e. leafhoppers.

Over the last three years, the work on this disease by the F.A.O. team and by this Research Department has covered many aspects but I refer, in particular, to the following because they are a guide to practical control measures:

A. Large-scale experiments lasting two years in which susceptible palms in drums were transferred to the diseased area, exposed to the disease for one, two or three months and then returned to a disease-free area showed that the incubation period of these young palms (two to three years old) was 3–7 months. Other work indicated an incubation period for mature bearing trees of not less than 7–15 months. These two facts show that apparently healthy trees can have contracted the disease long before visual symptoms appear. This would suggest that cutting down and burning trees with symptoms is not likely to reduce spread.

B. A total of 34 experiments were carried out during 1969 to 1970 in an attempt to control isolated new outbreaks. The method used was to treat approximately 4 acres around the diseased tree with insecticide on two occasions two weeks apart: in some experiments, the insecticides were applied to the crowns with a mist blower, but in most cases systemic insecticides were injected into the trunks. At the time of the second insecticide treatment, all apparently healthy palms over 1 acre around the sick palm were poisoned with arsenic and the trees died in two weeks.

The purpose of these treatments was to eliminate insect vectors and to remove sources of infection, within the limits of practicality. Approximately a year later, many of the treated sites developed new cases of disease. There were four sites where

the disease did not re-appear, but it is most unlikely that this was due to the treatment since observations on untreated outbreaks showed that five of them also did not develop new cases. Not only were the treatments by and large ineffective but they were more expensive and more destructive than most palm owners would wish.

C. Experiments were performed with aerial application of insecticides but these had many problems including damage to the trees and interference with pollinating insects and public water supplies.

The work of this Research Department on resistance to this disease has proved conclusively the high resistance of the Malayan dwarf. Many other varieties and hybrids are on test but to date, we have no variety to supplement or replace the Malayan dwarf. I attach copies of letters from me to the Editor of the *Miami Herald* from which you may extract any information you wish. Kindly acknowledge the source of your information.

Yours faithfully,

D. H. ROMNEY
DIRECTOR OF RESEARCH

Extract from a Letter Dated November 26, 1971

"Now. . . we have ample seed thanks to foresighted planting of seed gardens 5–8 years ago. We are setting 900,000 quality dwarf seed in Jamaican nurseries this year and we export seed regularly. I note with pleasure that the Commissioner of Agriculture, Mr. Doyle Connor, is proposing very sensibly to relax the quarantine restrictions on importation of Malayan dwarf seed into Florida.

"I think that coconut palm owners in Florida can learn a lesson from our Jamaican experience, particularly over the last ten years. Mr. Donald P. de Sylva, in a letter to the editor of the Miami Herald printed on October 15, 1971, writes 'After a 2-year absence from Jamaica, I recently returned. . . the palm blight has spread dramatically where lush coconut farms once flourished so that parts of this area resemble the war-torn South Pacific Islands. . .The thought of the same. . . occurring on this scale in South Florida is most dismaying.' This Jamaican situation is a true portrayal of what is in store for Florida. At least we have taken action in Jamaica. Over 1 million selected Malayan dwarfs have been planted since 1968!! If we had learned our lesson a few years earlier, much of our devastated north coast would already be back into productive coconut trees.

"Not only is Jamaican Malayan dwarf seed produced with resistance to lethal yellowing in mind, but reaping and transport is well organized to ensure good germination, and all export seed is fumigated. I am not saying this as a form of advertising—I am simply emphasizing that lethal yellowing disease has to be tackled systematically and seriously. My advice to coconut palm owners would be:

1. Don't panic, but square your jaw for action.
2. Don't waste time by looking sorrowfully at dead trees, and certainly not by attempting to treat them.
3. After the symptoms of the diseases are confirmed—plant Malayan dwarfs.
4. Even if you are several miles from the disease, start planting now.
5. Make sure that you are planting reliable pure Malayan dwarf.

"Your division of Plant Industry Director, Mr. Halwin Jones, recommends that all new plantings of palms be restricted to the Malayan dwarf because of its resistance. Follow his advice."

News Release from Coconut Industry Board, December 16, 1971

Scientists in the U.S. and Britain have located an organism in diseased coconut tree tissues from Jamaica which they believe to be the cause of lethal yellowing. This was announced today by the Minister of Trade and Industry, the Hon. Robert Lightbourne, at a press conference in the offices of the Coconut Industry Board, 18 Waterloo Road, Kingston.

Dr. Karl Maramorosch and Dr. B. Plavsic-Banjac at the Boyce Thompson Institute for Plant Research in New York using a powerful electron microscope have shown that tiny micro-organisms called mycoplasms are present in parts taken from diseased palms and are absent from healthy ones. Almost simultaneously, independent research by Dr. Beryl Beakbane of the East Malling Research Station in England, who was also studying coconut samples sent from Jamaica, produced the same results.

The samples were selected and specially prepared for electron microscopy earlier this year by Dr. Peter Hunt of the Botany Department, University of the West Indies, Mr. Dave Romney and Mr. Hugh Harries of the Coconut Industry Board's Research Department and by Professor Kurt Heinze and Mr. Mark Schuiling of the F.A.O. team working on lethal yellowing.

Plant Dwarfs

The discovery represents the first major breakthrough in the fight to stop the widespread damage caused by lethal yellowing in Jamaica, the Minister of Trade and Industry said. But he warned that the information does not offer an immediate method of curing or preventing the disease. He urged coconut growers to continue planting of Malayan dwarf coconuts, as it might be some time before research would produce a cure for lethal yellowing disease.

Mycoplasms are tiny micro-organisms partly resembling bacteria and partly resembling viruses. Unlike bacteria, they are too small to be seen even by the most powerful conventional microscope—one thousand joined end-to-end would stretch across the dot of this letter "i". They also differ from bacteria in not having a cell wall around their bodies. Unlike viruses, mycoplasms have a very variable shape being anywhere from spheres to cucumber-shaped. Mycoplasms have been known to cause certain diseases in animal and man for many years but their association with diseases of plants was first demonstrated only four years ago. Since that discovery they have been found associated with over 40 different diseases of plants including aster yellows, pawpaw bunchy top disease and corn stunt.

Scientists will continue research to produce further evidence positively demonstrating the link between mycoplasms and lethal yellowing disease. Whereas most fungi and bacteria which cause disease can be grown in a test-tube and used deliberately to infect healthy test plants, the mycoplasms have not yet been handled in this way successfully. Mycoplasms can be transmitted from plant to plant only by particular insect carriers.

However, the constant association of mycoplasms with these diseases, their absence from healthy plants and the fact that they can be seen under the electron microscope in infectious insect carriers,

all point to the fact that they are the cause of the diseases.

Progress on the understanding of lethal yellowing and any possible control of the disease has been frustrated in the past by not knowing what causes the disease or how it is spread. Jamaica is not alone in this ignorance. A similar or identical coconut disease is active in Cuba, Haiti, Florida and in several countries on the West Coast of Africa. By a process of elimination, many scientists have over the past few years become convinced that this disease is caused by an unknown virus or virus-like agent with an unknown insect vector which carries the disease from one tree to another—in much the same way as the malaria mosquito carries malaria from person to person.

Research Value

The finding of a mycoplasm in diseased coconuts is the first positive indication that the scientists have been thinking along the right lines. An electron microscope with all its equipment is expensive (about $80,000) and needs experts to run it. Jamaica is fortunate to have had the use of the facilities at the Boyce Thompson Institute and at East Malling, and further work on lethal yellowing disease will be done at both places.

Research on lethal yellowing has been proceeding in Jamaica continuously since 1962. F.A.O. experts working at the Coconut Industry Board have demonstrated that the disease is air-borne and that the incubation period in young palms is about 3–6 months. Many thousands of insects have been tested as carriers of the disease: gallmites and the once-suspected white-flies have been tested and re-tested without result. Experiments have also shown that the disease cannot be transmitted by hand, despite claims that this has been done in Florida.

The Coconut Industry Board is continuing its introduction of new varieties, production of hybrids and testing for resistance and yield. The Board has also carried out, with the cooperation of properties, numerous and expensive attempts to control new outbreaks of the disease: although unsuccessful, these experiments showed the incubation period for bearing palms to be about one year. The U.W.I. Botany Department is studying the effects of the disease on the internal structure and biochemistry of coconut palms in a search for earlier symptoms than those seen by the naked eye.

The discovery of mycoplasms in lethal yellowing diseased coconut trees is a great step forward in the research. This will help the scientists considerably in their understanding of the disease. They can now stop trying to transmit the disease by hand, since this has never been achieved with mycoplasms. They will, of course, make further experiments to incriminate the mycoplasm as the cause of the disease. They will also be able to check whether resistant coconut varieties carry the mycoplasm without showing symptoms or whether they are immune.

Search for Carrier

Knowledge derived from the study of other plant diseases associated with mycoplasms may be applicable to lethal yellowing. For instance, all of the other plant mycoplasm diseases are known to be transmitted from plant to plant only by the activities of insects with delicate piercing mouth parts, which feed deep in the food-conducting channels of the leaf. All except one or possibly two of these diseases are transmitted by various species of leafhopper. Scientists working on the disease in Jamaica will now

be able to concentrate their efforts on leafhoppers instead of spreading their nets wide to look at every insect that visits palms.

Once the insect is known it may be possible to control it in the field by biological or chemical means, and so hinder the spread of the disease, although the regular widespread use of insecticides may be dangerous and costly. Scientists may also be able to use the insect carrier to screen varieties and hybrids for resistance much more quickly, more cheaply and more effectively than the present system of growing the trees for years in the diseased area: this would help in identifying any new resistant variety, and in learning the mechanism of the inheritance of the resistance of the Malayan dwarf.

Finally, if in the future a new strain of lethal yellowing disease should start attacking the dwarf, scientists hope by then to know enough about the disease and its carrier to control the new strain.

Coconut farmers are not immediately affected by this discovery. They should continue increasingly to plant the Malayan dwarf with confidence, scientists say. The high degree of resistance of this variety has been established by many years of field trials in which it has been exposed to heavy doses of the disease. Experience has established that if farmers care for this variety properly, they can look forward to much better yields than from the Jamaica tall.

The discovery of mycoplasm does not offer any immediate method of curing or preventing lethal yellowing disease in Jamaica talls. However, the research necessary for the future of the industry is making headway and all possible sources of assistance and know-how are being brought to bear on the problem.

On behalf of the coconut growers of Jamaica, Mr. Dossie Henriques, Chairman of the Coconut Industry Board, congratulated Dr. Hunt, Dr. Maramorosch, Dr. Plavsic-Banjac and Dr. Beakbane on the success of their efforts and expressed the island's gratitude to them, the F.A.O. team and other scientists, who have co-operated with the Board's Research Department in tackling this vital problem.

PALM BRIEFS

Euterpe at Iguassu Falls, Brazil

In February of 1970, on a palm collecting expedition in South America, I chanced across a very striking species of *Euterpe* which may be of particular interest.

Its habitat is on a high tropical rainforested plateau almost exactly on the common border of Brazil, Paraguay and Argentina in the Brazilian state of Paraná in the Iguassu Falls area at approximately 25° 35′ S. latitude and 54° 22′ W. longitude, a few degrees south of the Tropic of Capricorn. This is one of the few areas that harbor a tropical rain forest out of the boundaries of the tropics; (e.g. jungles of northern Burma, southern China and eastern Australia).

The soil is typical tropical red lateritic clay covered by two inches of decomposed and partially decomposed leaf debris. The forest is extremely rich in a variety of epiphytic bromeliads and *Philodendrun selloum* was abundant with cascading aerial roots to the ground. This plateau has considerably less atmospheric humidity and temperature than the lowland forest of the Amazon Basin, yet is not montane cloud forest as this is a grand expanse of generally flat land, dropping drastically in steps by a series of waterfalls which dwarf Niagara. From what I could glean from local inhabitants, temperatures in the colder months occasionally reach freezing.

1. A crown of a mature *Arecastrum romanzoffianum* occupies the third story of the forest canopy. Note *Euterpe* fronds in the second story at left.

Arecastrum romanzoffianum seems to be the only other palm indigenous to the area and is a common sight with its plumed head in full sun as it occupies the third of a three story canopy. It is also fond of clearings and forest edges. The close proximity of *Euterpe* to *Arecastrum romanzoffianum* gives promise for its hardiness at our subtropical and temperate latitudes.

Without exception, this *Euterpe* species had a very thin pale single trunk ringed by deciduous leaf bases. It possesses a green crownshaft and a prominently flanged trunk base. Its crown holds 13 fronds (mature specimen) similar in form to mature *Howeia Fosteriana* fronds, although slightly lighter green. A much-branched spadix with slightly out-of-round purplish black fruits 1.4 cm. in diameter is borne below a smooth green crownshaft. Seed is covered with fibrous pulp.

Having seen *Euterpe oleracea* in the Amazon valley, I am doubtful this palm is the same. After seeing photographs, David Barry, Jr. shares this opinion.

Although the *Euterpe* of the Iguassu

2. A plant of *Euterpe* about one-third mature in forest near Iguassu Falls.

area occupies the second story canopy, it seems to appreciate an open overhead with its crown in full sun during midday. In the area of a solitary *Euterpe*, its seedlings are common in the undergrowth. However, as is typical for mixed tropical rain forest associations, seedlings of the adult tree are quite abundant but virtually none of these mature due to light and root competition. The result being solitary individuals of a species (exception to this would be consociations; e.g. *Mora excelsa* consociation of Guyana and Trinidad) with an enormous variety of genera and species but incredibly few duplications. Such was the case here and a search of the

3. Seedlings of *Euterpe* abound but few reach maturity.

vicinity both on foot and in low-flying aircraft revealed only three other mature specimens.

Many *Euterpe* species as well as other edible palms in which the bud is utilized as heart of palm salad are collectively referred to colloquially as palmitos. This could account for the palm's scarcity, although I saw no stumps to indicate a severe harvest.

One of the few specimens of this palm is visible (for future collectors) by looking into the forest on the left side of the road from Iguassu Airport towards the falls on the Brazilian side in the forest through a gap in a thick wall of a very tenacious variety of climbing thorned bamboo and lianes which typically overgrows because of surplus light created by road clearing on rivers etc. It gives a false impression that the forest is this thick uniformly.

I had already collected only a handful of seeds from the few specimens I could locate. I felt the need to collect more, which leads me to a colorful memory. In a bus full of passengers, I could not convince the driver to stop for ten minutes to facilitate my collecting of more seeds. We arrived at the airport and our flight was due to depart in 30 minutes for Uruguay. In some sort of compulsive frenzy I told my wife, Arlene, that if I missed the flight, I would see her one week later (the next flight out) in Uruguay. Much to her dismay I paid a driver all the Brazilian currency left in my pocket (which wasn't enough, but my pleading was) and raced top speed past a government check point. In a record ten minutes we reached the palm where I did a rather movie stunt head-first dive through the bulk of climbing bamboo, which would have taken too long to wriggle through without my machete, and entered the slightly more spacious interior of the forest. It took ten minutes to reach the palm and collect windfall seed, shake the trunk and collect more and get back to the waiting car, whose driver thought I was a *loco americano*. In another ten minutes I was back at the airport with 20 seconds to spare for the flight.

A rather disturbing footnote to this story is that apparently no seeds of the *Euterpe* sp. germinated. Anyone visiting this area should be on the lookout for the seeds of this fantastically graceful palm.

ARNOLD C. NEWMAN

NOTES ON CULTURE

Sealing Wax Palms in South Florida

Cyrtostachys lakka or *C. renda* can be grown successfully and beautifully in South Florida . . . with special care.

These palms like full sun, warm and wet growing conditions and acid soil. A protected southern exposure will give daytime warmth even in the cooler parts of the winter season; a strategically placed floodlight—close enough to give much heat, but not too close to singe—will give nighttime warmth and in the

event of extra cool days may be left on to heat during the day. Daily or every-other-day flooding with warm, and I mean very warm, water seems to promote faster growth. When planting this palm, choose a depression or create one where the water will tend to collect about the palm and not run off. . .it likes to be wet. If a severe cold night threatens, the lights should of course be left burning and a cover should be placed over the palm for protection. Be careful that the cover and light combination is not too close to burn. Actually the palm will not be killed by some cold but this is a relatively slow grower and cooling seems to slow growth completely.

An acid fertilizer applied frequently seems to keep the sealing wax palm in a happy and healthy condition. . .this in combination with the acid soil which can be accomplished by the use of peat moss and muck and acid sand in the Miami area. One more thing. . .frequent sprays or soakings with a nutritional spray and also with an iron compound keep the colors bright and growth moving along.

This may sound complicated but once it becomes routine it is simple. . .the results are spectacular and very rewarding. Main points seem to be FULL SUN, WARM LOCATION, CONSTANT WATER, ACID CONDITIONS, and *tender loving care.*

John Turner of Miami, probably the best palm grower in this area, developed most of the above culture. His sealing wax palms are red and green and beautiful.

Obtaining *Cyrtostachys* is another matter. They are native to the Eastern tropics (Sumatra, etc.) and the nearest sources to Florida are Morgan's Nursery in the Panama Canal Zone and the famous Summit Gardens of Panama. Seeds are very tiny and take about two months to germinate. They are not the easiest to raise beyond the seedling stage but with the proper guard against damp-off they should make it. The requirements for the seedlings seem to be about the same as for the adult palms.

Holders of plant import permits may apply and obtain a special permission to bring this palm in bare-rooted from Panama. Persons who are making a trip to Panama have a fine opportunity to obtain these rare beauties. The above-mentioned nurseries in the Canal Zone will probably cooperate with you in preparing the plants. They must be thoroughly cleaned and free of all contamination in order to avoid the deadly dipping at Plant Inspection upon arrival in the U. S. A. The bare roots should of course be wrapped in wet Spagnum and then in a plastic bag to prevent drying. GOOD LUCK!

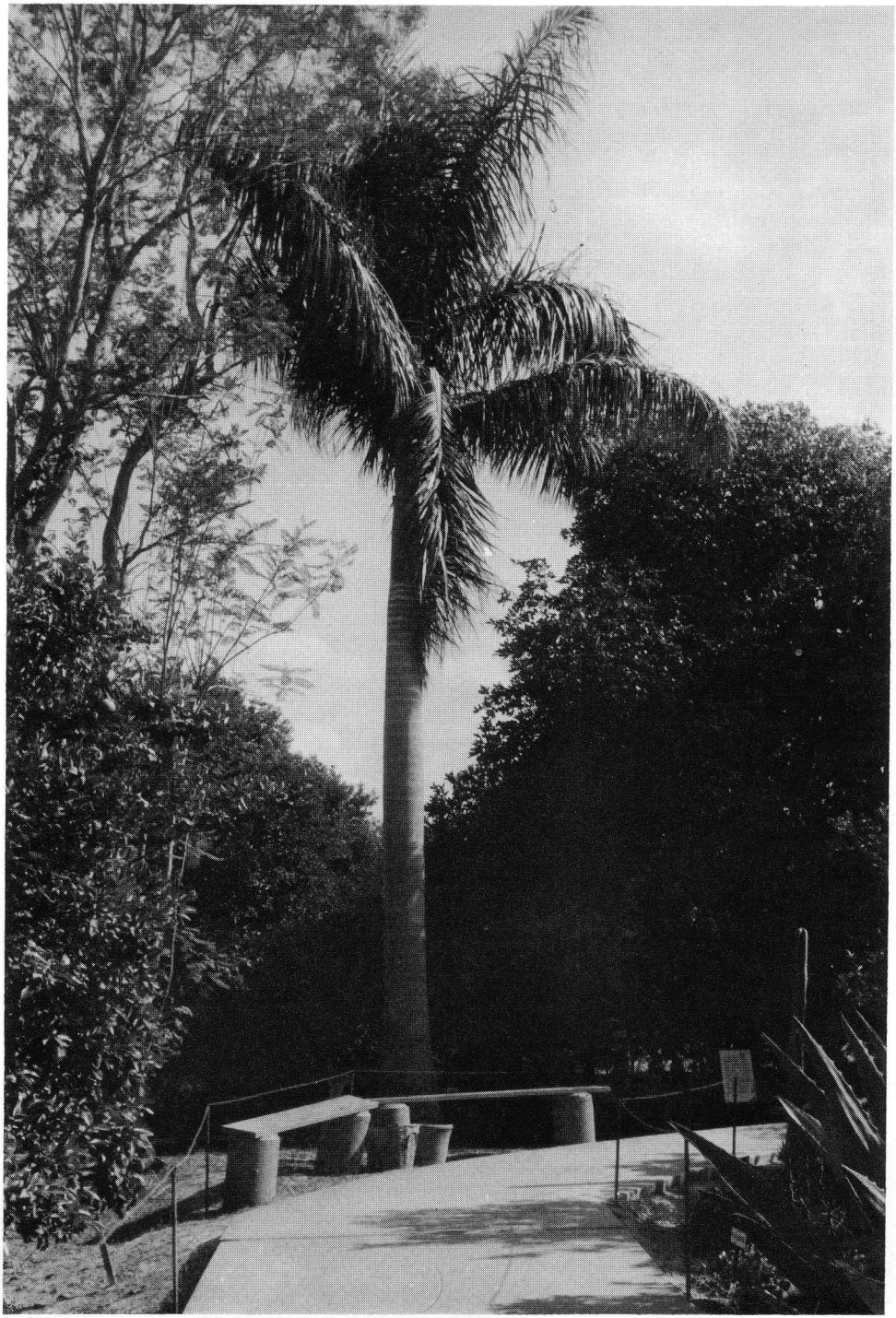
PAUL A. DRUMMOND
Miami, Fla.

A Roystonea in the Desert of California

The 30-foot royal palm pictured opposite has been growing out of doors in the Coachella Valley of southern California for 17 years. The palm was brought from Florida and in 1953 planted in the landscape surrounding the salesroom of Sniff's Date Gardens in Indio. Winter protection of an adjacent collection of tender citrus varieties has no doubt aided its survival. The desert heat and ample flood irrigation has promoted vigorous growth which should be the envy of the palm fanciers in the coastal belt of California who dream of growing large royal palms.

FREDRICK C. BOUTIN
Huntington Botanical Gardens

Photo Gallery . . .



PALM BRIEFS

A Visit to Lord Howe Island in November, 1971

It was my good fortune to join a tour of 65 California nurserymen to the South Pacific for 24 days in the fall of 1971. Roughly, the itinerary was from Los Angeles to Tahiti, to Australia, New Zealand, Fiji Islands, Samoa, Hawaii, and home. The nurserymen's tour was geared to horticulture, which means botanical gardens, private estates, universities, horticultural research facilities, wholesale and retail nurseries, meetings with nurserymen's associations in various countries, besides all the other niceties of traveling life, 18,700 miles in all.

Besides all this, my main purpose was to take advantage of a long desired opportunity to visit a remote tiny island in the Sea of Tasman, between New Zealand and Australia, just a little south of the 30th degree of latitude on the other side of the equator. This island has furnished a product to our nursery, the most essential in our business of growing and selling plants for the last 20 years. It is the seeds of a palm tree, *Howeia forsteriana*, indigenous only to this lonely island where it grows with three of its relatives, *Howeia belmoreana*, *Hedyscepe canterburyana* and *Clinostigma mooreanum*. Now, these names mean nothing to you, or very little at most; suffice it to say that one of them is the palm that you find in lobbies of hotels, business houses, sales and convention rooms, churches, as decorative background in magazine pictures, or the palm behind your President when he addresses the American people.

Not only was it my desire to get acquainted at close range with these palms on Lord Howe Island, but also to learn at the source the reasons for the ever diminishing quantity of seeds available in an ever increasing market.

Regrettably, it was necessary to cut short my visit in Tahiti to meet a 3 A.M. departure date, November 4th, from the Rose Bay seaplane airport in Sydney, Australia. Flying trips to Lord Howe Island depend on high tide conditions in the lagoon, therefore schedules change for every flight, which happen once or twice a week. A steamer stops for freight—no passengers—only every three to eight weeks.

We departed in a foam of spray raised by the pontoons, soon penetrated through the cloud cover and floated in the eerie light of a southern full moon over fantastic cloud billows, white castles, grotesque dream formations, with off and on a glimpse through to the black ocean underneath, smooth and slick like a mirror, reflecting the unearthly light of the moon. The whole scenery was so unreal, that I pinched myself to find out whether I was still alive or dead. Dawn finally broke, gloriously the sun emerged over the horizon from which the clouds had disappeared in defeat and then, at once, the green island appeared below, narrow, hilly, with two steep formidable mountains at one end.

The white breakers of the coral reef marked the lagoon. Soon the Sandringham Flying Boat set down in a cloud of spray again on the shallow blue-green, immeasurably clear waters. We were boated out and set foot on the small jetty of the island.

Imagine a tiny island, about seven miles long by one mile wide at the widest south end where the two volcanoes of seven million years ago—by scientists' calculations—pushed themselves 2800 feet out of the ocean. The island is the creation of volcanic forces; the coral reef the southernmost of the

southern hemisphere. Discovered in 1788, it showed no previous human habitation, no prehistoric remnants of natives were found. Settlers arrived in 1834, but it was not before 1840 that settlers came to stay for good, making their livelihood from sales of water, wood and vegetables to whalers. When whaling stopped, for a long time nothing happened, until another source of income for the 200 inhabitants showed up: collection and sale of *Howeia* palm seeds, more often but incorrectly called *Kentia*, which found a ready market in all civilized countries of the world.

This is the remarkable story of the kentia palm: it is as much of a puzzle—as many things in the universe remain unexplained to the human mind—how of all places and numerous possibilities four species of palms could develop to such perfection in millions of years on only this mere speck of land, surrounded by vast oceans of the South Pacific away from contact with anything from the outside world! These four palms have been found indigenous (native) to Lord Howe Island only. Its average annual rainfall is 67 inches, lowest temperature 50° F., highest temperature 79° F. over the last 27 years by record; these making it marvelously subtropical. The palms are found in great numbers and groves in four distinct belts from sea level to the tops of the two extinct volcanoes, Mt. Lidgbird and Mt. Gower, each belt overlapping the next one. *Clinostigma mooreanum*, shortest and sturdiest of the four grows on top, especially on top of 2840-foot-high Mt. Gower which has a summit platform of nearly 100 acres.

It was my desire to find and study all four species on Mt. Gower for which purpose I had engaged a guide to take me up. I was fortunate to find a most knowledgeable and sociable guide in Max Schick, partially Polynesian with a magnificent physique. Had I known the difficulty and exhausting effort of the ascent—and descent—I probably would have backed out. But, once started, I was too proud to give it up halfway. The ascent to Mt. Gower begins at the base of its neighbor Mt. Lidgbird. The southwestern portion of this mountain falls almost perpendicular to the sea and it is here that the Lower Road is situated. An explorer's description of his journey, recorded in N. S. W. Parliamentary Notes of 1870, is very accurate and of particular interest, because it describes the feelings of the average person who is foolish enough to travel along this path. R. D. Fitzgerald wrote: "On turning a rock, they got the first glimpse of the 'bad bit,' and a 'bad bit' it was—a track across the face of the precipice. The precipice rose sheer and naked, perpendicular as a wall for a thousand feet; then a little rubbish, with here and there a stunted plant. The track not more than two feet wide, then down to the palms 500 feet. Now came a slope covered with loose gravel and the caution is: 'Have a care now, if you once begin to slip, you will—there don't mention it please! 'Now the path is level, with a few loose stones, probably sent down from the ridge above by the wild goats. The smallest of them had it fallen then, might have been death. [A huge basalt boulder blocked the path on our own trip, down by erosion.] Kick one off the path—oh, the horror that it makes no sound—nothing could make a sound out there, over the edge of that path, what a treasure those little bushes are, but there are places where there are none, where there is nothing to grasp but the roughness of the perpendicular rock; and there are places—'gulches'—where the path itself is gone, and footholds have been cut out with a

pick in the rock, and where it is dreadful to start with the wrong foot. 'Is this ever coming to an end?' is the thought as each angle is rounded; and in all that dangerous track the rounding of the angles is the worst, when you cannot see where you are going and grasp at anything with one hand reluctant to let go the other, and the other is sidled on over nothing. But the last angle is turned, and they stand again on the talus of the precipice, and it is grand—wonderfully grand to look up to it—1000 feet of grey perpendicular basalt, the very highest mass of which overhangs the base. A sight that one turns to look at again, again and again to imprint it on the memory. A sight of awe and fascination."

We passed through a forest of banyan trees, over windswept ridges, with breathtaking vistas across the ocean, the reef, the narrow green strip of the isle, up and up, until we met the most welcome tiny streamlet in Erskine Valley, crystal clear over a sheet rock polished in millions of years by torrential downpours. We lay flat on our bellies to sip the cool drink. Then to the ridge connecting Mt. Lidgbird with Mt. Gower, and up the long steep ascent to the top. We had left behind us long ago the belt of *Howeia belmoreana* and higher up of *Hedyscepe canterburyana* with its silvery-white crownshaft and its beautifully curved crown of leaves. We were now entering the high range of shrubs, dwarfed trees, grasses, ferns and lichens. First singly, then in stands, *Clinostigma mooreanum* were showing up, first mixing with the *Hedyscepe*, then bolder and in more perfect shape—shorter than the other three species, stubbier stronger, with a knobby, rounded crownshaft, stubborn, fighting the ever menacing forces of winds, fog and rains. They are kind of stalwarts. Finally—the top!

We threw ourselves down in a grassy clearing out of the range and protected from the harsh winds. I was too worn out, weary and exhausted to eat the lunch Max had carried up here. But fortify myself I had to for the steep descent, so I ate and said to Max: "If we had *only one* cool drink!" "Just wait," said Max, "let's walk 30, 40 yards to the other side." There, what seemed a miracle, was a break-off, a cut in the near level top, a hanging garden, as we know them from the High Sierras, but this one deep in darkest shade of the trees, bushes, ferns and palms, a veritable paradise. A perpetual spring, crystal clear out of the red volcanic rock, really not enough to run in a stream was trickling in a heavy drip, which we caught in our cupped hands. It never gives out, summer or winter! Where would the water come from so near the top of the flat mountain?

After we had our fill of the spring water, we went back to our grassy, sunny resting place. While dozing on our backs, we heard suddenly a strange rasping noise—we had a visitor, a bird of oddest dimensions, a rockhen, bird without wings, but with strong legs, a powerful, long, curved beak. The strange bird was the size of a bantam hen, red-brown of color, one of the remainder of a species which had "lost" its wings. Originally these birds had no enemies and thrived on the island, where there are neither snakes nor rodents, owls or the like. Then a shipwreck brought rats on drifting boxes to the shore and because they had no natural enemies either, they took over, fed on the eggs and newly hatched young of the rockhens until they are nearly extinct. They also climbed the palms and feasted on the seeds, to become a detrimental pest. In the lowland a bounty of five cents was paid to rat hunters for each tail;

so many were brought in that rat tails were used as currency, but I don't believe the story somebody told, that a tail was found once in the collection plate of a church. Anyway, the rats in the inhabitated areas are well under control, whereas it has been impossible to eradicate the pest in the nearly inaccessible places. The remaining rockhens are now under government protection. Some that I saw on the mountain were banded. They look similar to New Zealand kiwis. Let us hope that the government rat poison will do the job, and that these lovable almost tame birds on top of the two mountains will have a chance to survive.

The sun had been shining all day. All at once, it disappeared; it became dark. A heavy cold fog drifted in and all around us. It remained. We began to shiver, specially as we had left our sweaters down the mountain to be picked up on the return. Gone were the views. The only thought: down, down, before night comes, to where it's warm. My knees were buckling, I had to stop often,—and then again that terrible Lower Road. But we made it, long after a glorious sunset, long after the shadows of night hid the palms, the banyans, even the path home.

To take leave from Lord Howe Island is like leaving paradise. In fact Lord Howe Island is called the "Paradise of the Pacific." It's a world different from ours. The people are different, wild creatures are and so is its flora. I feel affection in my heart for the island and its kindly people and sorrow that I had to say 'Good bye.'

OTTO MARTENS

Facts & Figures of Lord Howe Island

Location: In the Tasman Sea, 360 miles east of Australia, 436 miles east-northeast of Sydney; ca. 7 miles long, 1 mile or less wide.

Transportation: By Sandringham Flying Boat since 1947, once or twice a week, ca. 40 passengers: 1 or 2 narrow roads, a number of paths, few motor cars, many bikes.

Facilities: Bottled gas imported; rainwater collected in cisterns from metal roofs, a few private mediocre wells, a small creek. Electricity by local power station.

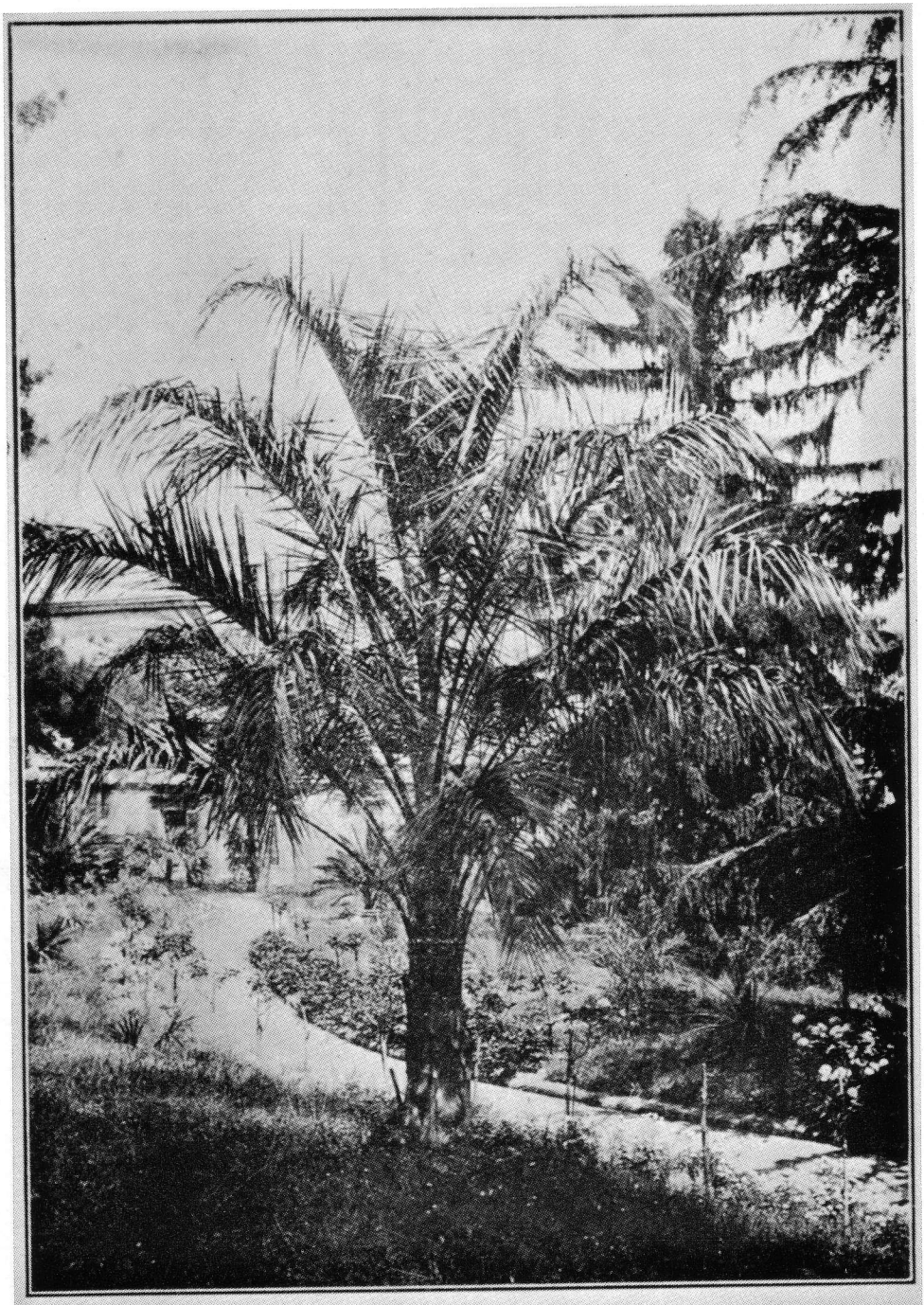
Government: Island belongs to New South Wales, Australia. Local Board of Control manages local affairs, under directions from headquarters in Sydney. No courthouse, no jail, no policeman, no sheriff or constable, nobody to make an arrest, no lawyer, no need for any of these.

Hospital care: Retired doctor resident. Each flight ticket includes insurance for emergency flight to Sydney hospital. Small hospital on the island, operated by one beautiful nurse.

Schools: All grades in three elementary classes. High School by correspondence course.

News: Radio. No T.V.

Miscellaneous: Nobody has ownership of land, lease only. No land sales possible, outsider cannot buy lease of vacant property. No poverty; everybody has an income. Everybody owns a home, some small, some larger. All capable male help must collect palm seed, sales return go into general fund, workers are paid from this fund; same with unloading freight from steamer. First export of palm seeds in the 1880s. Sales now managed by government.



Fot. Prof. G. Roster.

Arecastrum Romanzoffianum X Butia.

Further Notes on Arecastrum × Butia

Glassman (1971) felt that evidence was insufficient to warrant recognition of the palm hybrid designated by Beccari as *Arecastrum romanzoffianum* × *Butia*. The accompanying photograph will at least attest to the existence of this hybrid. Pictured is Plate V of two plates in Ruffo (1920) showing *Arecastrum romanzoffianum* × *Butia* growing in the garden of the Villa Lucia, Castellammare di Stabia, near Naples, Italy. Ruffo reported that this and another plant were planted in the open in 1908 and 1909 and produced viable seedlings after 1915 or 1916.

Giorgio Roster, the photographer, reported in 1923 that *Arecastrum romanzoffianum* × *Butia* was being grown in six gardens in Italy and France: Chauvassaigne (Villa San Louis), Garavan, Mentone; Nabonnand Nursery, Golfe Juan; Garbari, Trento; Villa Lucia, Castellammare di Stabia; Giardino dell 'Ottone, Island of Elba; and Roster's own Giardino dell 'Ottonella, also on the Island of Elba.

Ruffo indicated that the hybrid plants at the Villa Lucia were acquired before 1908 from the Nabonnand Nursery. These hybrids, sold as *Cocos Nabonnandii*, were most likely produced by Paul Nabonnand, known for his breeding of tea roses and *Rosa gigantea* hybrids, for Nicolas (1937) reported that "Nabonnand was commissioned by the French government to hybridize and improve coconut, date, and ornamental palm trees for the French colonies. . . ."

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FREDRICK C. BOUTIN—*Huntington Botanical Gardens, San Marino, Calif.*

LETTERS

The following is in reply to the letter published in *Principes* 16: 10–11.

LORD HOWE ISLAND BOARD
SYDNEY, AUSTRALIA
December 30, 1971

DEAR MR. MARTENS,

Thank you for your letter, dated 30th November, 1971, in which you record your observations on the Lord Howe Island palms, following your visit in November, 1971.

The trouble you have taken to express your views in this matter is greatly appreciated and your comments will certainly be borne in mind by the Lord Howe Island Board in its future deliberations and action towards the propagation of the species on the Island.

You will be interested to learn that the Board is contemplating the development of plantation areas in order that, not only the supply of seed can be increased, but that the Island can be further beautified.

Your view concerning the future demand for the seed was recently confirmed by the response to public tenders invited by the Board for the sale of the 1972 crop. You may be assured that everything possible will be done by the Board to increase production.

Thank you once again for your views which, coming from a person who has

been in the nursery business for more than twenty years, are highly valued by the Lord Howe Island Board.

Yours faithfully,

J. B. HOLLIDAY, CHAIRMAN

NEWS OF THE SOCIETY

California members elected James J. Wright chairman and Susan Wright secretary-treasurer of the local group in a meeting held February 12, 1972, at Casa del Prado in Balboa Park, San Diego. Ken Foster showed slides of a recent trip to Miami and Jamaica to the 45 members present.

A late April meeting was held at the home of the Whitelocks in Los Angeles in their garden filled with palms and cycads. A raffle of palms was included in the program.

* * *

In March, The Palm Society was asked to enter an educational exhibit in the Metropolitan Miami Flower Show. Member Eric Beers demonstrated his artistic ability by arranging about 20 choice specimen plants in a most pleasing manner, aided by John E. Turner. Cut fronds were provided by Fairchild Tropical Garden while Mr. W. E. Manis, Eric Beers, and your secretary loaned the potted plants.

* * *

Miami area members had a rare treat on April 22, 1972 when they were invited to see the garden of former President Nat DeLeon. Those who know he is Horticulturist-in-charge of Miami's showplace, the Parrot Jungle, will not be surprised to hear of the beauty he has created using many colorful and unusual bromeliads as ground cover under his palms. Of course, when he acquired the property he had a headstart on most of us—he bought it from another Palm Society member, Mrs. O. C. Corbin, whose close connection with Fairchild Garden, interest in, and knowledge of gardening had served her well in developing quite a palmetum among the native plants on the property. The profusion of orchids, too, does nothing to lessen the tropical effect. Nat, a most gracious host, took members around to show them his many treasures such as *Normanbya normanbyi*, *Pelagodoxa henryana* and a large *Licuala grandis*. He had a collection of choice palms, potted and labeled, on the patio. Among these were *Kentiopsis olivaeformis*, *Oenocarpus panamanus*, *Laccospadix australasica*, and two species of *Reinhardtia*—*R. gracilis* var. *rostrata* and *R. gracilis* var. *gracilis*. Nearby, his wife Eileen had a table of refreshments which was most welcome to allay the thirst caused by all the exclamations of admiration and envy at the delight that greeted the eye wherever it looked.

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In February Miami members saw some magnificent slides taken in Thailand by Treasurer W. E. Manis on a hurried trip he had made for the Agriculture Department. He told us fascinating facts about that country's agricultural economy though he had little time to see or photograph palms. At the same meeting we saw more slides of Thailand made by new member Dr. Brian T. Gaine. He had brought along some of the palm specimens he and his wife had brought back with great difficulty, among them several special types of coconut.

T. B. BUHLER