PRINCIPES

Journal of The Palm Society

April, 1973
Vol. 17, No. 2

PRINCIPES

JOURNAL OF THE PALM SOCIETY

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Contents for April

Cover Picture

Veitchia merrillii cultivated along Old Cutler Road near Matheson Hammock, Coral Gables, Florida. For contrast, see palms attacked by disease, page 43. Photograph by M. V. Parthasarathy.

PRINCIPES

JOURNAL OF THE PALM SOCIETY

An illustrated quarterly devoted to information about palms and published in January, April, July and October by The Palm Society, Inc.

Subscription price is $6.00 per year to libraries and institutions. Membership dues of $10.00 per year include a subscription to the Journal. Single copies are $1.50 each. The business office is located at **1320 S. Venetian Way, Miami, Florida 33139.** Changes of address, undeliverable copies, orders for subscriptions, and membership dues are to be sent to the business office.

Second class postage paid at Miami, Florida and at additional mailing offices.

Mailed at Lawrence, Kansas
July 25, 1973

The Menace of Lethal Yellowing to Florida Palms

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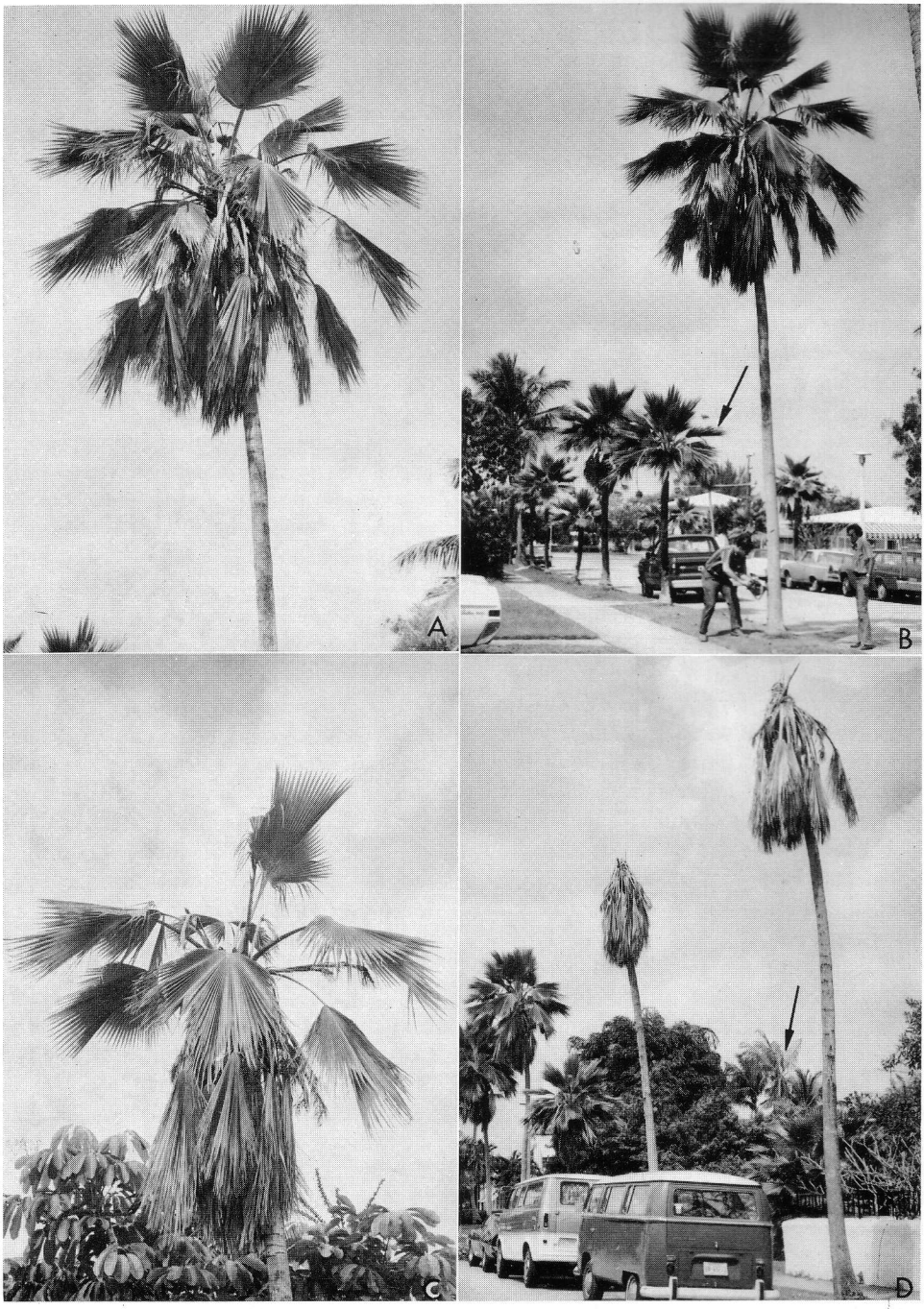
Palm trees are such a regular part of the Florida landscape that it is difficult to imagine a southern Florida landscape denuded of its picturesque palms. Yet, thanks to the lethal yellowing disease, such a possibility may be closer to reality than many people think. Most residents of Miami are already familiar with the deadly disease that has affected thousands of coconut trees in Dade County. In addition to rendering the landscape of southern Florida bleak, the disease can be expected to lessen property values by millions of dollars since replacement can cost $100 or more per tree. Furthermore, removal of the dead or diseased palms can cost $25 to $75 per palm! In countries such as Jamaica where coconut products play an important role in the national economy, the disease has been particularly disastrous.

Although most Floridians may now be aware of the lethal yellowing of coconut palms, particularly the 'Jamaican Tall' variety, and the efforts of the Florida Department of Agriculture to control the disease, they may not be aware of the apparent spread of the disease to two other palms—the popular Christmas palm (*Veitchia merrillii*) and the lovely fan palm, *Pritchardia pacifica*. Many of the roads in Dade County that are decorated by avenues of these graceful palms may soon become desolate if the disease spreads. The taller *Pritchardia pacifica* appears to be more susceptible to lethal yellowing than the shorter *Pritchardia thurstonii*, a species that is also popular for roadside plantings. It is obvious that the apparent spread of lethal yellowing disease to two additional genera of palms from different subfamilies has far reaching implications for Florida palms in general.

The diseased pritchardias and veitchias exhibit symptoms that are somewhat similar to those of coconut trees affected by lethal yellowing. However, recognition of the symptoms, particularly during the early stages of the disease, is more difficult in the pritchardias and veitchias, especially since these species have not been as well observed during their stages of infection as the coconut. The first obvious symptom of the disease in an affected pritchardia is the dying of the older leaves. Discoloration can be in patches or uniform throughout the leaf. Except for the dying or yellowing of the older leaves, the tree at an early stage of infection appears healthy (Figs. 1A, B). If the tree is felled at this stage and the crown is dissected (Fig. 2), it will be seen that the tips of some unexposed inflorescences are darkened or deep brown instead of the normal pale yellow color (Fig. 3). Often these discolored tips are described as "black," but truly black tissue is usually related to physical injury, as after leaf trimming. As the disease advances, the older leaves turn brown and collapse and the younger ones begin to turn



1. *Pritchardia pacifica.* A, Crown of *Pritchardia pacifica* at an early stage of the disease. The palm looks healthy in this picture, but several of the older leaves had turned yellow-green. Some persistent dried leaves are also present. B, Same palm as in A being felled for dissection and

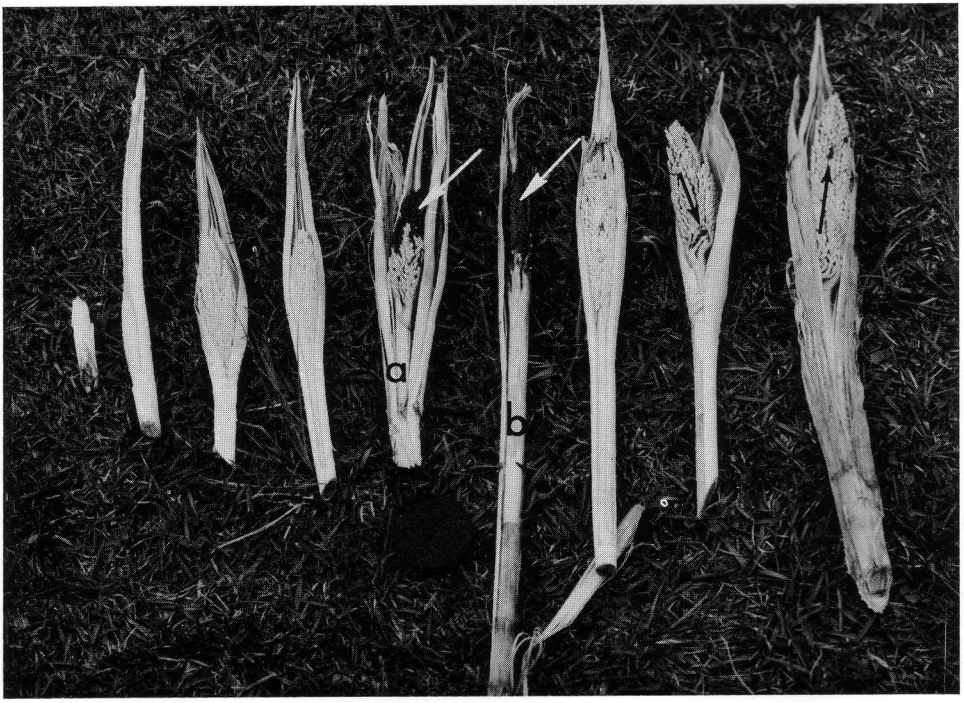
yellow. Inflorescences that expand at this stage of infection usually have flowers that are rust-brown and/or aborted. At this stage of the disease, the bud starts to rot from secondary infection by bacteria and the palm definitely looks sickly (Fig. 1C). Within a week or two, the bud is completely rotted and all that is left of the once graceful palm is the depressing sight of a stump with a few dried leaves (Fig. 1D).

The early stages of the disease are even more difficult to detect in *Veitchia merrillii* than in the pritchardias. The discoloration of older leaves is not as dramatic as in the coconut palm or as evident as in the pritchardias. The first clear symptom of the disease is usually the brownish "water marks" of older leaves along the margin of the pinnae or "water-soaked" streaks on the pinnae. Fruits and older inflorescences tend

2. The crown is being cut from the felled tree for dissection and subsequent investigation in the laboratory.

←

investigation of the crown. The shorter fan palms (arrow) are *Pritchardia thurstonii* that appear to be more resistant to the disease. C, A more advanced stage of the disease than indicated in A. The palm definitely looks sickly. Bud rot had begun in this particular tree. D, Healthy and diseased pritchardias by the roadside in southwest Miami. The disease has killed two palms. Arrow indicates one of many coconut trees in this area that are dying from lethal yellowing.



3. Unexpanded inflorescences of the diseased pritchardia palm shown in Figures 1A and B. The flowers in the distal part of one of the inflorescences (a) has turned black while almost all the flowers in an adjoining inflorescence (b) have become black (white arrows). The rest of the inflorescences appear to be healthy except for two that have a few isolated, blackened flowers (black arrows). Mycoplasma-like microorganisms have recently been found in the phloem of inflorescence a.

to drop off prematurely as in coconut. At this stage the older leaves, which may or may not turn yellow-brown, tend to break easily at the junction of the sheathing leaf-base and the midrib (Fig. 4A) and younger fronds tend to break within the lower region of the pinnae. Unexpanded inflorescences often have a distorted or twisted appearance (Fig. 5). Although inflorescences had not darkened in the three veitchias we examined, inflorescences have been known to darken in other individuals. As in the diseased pritchardias, bud rot follows, and soon there is nothing left but the stump as a grim reminder (Fig. 4Bb). Pritchardias and veitchias growing in the southwest Miami area appear to be most severely affected by the disease, although a more thorough survey is needed to clarify this. The havoc caused by the disease to coconut palms has to some extent taken attention away from the plight of these equally beautiful palms.

One should perhaps be cautious with the assumption that similar symptoms always indicate similar diseases or the same disease. More work is needed to prove beyond doubt that the lethal yellowing of coconut palms, pritchardias and veitchias is the same disease. Obtaining such proof will be more difficult than might be imagined, since very little is known about the causal agents of the disease. Recent electronmicroscopic in-

4. *Veitchia merrillii*. A, A tree in southwest Miami showing early symptoms of the disease. The older leaves are broken at the junction of sheathing leaf base and midrib. It is difficult to recognize early symptoms of the disease in the veitchias. B, An advanced stage of the disease showing a veitchia palm with very few leaves (a). The older broken leaves have apparently been removed in this palm. Bud rot that sets in at a later stage of the disease has resulted in the decapitation of another veitchia (b).

vestigations in three different laboratories on the phloem of coconut palms affected by lethal yellowing in Jamaica have revealed that mycoplasma-like microorganisms are present in the sieve tubes of the diseased palms but absent in the healthy ones (Banjac, Hunt and Maramorosch, 1972; Beakbane, Slatter and Posnette, 1972; Parthasarathy—unpublished data). Although the mycoplasma-like microorganisms are currently considered as the organism most likely to be responsible for lethal yellowing, the etiology of the disease is still not clear. It is significant that electron-microscopic investigations on the phloem of the diseased pritchardia inflorescences have also recently revealed mycoplasma-like organisms in the sieve tubes (Parthasarathy—unpublished data). The microorganisms have so far not been observed in the diseased phloem of veitchia palms, but the search continues in laboratories at Cornell University, University of the West Indies, and the University of Florida Agricultural Research Center, Ft. Lauderdale (Purdy, 1973). The similarity of external symptoms of diseased pritchardias with those of coconut trees affected by lethal yellowing, and the presence of mycoplasma-like microorganisms in both palms strongly suggest, but do not prove, that the two are affected by the same disease. The likelihood of the three different genera of palms being affected by the

5. Inflorescences of a diseased veitchia palm. Arrow indicates an unexpanded inflorescence that appears twisted.

same disease raises grave questions about the future of Florida palms in general, if the disease spreads unchecked. Several private and state agencies are very much aware of the acute problem and have initiated programs to slow down the spread of this disease among the coconut palms. Their programs include early detection of the diseased trees and cutting and burying them, and encouraging nurserymen and homeowners to plant or replace the 'Jamaican Tall' variety with resistant 'Malayan Dwarf' varieties. From October 1971 to late May 1973 the Division of Plant Industry has cut 6,687 of the 7,246 diseased coconut trees found primarily in Dade County. There are no accurate records of the numbers of diseased or cut pritchardias and veitchias according to Mr. G. Gwin, Division of Plant Industry. The plight of pritchardias and veitchias, however, has not yet received much attention. Although the programs mentioned above are no doubt essential to slow down the spread of lethal yellowing, they are unlikely to completely eradicate the disease. More studies on the etiology of the disease are needed so that the causal agents can be determined beyond any doubt. Such studies, however, may be slow in yielding results because of basic deficiences in understanding of the anatomy and physiology of the coconut palm. As Tomlinson (1972) has pointed out, for each scientist who works on a coconut or oil palm, there are a hundred scientists who work on temperate cereals and cash crops. It is difficult to transpose information obtained from such temperate plants to a tropical tree like the coconut with its

complex structure. Obviously, a crash program that includes basic research on palms is essential in combating the lethal yellowing disease of palms. To this end, preparations are underway for a research symposium on lethal yellowing to be held at Fairchild Tropical Garden this September. Details should appear in the next issue of PRINCIPES.

We are very grateful to Mr. Terry Fedelem and Mr. John Kyriakopulos of the Division of Plant Industry, Miami, Florida, for their help in locating and collecting the diseased pritchardias and veitchias, and to their supervisor, Mr. George Gwin, for information on lethal yellowing symptoms.

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More on Albino Palm Seedlings

Albino seedlings of *Euterpe edulis* and *Caryota mitis* were reported in Principes 16: 115, 1972, but a photograph of the first was overlooked among materials on the editor's desk. It is published here with a photograph of Mrs. Buhler's albino *Caryota mitis* and with apologies from the editor.

1. Albino and normal seedlings of *Euterpe edulis* in tropical rainforest of southeastern Brazil. Photograph from color transparency by Professor Aylthon Brandão Joly. See *Principes* 16: 115, 1972.

2. Albino and normal seedlings of *Caryota mitis* from garden of Mrs. T. C. Buhler, Miami, Florida. Photograph from color transparency. See *Principes* 16: 115, 1972.

On the Solomons' Sago Palm

T. C. WHITMORE

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Throughout the British Solomon Islands there grows a fine sago palm (Fig. 1), cultivated everywhere for its leaves which are the universal thatch provider. Within living memory this palm was also grown for its sago and its fruits were gathered and sold to traders for export for button manufacture, under the name ivory nut, and the pidgin English name hebe nut, being a corruption of the trade name. The vernacular name in Kwara'ae and several other Solomons' tongues is *sao*. This Solomons' sago palm is solitary; it does not sucker from the base. In this respect it differs from *Metroxylon sagu* Rottb., the widely cultivated sago of the East Indies. *Metroxylon sagu* is rare in the Solomons. It has a smaller stem, smaller inflorescence and fruits and also is restricted to swampy sites, whereas the Solomons' sago is often cultivated well away from water, sometimes on high ridges. *Metroxylon sagu* is locally recognised as *ambosao*.

Two species of *Metroxylon* have been described from the Solomon Islands,

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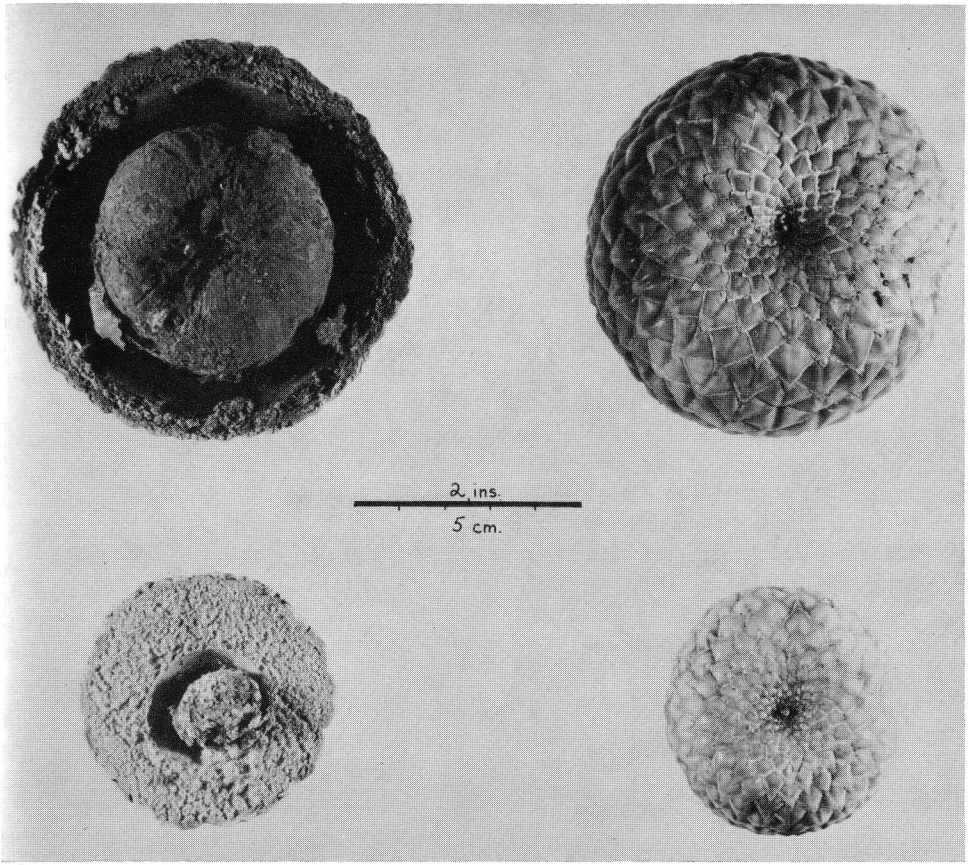
1. The Solomons' sago palm, a fine tree in the centre of Honiara, growing on the alluvial flood plain of the Matanika'o river. Most of the leaves have been removed for thatch.



2. Fruits from a Solomons' sago growing in Malaya: above, gathered in August 1971; below, gathered in February 1971.

Metroxylon salomonense and *M. bougainvillense*. These were fully annotated and illustrated by Beccari in his monumental monograph on the Asiatic lepidocaryoid palms, published in 1918 (*Annals of the Royal Botanic Garden, Calcutta* 12(2): 1–231). Neither species had been much collected at the time Beccari wrote. In his key and descriptions he distinguished the two species and concluded by stating that *M. bougainvillense* is "very similar to *M. salomonense*, and perhaps only a variety of it from which, however, it differs in its smaller, more depressed fruit with the base excavate and the mesocarp considerably thicker, and in having a smaller seed." His plate 114 very clearly shows these differences.

I have followed the flowering and fruiting of an individual Solomons' sago palm planted in Malaya and believe that *M. bougainvillense*, based as it is solely on one leaflet and fruit collected by Rechinger, merely represents *M. salomonense* with immature fruit.

There is a stand of Solomons' sago palms in Malaya at the Federal Agricultural Research Station at Serdang south of Kuala Lumpur, established from seed sent to Mr. H. D. Pagden there in about 1939. In 1955 seeds were taken

from this stand by Mr. E. Allen, an agricultural officer, to establish a grove by the Sungei Kanching at the northern end of Templer Park, a few miles north of Kuala Lumpur, at the time the Park was being set up. In December 1967, about twelve years later, one of these palms came into male flower, and Dr. J. Dransfield and I followed its development by frequent visits until we both left Malaya in September 1968. By April 1969, when I returned to Malaya from leave, the tree had just begun to set fruit, which were 3 cm. across by early July and continued to develop very slowly. On 11 February 1971, nearly two years later, I collected fallen fruits from below the tree. In mid August 1971 a second gathering was made. Fruits from these two gatherings are shown in Figure 2. In February 1971 (lower photos) the fruits were about 5 cm. across, many with excavate base (not shown), and with thick spongy mesocarp and small seed. By August 1971 (upper photos) the fruits were mostly larger, about 8 cm. across, with the base only slightly depressed, had a bigger seed, and the mesocarp was much thinner and was disintegrating into powder at its inner face. My Figure 2 is virtually identical with Beccari's plate 114 which shows fruits of *M. salomonense* (above) and *M. bougainvillense* (below). I do not think there can be any doubt that only one species is involved.

This huge palm has a very leisurely reproductive cycle. At the time of writing, December, 1971, four years after it came into flower, it still bears some fruits, though the leaves have now all turned brown.

The formal reduction of *M. bougainvillense* to synonymy is as follows:

Metroxylon salomonense (Warburg)

Beccari in Rechinger, Botanischer und Zoologischer Ergebnisse . . ., Denkschriften der K. Akad. d. Wissenschaft Math. Naturw. Klasse, Wien 89: 60, 61 *f. 5b, e, f, i,* 62 *f, 7.* 1913; Annals Royal Botanic Garden, Calcutta, 12(2): 192–3, *plate VI, f. 16, plate 114.* 1918.

Coelococcus salomonensis Warburg, Ber. Deutch. Bot. Ges. 14: 141. 1896 Schumann & Lauterbach, Fl. Deutsch. Schutzg. Nachtr. 606. 1901.

Sagus sp. Guppy, The Solomon Islands 83, 90, 303. 1887.

Metroxylon bougainvillense Beccari in Rechinger, Denkschriften der K. Akad. d. Wissenschaft Math. Naturw. Klasse, Wien 89: 60, *f. 5c,* 61, *f. 5g, h, j,* 62. 1913; Annals Royal Botanic Garden, Calcutta 12(2); 193–4; *plate VI, f. 17, plate 114.* 1918 **syn. nov.**

'Pacific Islands' Metroxylon in Whitmore, Palms of Malaya, 1973 (referring to the Serdang and Templer Park stands in Malaya).

Palmologue
Letters and Excerpts

It seems that not quite everyone goes overboard for palms. In a letter that came to hand just yesterday, I learned that a palm is only "a pole with a bunch of thatch on top." This definition, according to my correspondent, was attributed by a San Diego newspaper to a noted architect. Across the continent in Florida, another newspaper, the St. Petersburg TIMES, *not long ago quoted some seemingly disparaging remarks about palms by the City Forester of Clearwater. Besides not giving any shade, they don't have enough leaf surface to break up the wind. In addition to these and other defects, they are not the best support for the environment; in fact, they're one of the worst. "Don't get me wrong," the Forester is quoted. "It's not that I dislike palms, it's just that they're really not good for much." If the* TIMES *correctly quoted the Clearwater official, perhaps the local palmateers were somewhat nettled, but why object to such a plentiful commodity as ignorance, especially when it's so innocent and blissful? It's entirely lawful to think palms good for nothing and a blot*

1. A row of *Phoenix reclinata* along a canal bank in Leesburg, Florida, showing what an effective windscreen may be made with certain palms.

on the landscape, just as it is to think the most delicious repast is a hot dog "with everything"—everything being quite literally sauerkraut, ketchup, mustard, onions, relish and pickle. All of which points up the virtues of living in a free country. Strange and wonderful to behold are the ways of men and also the ways of palms. Some of the latter may be discerned in the correspondence quoted below.

—Dent Smith

2. The oddly shaped *Sabal Palmetto* on a ranch near Immokalee, Florida, owned by Dr. Arthur H. Weiland, standing beside the phenomenon. Photograph by Nixon Smiley.

From Mr. Nixon Smiley, Miami, Fla., March, 1973.

Here are some pictures of a strange, strange palm, much like the one which you showed me several years ago at Daytona Beach. The man in the picture is Dr. Arthur H. Weiland, Miami surgeon, on whose ranch near Immokalee I made the shot.

The palm is located in a pop ash swamp, but grows from the edge of a small hardwood hammock from which it toppled many years ago and, some way, grew in this position, like a coiled serpent ready to strike. It is some 80 feet in overall length, which would make it the tallest palm in the area if it were growing upright. This area, incidentally, is flooded much of the year so that only the head of the palm is above water.

Thought you'd like to see this and make some comment on it, perhaps, before sending it on—if you think it's worth using. You certainly wonder how

3. Another "serpent palm," also *Sabal Palmetto*, in a hammock on the outskirts of Daytona Beach, about 200 miles to the north of Immokalee, and shown here because of the striking similarity.

a cabbage palm could ever get itself twisted like this. And it's more of a wonder that the specimen is so similar to the one at Daytona Beach.

The similarity that Mr. Smiley refers to is made more apparent by comparing the accompanying illustrations of the two palms, both Sabal Palmetto, *in locations some 200 miles apart. It is indeed remarkable that both have grown in a circular pattern after being toppled and before reaching upward for the light. One theory for the circular growth has to be the same for each palm, viz., that shade from heavy undergrowth in a changing pattern caused the palm to seek the light until finally it found an escape from the overhanging vegetation and could grow upward. A "hammock," for any out-of-staters who may not know it, in Florida is something besides a suspended couch; it's a low-lying wooded area with rich moist soil. "But you must mean a hummock," says a Michiganer down for the winter. "Nope," we have to respond, "we mean a hammock, and we're stuck with it for better or worse."*

4. *Coccothrinax argentata* cultivated in Daytona Beach and still normal for its type except for the loss to decay of nearly all its stem at one height.

5. Close-up of palm stem in Figure 4.

From Mr. Roy C. Sutliffe, Los Angeles, Calif., January, 1973.

There is a very peculiar fan palm over in Burbank. It is about forty feet high, but at least half the trunk has rotted away about ten feet from the ground and farther up there is another place that looks deeper and much worse. There are other smaller holes in the trunk, but up on top this tree looks like any other of these Washington fan palms. How can it stay healthy and continue to grow with over half the trunk gone in two different places?

Palms have no cambium layer and are nourished through conductive tissue called "bundles," so that with only a part of the trunk remaining, sufficient water and nutrients can be transported upward through the stem to maintain, often, at least the semblance of perfect health. This correspondent is right, nevertheless, in thinking it strange that the crown of a palm can appear normal when a good part of the stem has been destroyed, for its lifeline of conductive tissue will have been proportionately reduced. The Burbank palm is not an isolated case by any means, and in fact I have here a palm that outdoes it. It is a dwarfish silver palm, Coccothrinax argentata, *a native of Florida now about thirty years old, with its slender stem reduced in volume at one point by about 80%, yet the crown remains normal and the palm continues productive of flowers and fruit. Seeing is believing, so a photograph of the whole palm is reproduced here and another of the stem cavity, close up. Two weeks ago the cavity was filled with cement to prevent collapse of the palm in a high wind, which of course does not ensure its longevity.*

From Mr. William D. Manley, Stockbridge, Ga., February, 1973.

It never did get below 28° during the ice storm here, but the ice stayed around for several days. I wish you could have seen the *Trachycarpus* on the patio. Just for the heck of it I took the hose and washed off all the ice from one of them and left the full ice coat on the other. After the weather warmed up and the ice melted, there was no difference in the end—both palms looked the same. All the needle palms were almost flat out on the ground from the weight of ice and I did not bother with them. Snow, you know, can be knocked off the fronds with a broom, but ice cannot. It usually clings not only on top of the fronds but under. This morning it was down to 16° and it is still cold, now only 24°, but that north wind is still blowing,

which makes the chill factor down to about zero. I have two *Chamaerops humilis* on my patio, and neither one has suffered any damage. These *Trachycarpus* on the patio are the most gorgeous things I have ever seen. I have seen many even in Europe and on the west coast, but none compared to these.

Bill Manley is definitely the Trachycarpus *king. But beyond dispute, he is also the* Rhapidophyllum *king, and for many years has grown it with perfect impunity through several winter spells almost cold enough to make a polar bear's teeth chatter. The coldest he recorded at his former location in Atlanta was 6° below zero, and at his present location in Stockbridge, 3° below. The third palm of his hardiest trio is* Sabal minor.

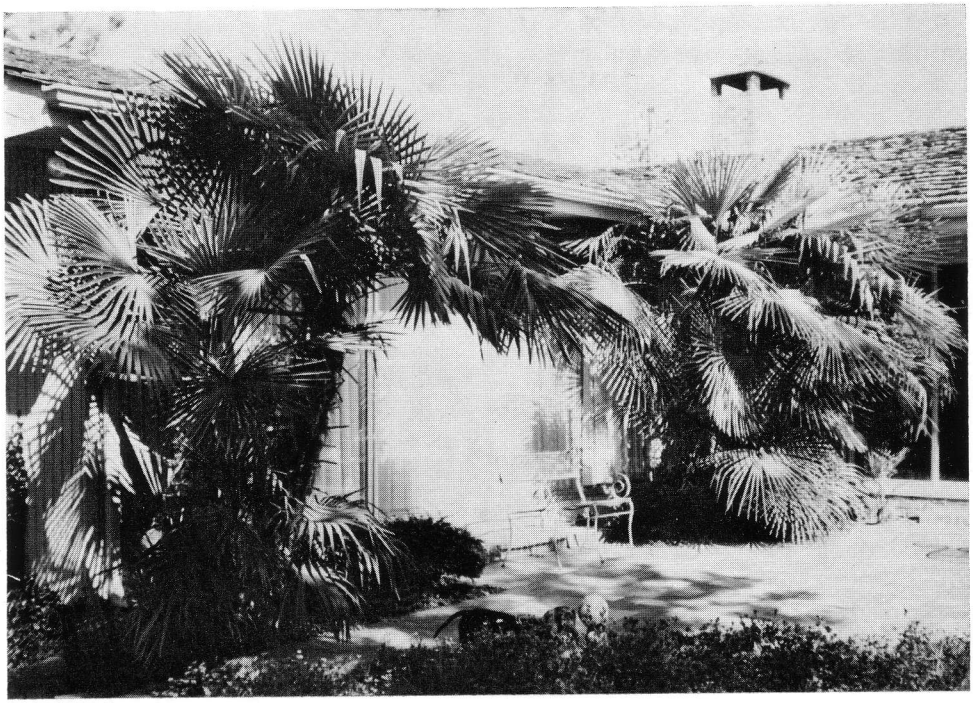
From Mr. Kenneth C. Foster, Yorba Linda, Calif., February, 1973.

Here is an account of the calamity that befell my tropical palm collection on Christmas Eve. I think you are familiar with our "Santa Ana" winds that blow five or six times during the winter months in southern California, having yourself lived in Los Angeles some years ago. These winds are extremely hot and dry, being formed by compressional desert heat, that blast through the canyons surrounding the Los Angeles basin to the sea. This particular wind was the strongest I had ever seen, blowing at a steady 60 mph with gusts up to 85 mph.

Well, as you might expect, it blew down my 20′ × 40′, by 13′ high, tropical palm house. We in California must grow the more tender palm species under controlled protection, as they won't withstand our long winter nights averaging in the low 40's and colder. We seldom get even a degree or two of frost in the winter, but the nighttime soil temperature remains cold for much of the winter regardless of how high the daytime temperatures might be.

It was about midnight on Christmas Eve that I realized we were having a really big blow. I drove down to my greenhouse area and found the ends of the palm house already caved in, with the roof pressing down on the crowns of the palms. The water line had broken and was shooting a 25′ column of water in the air. Both gas heaters were overturned (luckily they have automatic shutoff) and the electricity had shorted out on my seed-heating cables. I could barely crawl into the greenhouse on hands and knees. The damage was overwhelming. Beams had fallen on the crowns of some of the palms, many containers were overturned and crushed, and seemingly the choicest rare palms received the most damage. With the continuing destruction of the shade cloth and protective plastic covering the palms were being sandblasted by the high winds and sand. There was really not much I could do about it as I stood there surveying the damage with a flashlight.

Early Christmas morning, after a hasty present-opening with the family, I was on the phone lining up a local nurseryman who offered to let me store the palms in his facilities until I could rebuild. I reached my good friends Kurt and Lois Rossten, Palm Society members from near-by Huntington Beach, who came over Christmas morning to help me move the palms. Even with the two trucks it took us all day to move the approximately 500 palms. Only a few looked dead at the time, but with the passing weeks the mortality rate rose to about 15%. *Cyrtostachys, Johannesteijsmannia, Pelagodoxa, Phoenicophorium, Pigafetta,* etc. just couldn't withstand the drying effect of the wind (about 5% humidity during a "Santa Ana"). Many others that were reduced to only a green



6. *Trachycarpus Fortunei* at the home of William D. Manley, Stockbridge, Georgia, near Atlanta.

spike have recovered and are again growing nicely in my reconstructed palm house. This house is built with considerably more support, and I expect it to withstand the strongest winds of the future. I believe six months to a year must pass before my tropical palm collection is something to be proud of again.

Several friends have offered to help me replace some of the species lost to the big wind. The more cold-hardy palms growing outside, either in the ground or in containers, all withstood the wind with no more than the usual fraying and brown-tipping that occur every winter.

The way of the palmateer attempting to grow any large number of palms is sometimes hard, as the foregoing account illustrates. Small palms are subject to a veritable gamut of risks, even though not nearly so much to pests and diseases as most other cultivated plants are subject. Whether indoors or out, the tender kinds are mortal, and very. If immune to all ordinary risks, such as insect attack, perhaps a delivery truck will crunch a favorite cutie, or rats will bite off a whole flatful of seedlings. Small palms, depending on circumstances, have to run a gauntlet of possible risks, consisting of theft, vandalism, windstorm, fire, frost, drought, flooding, fungous diseases, scale and other pests, plus an assortment of other contingencies. Possibly the greatest risk to potted palms would result from neglect due to the gardener's illness or other forced inattention. But if there were no hazards and no demands, there could be no accomplishment for the gardener. Any feeling of achievement in any kind of endeavor has to be based on the overcoming of difficulties, and achievement, whether vague or with a planned goal, is really what keeps some of us all fired up.

From Mrs. Lucita H. Wait, Miami, Fla., February, 1973.

We are losing our coconuts at a fast pace, and are very worried. DeArmand Hull says that *Veitchia Merrillii* and *Ptychosperma elegans* are also affected, and possibly *Pritchardia.* Some research is being done by the Florida Department of Agriculture, and we have formed a committee to try to help the scientists in any way we can. There is a young bank president's wife heading it up, and doing a fine job. The Seed Bank has contributed $50.00 toward stamps and other small expenses. We hope the remedy will be found soon.

After years of no sign of any *Trithrinax* seeds, in came a batch of *T. acanthocoma* from Huntington Gardens, then yesterday some *T. campestris* and *T. biflabellata* from a young botanist in Buenos Aires. The latter is rare. . .

It is to be hoped that, if this issue of the journal is delayed much beyond its April publication date, some method of combating the lethal yellowing disease will have been found by the time this issue reaches its readers. As of this writing, however, no reason to be sanguine about a quick solution appears to exist. . . . Lucita's latest acquisition for the Seed Bank is some seed of Pigafetta filaris, *sent by Dr. Dransfield from Indonesia. Shades of Mardy Darian!*

From Mr. Michael Shapiro, Camp Meeker, Calif., March, 1973.

I've been planning to write to you for some time now, since reading your writings in PRINCIPES. I'm a relatively new member of The Palm Society, which I found out about from a friend in the nursery business. Soon after joining, I purchased the set of back issues and started reading.

I was born and raised in Los Angeles where there are plenty of palms to be found, though most people don't notice them, let alone distinguish species. I first became interested in palms about five years ago, when I was fifteen. I used to think that *Washingtonia filifera* and *W. robusta* were one species with two different shapes, tall and thin or shorter and fat, like people. I was thrilled no end when I found a book on trees and found them listed, thus learning the names of the most common palms in my area.

At that time I also noticed the third most popular palm, *Phoenix canariensis.* I would confidently tell people that there were only three different kinds of palms that would grow in California, until to my surprise I stumbled onto *Trachycarpus* and *Chamaerops*, and revised my calculation to five. After noticing *Erythea armata, E. edulis* and *Arecastrum Romanzoffianum*, I decided to keep my mouth shut. This proved to be the smartest thing to do, even though the people I would talk to knew less about palms than I did. Since then I've noticed many more kinds, and I would never limit California's palms to a set number of species again.

Last year I decided to hitch-hike cross-country, heading east. At the time I knew many palms by sight, but only *Washingtonia* and *Phoenix canariensis* by name. I saw my last palm (of the West) somewhere north of St. George, Utah. It was a *Washingtonia filifera*, and by the look of it remarkably hardy. Its shag was turned in many directions, unlike any I'd ever seen, and it was very much alive. Incidentally, the main street of the downtown business section in St. George had *Trachycarpus Fortunei* growing on both sides.

It wasn't until I reached Boston that

I decided to head towards Florida. Being from southern California, I'd never had much desire to see Florida because of all the propaganda we Californians get about our own sunshiny state. But as I grow older my horizons widen. After not having seen or been near palms during the long stretch since the lone palm in Utah, I was amazed to see my first eastern palm in North Carolina, a *Butia*. I knew that from there on south I was in palm territory.

The land of sabals and needle palms was hardly familiar. I took an immediate liking to the native palmettos I saw in Georgia and northern Florida. As I compared the groups of saw palmettos in small clumps with the tall sabals I saw later, I realized that both must be equally old, and therefore they were different species. I made it to southern Florida where I saw sixty or so new palms that I'd never seen before, including the proverbial coconut. I've since returned home to California to ponder my travels. I've read some back issues of PRINCIPES with articles and pictures of the native palmettos, and now I feel ready to visit the southern states again, this time more able to understand what I'd be seeing.

A story by Robert H. Nelson caught my attention in PRINCIPES of July, 1961. It was an account of your travels through the length of Baja California, which I really enjoyed. On p. 96, paragraph 6, it's mentioned that you saw a *Washingtonia robusta* with approximately ten heads, which you photographed from several angles, but, alas, no photo of the palm accompanied the story. Well, that did it! I decided that now I really have to write you a letter. I was fascinated by the description of that palm because I've seen in the Los Angles area thousands of *W. robusta* and *W. filifera* without ever once encountering a two-or-more crowned palm.

There is a photo in a book called Fantastic Trees, by Menninger, which shows a *W. filifera* with two crowns in Oakland, California. This is fairly close to where I live now, but as no address is given, I am stuck and cannot visit it.

Rather than throw my arms in the air, I thought I would write to you in the hope that maybe you could send me a photo or negative of this ten-headed *Washingtonia robusta* so I could have a copy made and return yours to you, and be able to see it for myself. A photo would have to suffice, since I know I couldn't get down to Baja quite yet.

Yes, Robert Nelson and I did see and photograph the palm with ten or more "branches" down there in southern Baja back in 1961. It was impossible to get a shot that would show many heads from any one viewpoint, though we tried from all sides. The foliage and so-called branches were mostly hidden from the camera by the great amount of dead shag, and no green color was to be detected except in the centermost leaves. The black-and-white prints and also the kodachromes failed to convey what the eye could make out as we circled the palm and viewed it from all angles. I had to tell my young correspondent that it was not only an uninspiring object to say the best of it, but a sick freak to boot and a very sorry spectacle indeed. At present I find but one surviving slide showing it, in which four thick divisions arise from the main trunk, and nothing else except dead foliage is visible. I offered to send the slide if it was still wanted in the light of the foregoing facts, but my correspondent has rightly decided it would hardly be worth seeing.

PALM BRIEFS

"Col Rouge" or Neodypsis lastelliana The Pride and Passion of a Palmateer

Whether or not *Neodypsis lastelliana* ever makes the scene outdoors in southern California, at least one healthy specimen grows robustly in Vista, California. This is the reward of reading *Principes* in which Dr. H. E. Moore, Jr. described and illustrated this palm which he saw during his trip to Madagascar (*Principes* 9: 13–29, 1965).

The author immediately started writing off to the island and very fortunately received some seed which was planted immediately. In short order, less than two months, one seed sprouted, then a second. Since I had over 50 seeds, I felt I would have plenty and another palmateer, Mr. David Barry, had stopped by so I gave him one of the newly sprouted seedlings. Only one other seed sprouted and this damped off in two days. Dave promptly lost his and I only had one left. It was just before the Biennial meetings in Miami (1966). I attended the meeting and saw approximately six six-inch plants at the Fairchild Tropical Garden. My plant was barely three inches high, so when mine reached about nine inches I checked with Stanley Kiem, Superintendent at the Garden, who reported that his were still six to seven inches high. A desperate attempt involving Dale Bremerman to try to save and force on those palms failed.

Given the V.I.P. treatment, my palm slowly grew. In its youth, when about five feet tall, the backs of the leaf rachises appeared "hot pink" and I became very excited. Although inside the jungle room, it continued to grow through the winter without any additional heat but it lost the pink coloring. As the crownshaft developed, instead

1. *Neodypsis lastelliana* with the author pointing to the reddish-brown feltlike crownshaft. The longest leaves are about 12 feet long and a trunk is just beginning to show. Photograph by A. B. Graf.

of red, it appeared more reddish-brown, very soft and woolly like felt or plush corduroy. The leaves are very erect—pinnae flat and held at right angles to the rachis—and a nice apple green. The trunk appears to be about six inches in diameter. Now all it has to do is survive outdoors. If this happens, Palm Society members in southern California, at least, can add another truly fine palm for cultivation but most important, one with color.

Since I feel others would like an estimate rather than "no comment," I'll estimate that the plant will flower in three to five years and I'll report it in *Principes* when it does.

I've made repeated attempts to get more seed which I did receive on two occasions but never did any of these later seed shipments germinate. A very

costly attempt is now underway to get more seed of this and many other palms of Madagascar.

The overall outline of this palm is similar to *Rhopalostylis sapida.* The major differences are the flat plane of the pinnae in *Neodypsis lastelliana* rather than the V-groove formed by pinnae of *R. sapida,* and the brighter green color of the leaves. The plant pictured has leaves about 12 feet long and one foot of green trunk showing. It produces two or three leaves each year. I would estimate that it is in almost full sun and has virtually no petiole. If there are other specimens anywhere, I hope the owner will write to me and let me know about his or her plant.

M. E. DARIAN, DVM
2615 Santa Fe Ave.,
Vista, California 92083

[Editor's note: Dr. Darian asked me to comment on the color of the crownshaft of *Neodypsis lastelliana.* It is a dull red or red-brown not bright red as I remember it, but still an interesting and pleasant contrast to the usual green of palm crownshafts.]

Livistona crustacea Burret

There follows a bit of history I have on the growing of a palm rare to Florida, *Livistona crustacea* Burret. During 1939, while working for the Fairchild Tropical Garden, Dr. David Fairchild gave me a small potted seedling of this palm and told me Dr. Leonard Brass had sent the seed in from New Guinea. The palm was planted here in Palm Beach County on the family homesite west of the city of Lake Worth. It now has an overall height of approximately twelve feet. The crown spread is about eight feet. It has been an attractive specimen since the early years of its growth. Although it has flowered over the past eight or ten years, no fruits have developed. The previous blooming was November, 1971. Flowers appear to be perfect.

In April, 1960, I corresponded with Dr. Leonard J. Brass, now deceased, then associated with the Archbold Biological Station, Lake Placid, Florida. He obligingly provided photos he had taken of the palm in its native habitat, the type locality for the species, and wrote much interesting information. I am taking the privilege of quoting from one of his letters as follows:

"My records show that seeds of my #7668, *Livistona crustacea* Burret (new species) were sent by air to Colonel Montgomery's Coconut Grove Palmetum in 1936. So far as I know, this is the only collection of the species, although it is possible that some other person has collected it since the war and sent seeds to the Fairchild Garden.

"My collection of *L. crustacea* was made at Lake Daviumbu, Middle Fly River, Territory of Papua, on 3 September 1936. The palm was common on forest edge along shores of swamps and lagoons, growing to a height of about 30 feet (much taller on open ground edging grass marshes); leaf bases persistent on younger trees. . ."

Dr. Brass was present at the 1960 spring meeting of The Palm Society and we discussed *Livistona crustacea* with the Superintendent of the Fairchild Tropical Garden, Mr. Stanley Kiem. Later in the year, Mr. Kiem wrote, "In tracing down the palm here at the FTG and at the Jennings' estate, it appears that all the ones planted in 1939 and 1940 were lost in the early 1940's." Mr. Kiem further expressed a desire for seeds at such time as the Lake Worth specimen might produce in order that the palm might be established at the Garden.

The plant has grown in its present location about thirty years with occasional mowing around it and no other care than to cut off dead leaves. Over

the years, several cold spells have "burned" some of the top more tender leaves but never enough to disfigure the palm appreciably. It grows in a black sandy loam soil that is damp most of the time and occasionally flooded a few days.

It would be most interesting to know if anyone else in Florida is growing this palm. One lonely species could use some companionship and possibly promote progeny.

CLYDE HARRIS
901 Belmont Place
West Palm Beach, Florida

The above was written September 18, 1972, and received during the absence of the editor who had earlier suggested that the Fairchild Tropical Garden might be interested in having this specimen tree which Mr. Harris was anxious to provide with a new home when his own home site was put up for sale. A letter dated January 30, 1973, noted that the palm had been moved to the Fairchild Tropical Garden on December 4, 1972, and had arrived in excellent shape. Still a further follow-up comes in a paragraph from Dr. John Popenoe, Director of the Garden, in a letter to Mr. Harris, dated January 31, 1973:

"Strange as it may seem we now find that there is another specimen of this species on the Montgomery estate. Ray Vernon recognized it when he saw the article in the bulletin. [*Livistona crustacea*, Fairchild Tropical Garden Bulletin 28(1): 14–16, Jan. 1973.] It, too, has flowered but never set fruit. Perhaps we can now try cross pollination and get seeds for growing more of this species."

Livistona brassii, L. crustacea, and L. muelleri

The name *Livistona crustacea* stirred the editor's memory of unpublished manuscript on *Livistona* in New Guinea, dated December 1969. In preliminary studies of the genus it had become clear, after examining isotype material of *Livistona crustacea* Burret and *L. brassii* Burret, that the two were not truly separable. Appropriately enough, the older name is *Livistona brassii* which should be used if the two species are considered the same. Unfortunately, it seems likely that further detailed study will show that both of these names must fall into the synonymy of the still older *Livistona muelleri* F. M. Bailey, a species of Queensland, Australia. Perhaps before seeds are obtained from the two trees known as *L. crustacea* in Florida, the results of further study will become available. In the interim, it seems fruitless to rename the two individuals now known in cultivation.

H. E. MOORE, JR.

LETTERS

From Teddie Buhler: "I pollinated my *Strongylocaryum* and suddenly the seeds are all turning red. I hope they are viable as the plant is really very pretty with its almost bluish green leaves that have quite wide leaflets. It is getting ready to open the succession of male flowers on a third inflorescence soon; the female flowers open about three weeks after the last male ones have flowered. I seem to have waited too long before pollinating the second spike; very few if any seeds have set."

From Arnold C. Newman: "An interesting footnote to my article [*Euterpe* at Iguassu Falls, Brazil, *Principes* 16: 53–55, 1972] is that the Huntington Botanical Gardens in San Marino, California, arranged with the Brazilian government the collection of five pounds of *Euterpe* seed from the tree described. A courier was sent down to pick up the seed and only one germinated."

EAST END GARDENS, INC.
POST OFFICE BOX Z
CHRISTIANSTED, ST. CROIX
U.S.V.I. 00820
NOVEMBER 15, 1972

GENTLEMEN:

The enclosed photograph of *Cocos nucifera* 'Dwarf Golden Malay' shows a double sprouting.

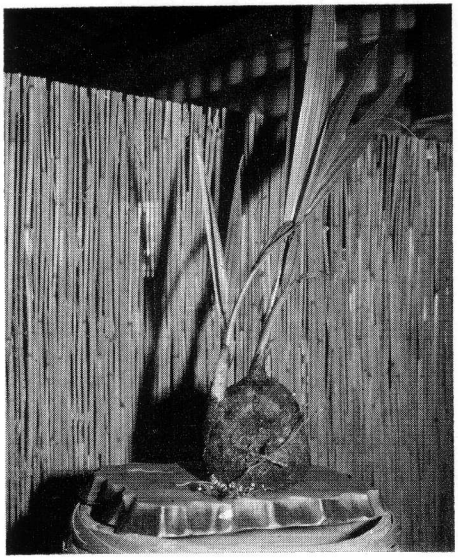
No one in our nursery has observed such double sprout before. Our employees include "down islanders," who have grown or been intimately associated with coconuts all their lives, as well as professionals with over thirty years experience in tropical nurseries.

Perhaps readers of PRINCIPES could add to our statistical knowledge.

Thank you.

Sincerely,
s/PAUL M. WHITE
Manager

[A double sprouting was illustrated in *Principes* 6: 111, 1962, but surely is uncommon.]



THE EDITOR'S CORNER

Thanks are due to Fred Essig who edited the July and October issues last year in the absence of the editor who was gathering material for study on the islands of the Pacific and Indian Oceans. Said field trip has been partly responsible for the late start of Principes in 1973.

Editing PRINCIPES seems sometimes to be a matter of "feast or famine." An article on the major groups of palms and their distribution had been projected for publication this year, but the addition of illustrative material and more ample descriptions made it too long for this journal. Instead, it is to be published in *Gentes Herbarum* as a separate fascicle. Thus, in addition to a late start, the quantity of manuscript fell sharply, accounting in large part for the delay in the April issue. A further delay was intentional in order to permit the publication of an article on the symptoms of lethal yellowing disease which seems very timely.

The Editor is encouraged to note that members are submitting notes on their experiences with palms. These help to provide a balance between original articles that contribute to our scientific knowledge of palms and those with a more direct impact on readers who grow palms. A symposium on "The natural history and utilization of palms" held at Cornell University in June has yielded a series of articles that are expected to appear in PRINCIPES commencing with the July issue.

Further prospects are short notes on some of the unusual palms of which seeds are sent to the Seed Bank and a continuation of the question and answer column recently initiated by DeArmand Hull, Extension Agent for Ornamentals in Palm Beach County, Florida. Readers are invited to send their queries to him at 531 North Military Trail, West Palm Beach, Florida 33406.

REPRINTED FROM HERE AND THERE

Fossil Palm Fruits and Seeds*

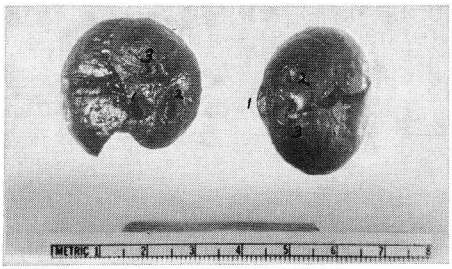
Fossil palm fruits and seeds have been found in many parts of the world, the largest number in the Eocene London clay beds. Over 300 different species, chiefly flowering plants including palms, have been found, the most common being *Nipa burtinii*. The fossil material suggests an affinity with flora of Indo-Malaysian character.

The famous Eocene Clarno nut beds of Wheeler County, north central Oregon, near Clarno on the John Day River, are the source of a relatively small number of fossil palm seeds. The fossil record there goes back to the Cretaceous period. In 1958 a fossil palm nut, together with an ammonite, included in a concretion, was found near Mitchell, in Wheeler County. It was identified as being of the genus *Attalea*, dating from the early Cretaceous. Volcanic tuff, outcropping through the John Day shale, is the matrix in which fossil seeds and fruits are embedded. Mr. Thomas J. Bones of Vancouver, Washington, assembled an important collection of fossil seeds from the Clarno area, part of which he donated to the Smithsonian Institution. Other parts of the United States which have yielded fossil palm specimens are Bastrop County, Texas, and Grenada County, northeastern Mississippi.

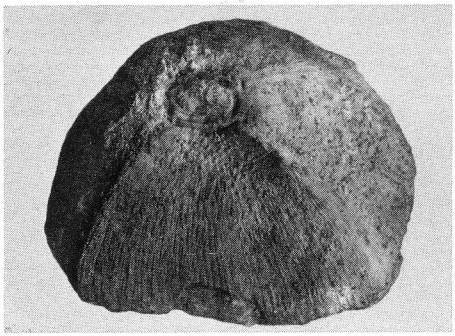
Fossil palm seeds have been found in North Island, New Zealand. Ocean currents may have carried the seeds from one continent to another.

JOSEPH A. TUTA, M.D.
Palos Verdes Estates, Calif.

* Reprinted with permission from Earth Science 26(1): 29. 1973.



1. Two fossil cocosoid palm fruits from Mangonui, North Island, New Zealand. In the specimen to the left, all three germination pores (1–3) in the endocarp had been compressed into one plane at the time of fossilization. Also, irregular deep cracks in the brittle jet-black fossils are present. Longitudinal ridges and furrows are seen in the specimen to the left.



2. Portion of a fossil *Nypa* fruit from the Eocene of Texas, about one-half natural size. Photograph is courtesy of Dr. Chester A. Arnold who described the fossil in *Palaeobotanist* 1: 73–74, 1952. The specimen measured 11 × 10 × 4.5 cm. There are three distinct ridges leading to an encircling groove, in the center of which is a prominent apical umbo.

Carnauba Wax Used to Hide Pieta Scars

Dr. Dennis Johnson has forwarded an Associated Press item from the *Los Angeles Times* for September 14, 1972, in which it was noted that wax from *Copernicia prunifera* (see articles on this

palm in *Principes* volume 16) was to be used to hide damage done to Michelangelo's Pieta. Readers will remember that the statue in St. Peter's Basilica at the Vatican had been vandalized in May. The Madonna's nose and left arm were broken off, her veil and left eye dented by blows from a hammer.

According to Dioclecio Radig de Campos, a Brazilian and director of the Vatican museums who was in charge of the restoration of the damaged statue, carnauba wax was being sent by the Brazilian government at his request. Special chemical glues were to be used to hold broken pieces in place, but the wax was chosen to cover the cracks that would show where the statue was repaired.

Recent reports in the press indicate that restoration has been completed and that the statue is now visible behind a protective screen.

H. E. M.

NOTES ON CULTURE

Mr. A. F. Glass of Gosnells, West Australia has provided his formula for a potting mix as follows:

"I have perfected a mix which gives me excellent results for potting on baby palms. I use

1 tip-truck load of stable litter
1 tip-truck load of brewery refuse (spent hops)
1 tip-truck load of light sandy loam.

"I have the truck dump the ingredients simultaneously and mix it all up with a back-hoe. I wet it down and leave it for five months. Then I thoroughly stir the whole mass up again and leave it a further five months. After the second mix, leave it for two months and then it is ready to use. Add fertilizer according to the size of the seedling or palm you are potting on."

NEWS OF THE SOCIETY

Who doesn't like to receive a compliment? Here is one for our Editor, from one of our newer members: Mrs. Virginia Ryder writes "I just received my PRINCIPES (back issues that I had ordered)—they are so wonderful and useful to me that I would like to order all of the rest of the issues available, however I sent my check list in with my order, so I would appreciate it so much if you could send me another check list." We were glad to oblige.

Member Jack Tomsky writes: "I was wondering if any issues were lost in the mail or whether there's merely been a delay in publication. I hate to admit it, but I look forward more to receiving PRINCIPES than the *Annals of Mathematical Statistics*." We really don't blame him...

Lethal Yellowing Disease

The spread of lethal yellowing disease in Dade County, Florida, of which Miami, Coral Gables, Miami Beach, South Miami, Miami Shores and about 20 more smaller municipalities are a part, has reached epidemic proportions. About 25 trees a day are being attacked, with some 4,000 already dead or dying. An effort has been made to remove the diseased trees as soon as they are found (helicopter surveys are used) but both money and manpower cannot seem to keep up. The Governor of Florida is being asked to release $100,000 in emergency funds to continue the removal because funds for this purpose will have run out by the first week in March and no more will be available until late in the spring. The disease now seems to be attacking the *Veitchia Merrillii* palm too, and the pritchardias also. Dade County has an estimated half million coconuts

and perhaps 4 million veitchias (known as Christmas or dwarf royal palm), the loss of this many trees will have a devastating effect on the entire area. The rest of South Florida has another estimated half million coconuts and countless veitchias as well. With new areas of contamination being found almost daily (the most recent is the Jennings Estate with its wonderful palmetum), a break-through in the research program is desperately needed, so citizens in Dade County have formed a "Save the Palms" Committee to help raise funds to speed research in hopes the insect carrier of the disease can be identified, a method of controlling it can be devised, and a treatment for the diseased trees can be found.

T. BUHLER

Seed Bank News

At a recent meeting of Palm Society members someone remarked that the Seed Bank is great, but how much better it would be if members would report on their successes and/or failures in germinating the seeds and raising the plants. Only a few days later I received a letter from Mr. Richard B. Murrow, who has been a member of the Society for a good many years, giving just the kind of information we had been wishing for. I hope this will inspire others to send in reports, specially on the various new species and genera we have been receiving from New Guinea, Indonesia, and other interesting countries.

"In returning my seed bank list and payment for a recent package of seeds, I thought it might be useful to include a few comments regarding results of some previous plantings.

"I am still using the old aquarium set-up that I described some years ago in *Principes* (October, 1962). One general comment is that in transplanting seedlings to larger pots, I find that by far most of the root system is flourishing in the gravel and sand used for drainage and aeration in the bottom of the pot—very few roots in the planting medium in the top two thirds of the pot, even if it is a very porous mix. Also, if any members have suggestions for reducing losses resulting from transplanting young seedlings, I wish they would publish them in *Principes*. Despite trying all the usual precautions such as not letting the roots get dry or exposed to air any longer than necessary, using fungicides or anti-damp products, etc., I still manage to lose a discouraging percentage each time the seedlings have to be moved up to a larger pot size—and long experience with orchids has taught me the dangers of overpotting, so I try to select the smallest appropriate pot size.

"An example, somewhat extreme rather than typical, will illustrate my frustration. After repeated unsuccessful attempts to obtain seeds of *Microcoelum* (*Syagrus*) *weddellianum* I was fortunate in August, 1964 in obtaining 96 seeds that were promptly planted. About ⅓ of the seeds germinated and progressed to healthy young seedlings in community pots in the case. Upon first separation and potting into individual 2″ square plastic pots (probably in 1966) only about half survived. The next repotting was in 1968 into individual 2½″ square plastic pots—again with only about half surviving. The last repotting was August 8, 1970, into 3.75″ square plastic pots, and again with only about 50% survival.

"The seedlings that did survive each repotting seemed to progress quite well—the non-survivors failed in a relatively short time. I am now left with only four survivors, all beautiful and about 20″ in height above the soil in the pots (measured with the leaves held upright).

"Incidentally, I find that this palm prefers coolness and shade. It did not do at all well in my indoor orchid case, but has developed handsomely, even at a young stage, outdoors in the same semi-shade where I grow cymbidiums, with six months of cool nights sometimes dropping a few degrees below 40°F. Like most palms, this one is a slow grower in its early stages. I am still waiting for mine to take off and really put on growth some 8 years after sowing the seed. I realize it is a dwarf palm, but in Hilo, Hawaii at Mrs. Hirose's nursery I saw much larger ones that I don't believe were as old as mine.

As to the fate of some fairly recent seeds received from the seed bank (and some that I brought back from Senegal) I record the following:

Species	Source	Planted	Germinated		Elapsed days
Caryota mitis	Palm Soc.	7/15/71	12/ 3/71	(2 of 5 up .5″)	Approx. 135
"	"	"	5/12/72	(2 of 5 up 2″)	
Total *C. mitis*			10/ 7/72	(6 of 10 up 10″)	
Calyptronoma occidentalis	"	8/17/71	12/ 3/71	(6 of 15 up 1–2″)	" 105
			10/ 7/72	(7 of 15 up 8–10″)	
Coccothrinax argentea	"	8/11/71	12/10/71	(1 of 18 up 1″)	" 120
Coccothrinax argentea (2nd pot)		8/21/71	5/12/72	(1 of 19 up .5″)	" 260
Total *C. argentea*			10/ 7/72	(4 of 37 up 4″)	
Clinostigma onchorynchum	"	8/21/71	10/ 7/72	No germination as yet	
Pinanga sp. (ivory crownshaft)	"	10/ 7/71	2/25/72	(11 of 20 up .5–1″)	" 140
			10/ 7/72	(11 of 20 up 8″)	
Caryota no Becc.	"	5/ 7/72	10/ 7/72	(1 of 10 up 1″)	" 150
Caryota? Arenga?	Senegal	7/25/71	12/30/71	(2 of 39 up .5″)	" 120

"The last were picked 5/22/71, so 2 months elapsed before planting. Also, I had no room in the seed case at the time so they had to germinate at ordinary temperature. This may account for the poor percentage germination. Those that did germinate are fine-looking young seedlings. These may be a species of *Caryota*—I can find neither genus listed in Bailey as being native to Senegal. I picked these from a large suckering clump in an agricultural experiment station near Dakar, the clump being about 20–25′ high, with stems about 4–6″ in diameter. It was a very beautiful thing. I hope I don't lose the few I have when it is necessary to move them up to individual pots.

"The following have not germinated yet—probably too soon for most, but some of them have gone a long time.

Licuala grandis	Palm Society	1/18/71
Basselinia eriostachys	"	7/25/71
Clinostigma Sp. (samoense?)	"	10/ 7/71
Pritchardia beccariana	"	7/25/71
Licuala sp. "elegans"	"	6/ 1/72

The above is the second planting of *Licuala grandis* that has failed to germinate; these seeds must be very short-lived."

RICHARD B. MURROW
Los Angeles, Calif.

Armando Dugand (1906–1971)

The death of Dr. Armando Dugand in Barranquilla, Colombia, on December 5, 1971, brought to a close the career of the foremost student of Colombian palms.

Born in Barranquilla on June 23, 1906, Dr. Dugand attended schools in Colombia, France and the United States. From 1940 to 1953 he was Director of the Instituto de Ciencias Naturales at the Universidad Nacional in Bogotá and from 1945 to 1955 he taught at the university and at the institute. In recent years he had lived in Barranquilla where, at the time of his death, he was Director of the Institute of Scientific Research at the University of the Atlantico.

Dr. Dugand was a member of numerous societies, founder of the journals Caldasia, Lozania, and Mutisia, and the recipient of several grants for study and lecturing abroad, including a John Simon Guggenheim Memorial Fellowship. A fuller account of his accomplishments appeared in *Taxon* 21: 377–378, 1972. A list of publications on palms follows.

1940a. Un nuevo genero de palmas del Vaupes. Revista de la Academia Colombiana de Ciencias Exactas, . . . 3: 392–393.

1940b. Un genero y cinco especies nuevas de palmas. Caldasia 1(1): 10–19.

1940c. Palmas de Colombia: clave diagnostica de los generos y nomina de las especies conocidas. Caldasia 1(1): 20–84.

1941. Notas sobre palmas Colombianas y una de Brasil. Caldasia 1(3): 17–29.

1942a. Nota adicional sobre *Mauritia minor* Burret. Caldasia 1(5): 40.

1942b. Palmas de Colombia, II. Localizacion tipica de algunas especies coleccionadas por Martius en el Caquetá Colombiano. Revista de la Academia Colombiana de Ciencas Exactas, . . . 5: 212–216.

1943a. Notas sobre el genero de palmas *Cuatrecasea*. Caldasia 2(6): 69–73.

1943b. Una palma nueva del genero *Desmoncus*. Caldasia 2(6): 75–76.

1943c. Noticias botanicas Colombianas, II: especies nuevas y criticas. Caldasia 2(8): 285–293.

1944a. Palmas nuevas o criticas Colombianas. Caldasia 2(9): 387–395.

1944b. Palmas nuevas o criticas Colombianas, II. Caldasia 2(10): 443–458.

1950. Una nueva palma de la costa del Pacifico. Revista de la Academia Colombiana de Ciencias Exactas, . . . 7: 515–516.

1951. Palmas nuevas o notables de Colombia. Revista de la Academia Colombiana de Ciencias Exactas, . . . 8: 385–396.

1953a. Dos palmas nuevas *Ceroxylon* de Colombia. Mutisia 14: 1–5.

1953b. Notas sobre el genero *Attalea* (Palmae) en Colombia. Mutisia 18: 1–10.

1954a. Palmae: *Mauritiella* Burret versus *Lepidococcus* Wendland & Drude. Mutisia 20: 1–2.

1954b. Notas adicionales sobre el genero *Attalea* en Colombia. Mutisia 20: 3–5.

1955. Palmas nuevas o notables de Colombia, II. Caldasia 7: 129–157.

1959. Una palma nueva *Scheelea* del bajo Magdalena, Colombia. Mutisia 26: 1–6.

1961. Palms of Colombia. Principes 5: 135–144.

1965. Las palmeras y la tierra. Caldasia 9: 187–217.

H. E. MOORE, JR.

XII International Botanical Congress June 23–30, 1975

The Closing Plenary Session of the XI International Botanical Congress held at Seattle, U.S.A., in 1969, accepted an invitation issued by the Academy of Sciences of the U.S.S.R. to convene the XII International Botanical Congress in the City of Leningrad in 1975. In 1971 the Organizing Committee was appointed: consisting of a chairman (A. L. Takhtajan); four vice-chairmen (A. A. Prokofiev, A. A. Theodorov, N. V. Tsitsin, A. A. Yatsenko-Khmelevsky); a secretary-general (O. V. Zalensky); a scientific secretary (N. S. Snigirevskaya); and a number of members at large. The XII International Botanical Congress is intended to facilitate interdisciplinary communication among botanists as well as an informal exchange of ideas. A number of sections are planned, including special ones to accommodate mycologists (also lichenologists), phycologists, and bryologists.

The Congress will be divided between organized half-day symposia and half-day contributed paper sessions. In addition to the opening and closing plenary sessions, two evening lectures are being scheduled. All special interest groups wishing to apply for space and time during the Congress should do so by writing as soon as possible to the secretary-general, Dr. Oleg Zalensky, Komarov Botanical Institute of the Academy of Sciences of the U.S.S.R., 2, Prof. Popov Street, Leningrad 197022, U.S.S.R.

The sessions of the Nomenclature Section will take place, as usual, immediately before the opening of the Congress —in this instance June 20–23. Four days are set aside in order to enable the Section to convene for six to eight sessions of two to four hours each.

A meeting of the International Association of Botanic Gardens (President Acadmician N. V. Tsitsin) will be held in Moscow at the Main Botanical Garden of the Academy of Sciences of the U.S.S.R. on June 20.

A tentative schedule of scientific field trips has been planned for the immediate pre-Congress and post-Congress periods. The principle purpose of these trips is to acquaint visiting botanists with as many interesting and unique features of the flora and vegetation of various regions of the U.S.S.R. as possible. Some specialized trips for phycologists, lichenologists, bryologists, and palaeobotanists are also planned.

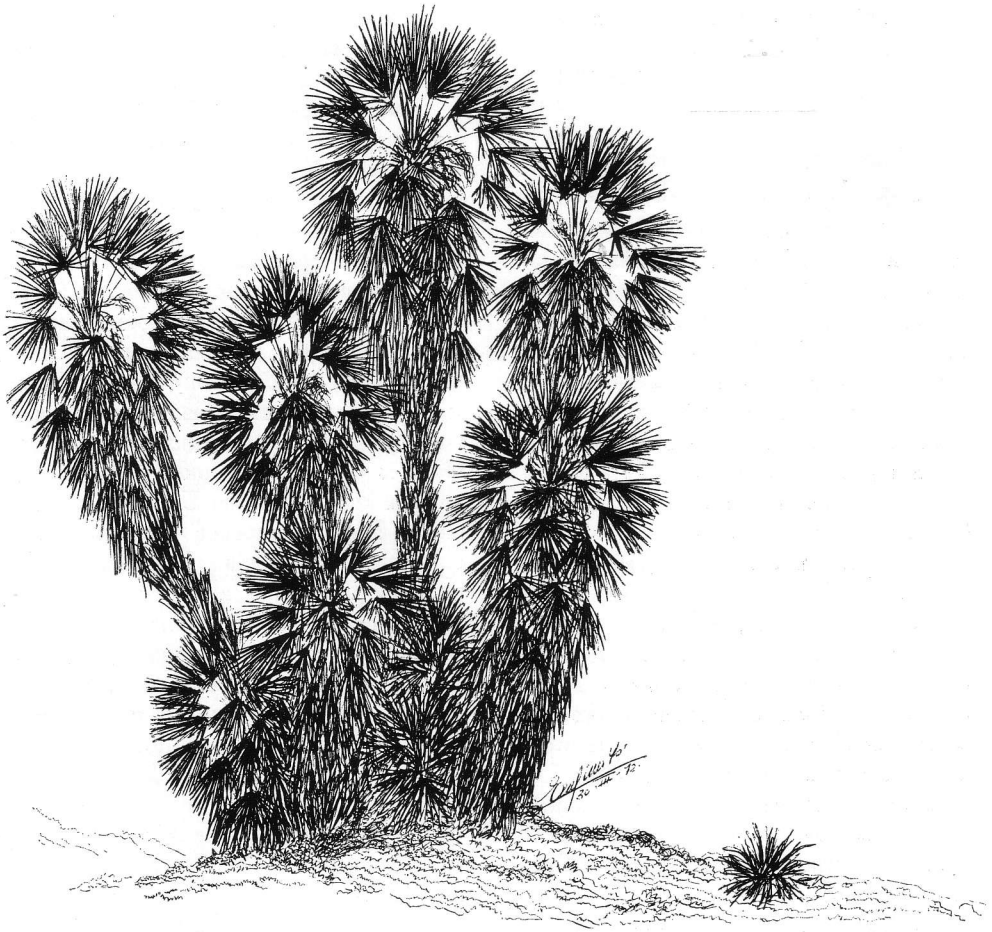
The double postcards announcing the XII International Botanical Congress were mailed during the last months of 1972. Those who wish to receive further information on the Congress should return their interest cards by March 1, 1973, so that they will be placed on the mailing list for the First Information Circular expected to be published June–July 1973.

A. TAKHTAJAN
Chairman, Organizing Committee

Errata:

Volume 1, page 95, line 5, read:
Iriartea (Panama), Vol. 3, Fas. 2, Art. 2, pages 64–71, year 1933.

Volume 16, page 69, line 11: *delete* styles not exserted;
page 70, column 1, line 16: *for* Solitary, unarmed *read* Solitary or cespitose, unarmed.
page 84, after column 1, line 7: *add* Chromosome complement $n = 18$ (Read, 1965).



Trithrinax campestris in the Jardin Botanico Carlos Thays at Buenos Aires, Argentina. Drawing by Eugenio Pingitore Burela.

PALM SOCIETY FINANCIAL STATEMENT

January 1, 1972 to December 31, 1972

Income:

Contributions	$6813.10
Subscriptions	1120.65
Seeds	1477.50
Convention Registrations	465.00
Convention Misc. Inc.	113.00
Sale of Petrified Wood	23.30
Sale of plants in Tampa	406.50
Postage	1.50
Bank Error	.50
Refund	16.00

Earned Income		$10,437.05
Convention Reservations		916.00
Total Income Entered in Books		11,353.05
Earned Income	10,437.05	
Interest earned in Security Federal Saving & Loan	191.36	
Total Earned Income		10,628.41
Expenses		10,127.18
Soc. Sec. & W. H. Tax Withheld		202.96
Transferred to Security Federal Savings Book		2,000.00
Total Checks Dispersed		12,330.14
Net Earned Income		10,628.41
Net Expenses		10,127.18
Net Gain		501.23
Balance, First National Bank of S. Miami		705.97
Balance, Security Federal Savings & Loan		4,584.43
Total Net Worth		5,390.40

Expenses:

Printing *Principes*		$4,652.92
Misc. *Principes* Expenses		64.39
Salaries:		
L. Wait	$ 70.00	
T. Buhler	1610.00	
W. Everngam	900.00	2,580.00
Social Security Tax		134.16
Office Rent		240.00
Petty Cash		250.00
Seed Bank		346.62
Postage		188.60
Computer Service		76.53
Bank Charges		7.94
Envelopes & Misc. Printing		488.44
Convention Expenses		235.00
Refunds		88.00
Dues		25.00
Publications		7.34
Advertising		46.70
Misc.		8.30
Total Expenses		10,127.18
Convention Deposits for Room Reservations		916.00
Soc. Sec. W. H. Tax Witheld		202.96
Transferred to Savings Bank		2,000.00
		12,330.14

PALM LITERATURE

Horticultural articles

DEWERS, R. S. & T. L. KEETER. 1972. Palms for Texas landscapes, noted in PRINCIPES for July, 1972, may be obtained at $.05 per copy from the Texas Agricultural Extension Service, Texas A. & M. University, College Station, Texas by referring to its official designation "TAP-619 Palms for Texas Landscapes" according to the Extension Publication Editor.

SACAMO, C. M. & W. D. JONES. 1972. Landscape Palms for Arizona. Arizona Garden Guides Q 28, 12 pp., Cooperative Extension Service, University of Arizona, 4201 E. Broadway, Phoenix, Arizona 85040.—Eighteen palms and two cycads are suggested as hardy enough for use in Arizona. Culture notes and brief descriptions are provided.

Technical studies

DRANSFIELD, J. 1972a. The genus *Borassodendron* (Palmae) in Malesia. Reinwardtia 8: 351–363, fig. 1–6.

———. 1972b. The genus *Johannesteijsmannia* H. E. Moore, Jr. Gardens' Bulletin Singapore 26: 63–83, fig. 1–5, pl. 1–6.

GLASSMAN, S. F. 1971. Rediscovery of *Syagrus werdermannii* Burret. Fieldiana: Botany 34: 1–10, fig. 1–9.

———. 1971. Re-evaluation of *Syagrus loefgrenii* Glassman and *S. rachidii* Glassman. Fieldiana: Botany 34: 11–25, fig. 1–11.

———. 1972. Systematic studies in the leaf anatomy of palm genus *Syagrus*. American Journal of Botany 59: 775–788, fig. 1–14, table 1–3.

KOCH, B. E. 1972. Coryphoid palm fruits and seeds from the Danian of Nûgssuaq, West Greenland. Grønlands Geologiske Undersøgelse Bulletin 99: 1–38.

MOORE, H. E., JR. 1973. Palms in the tropical forest ecosystems of Africa and South America. *In* Meggers, B. J., E. S. Ayensu & W. D. Duckworth [Eds.]. Tropical forest ecosystems in Africa and South America: a comparative review. 63–68. Smithsonian Institution Press, Washington, D. C.

READ, R. W. & L. J. HICKEY. 1972. A revised classification of fossil palm and palm-like leaves. Taxon 21: 129–137.

SOWUNMI, M. A. 1972. Pollen morphology of the Palmae and its bearing on taxonomy. Review of Palaeobotany and Palynology 13: 1–80.

THANIKAIMONI, G. 1971. Les palmiers; palynologie et systématique. Institut Français de Pondichéry, Travaux de la section Scientifique et Technique 11: 1–286.

TOMLINSON, P. B. 1971. The shoot apex and its dichotomous branching in the *Nypa* palm. Annals of Botany 35: 865–879, fig. 1–14, plates 1–5, table 1.

UHL, N. W. 1972. Inflorescence and flower structure in *Nypa fruticans* (Palmae). American Journal of Botany 59: 729–743, fig. 1–40, table 1.

UHL, N. W. & H. E. MOORE, JR. 1971. The palm gynoecium. American Journal of Botany 58: 945–992, fig. 1–126, table 1–2.

Book

WHITMORE, T. C. 1973. Palms of Malaya. 132 pp., 106 figs., 16 pls. Oxford University Press, Kuala Lumpur, Singapore, London. $Malay 35.

It is anticipated that this book will be available through the Oxford University Press, 16-00 Pollitt Drive, Fair Lawn, N. Y. 07410, but a price in dollars was not available when this note went to press.

Palmetto State Logo

SOUTH CAROLINA which prides iton being known as the PALMETTO STATE has once again turned to its official state tree as the focal point of the official logo of the South Carolina American Revolution Bicentennial Commission.

In addition to the palmetto tree, the logo is composed of an authentic six-pound field gun, used by British and American troops during the Revolution. Two dates are: 1775, the year of the first military engagement of the Revolution in South Carolina, and 1783, the year in which hostilities ceased and the British withdrew from American soil. Designed by Robert Maxwell, Bicentennial Coodinator, the logo is a symbol of the Bicentennial Era in South Carolina, the state that has been called the "battleground of freedom." During the Revolutionary War, more military engagements were fought in the Palmetto State than in any of the other original 13 colonies.

JACK COOK

Pritchardia thurstonii at the Fairchild Tropical Garden, Coral Gables, Florida, may be threatened by disease. See pages 39–45.