



# PRINCIPES

Journal of The Palm Society

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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.

PRESIDENT: Otto Martens, 308 Elfwood Drive, Monrovia, California 91016.

VICE-PRESIDENT: John Popenoe, 10901 Old Cutler Road, Miami, Florida 33156.

SECRETARY: Mrs. Lucita Wait, 7229 S.W. 54th Avenue, Miami, Florida 33143.

TREASURER: Wallace E. Manis, 13601 Old Cutler Road, Miami, Florida 33158.

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PRINCIPES

JOURNAL OF THE PALM SOCIETY

An illustrated quarterly devoted to information about palms published in January, April, July and October, and sent free to members of The Palm Society.

EDITOR: HAROLD E. MOORE, JR.

EDITORIAL BOARD

David Barry, Jr., Walter H. Hodge, Eugene D. Kitzke, Harold F. Loomis, Nixon Smiley, Dent Smith, P. Barry Tomlinson.

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Cover Picture

Fairchild Tropical Garden — just inside the entrance, at the right. Photograph by Gatteri.

Mailed at Miami, Florida  
 March 21, 1967

## NEWS OF THE SOCIETY

### The Society Loses Five Members

We are extremely sorry to report that we have lost five members by death since the biennial meeting last April. Mr. James C. McCurrach, author of "Palms of the World," Mr. Erle L. Wirt, Jr., of Babson Park, Florida; Mr. Harvey W. Beswick, of Florida and Lima, Peru, and Mrs. J. K. Williams, of Florida, all passed away very suddenly. Mr. J. G. Suthard, of Long Beach, California, died after a long illness. We shall miss these valued members, and extend our sympathy to their families.

### Meetings

The California members of the Society met at the home of Mr. and Mrs. Edwin C. Moore, San Diego, on November 6th, 1966. Officers for the coming year were elected: Mr. James P. Specht, chairman; Mr. Warren J. Dolby, vice-chairman in charge of publicity; Mrs. James J. Wright, secretary; Mrs. Sydney E. Jones, social chairman. Members in California who wish to be notified of meetings and field trips should send their names and addresses to Mrs. Wright at 2151 Burgener Blvd., San Diego 92110.

The central Florida group was entertained at a barbecue luncheon at the home of Dr. and Mrs. U. A. Young, Tampa, on October 9th. Those who attended gave enthusiastic reports of the Youngs' hospitality. Dr. Young showed slides of their palm collecting trip to Panama following the Society's biennial meeting in April.

The southern Florida group has held three evening meetings, one on September 25th, at which officers were elected: Mr. John E. Turner, chairman; Mrs. George F. Adams, vice-chairman; Mrs. T. C. Buhler, secretary and treasurer. Members wishing to be notified of meetings and field trips should send *five*

*self-addressed postcards* to Mrs. Buhler at 1320 S. Venetian Way, Miami 33139. The second meeting of the season was held on November 21st. Mr. Cecil Hartson spoke on the dangers of the new hydrocarbon plant sprays and urged everyone to take drastic precautions when using them. He also spoke briefly on raising palms in containers. A lively question and answer period followed. The third meeting took place on January 10th at the home of Mr. Gerard Pitt. Dr. John Popenoe, director of Fairchild Tropical Garden; Mrs. George F. Adams and Mr. Pitt, volunteer workers at the Garden, spoke briefly about their activities there, and then answered many questions from the audience.

### Assistant Editor Appointed

Mr. Warren J. Dolby of Richmond, California, has been appointed assistant editor of *PRINCIPES*, with the object of finding and editing matter that will bear directly on palm gardening, thus to stimulate greater interest on the part of gardeners and growers. It is hoped, moreover, that Mr. Dolby's assistance will lessen the burden that Dr. Moore has borne single-handed for a good many years. Because of Dr. Moore's extensive field work abroad (once again he is so engaged, at present in South America) and the enforced absence from his office at Ithaca, *PRINCIPES* has fallen about two months behind its publication schedule. Mr. Dolby's assistance will become effective beginning with the July number of *PRINCIPES*, or perhaps even sooner, and in all probability it will mean that delays in publication can soon be remedied. Technical articles should be sent as usual to Dr. Moore, but henceforth those bearing on the practical aspects of palm-gardening and on the hobbyist's interests in palms should be sent to Mr. Warren J. Dolby, 6140 Park Avenue, Richmond, California 94805. The editorial work that publication of *PRINCIPES*



entails is further dealt with elsewhere in this issue.

#### Newsletter

Great things are happening in California these days. Not only do we have a new Assistant Editor there, but we have a new publication. Since the California members are scattered over a large area, some of them have decided that they need better communications. So they are starting to publish NEWSLETTER, a four-page leaflet which will appear every other month and will go to all members in California, containing information of special interest to them. Mr. James P. Specht, 4398 Aragon Way, San Diego, Calif. 92115, will be the editor, and Mr. Kenneth C. Foster, 3822 Larkstone Drive, Orange, Calif. 92667, will do the printing. This paper should do a lot toward keeping up the interest of the Western Chapter.

#### Gentes Herbarum

The Liberty Hyde Bailey Hortorium of Cornell University, Ithaca, N. Y. has published, over the years, some ten volumes of plant studies, called *Gentes Herbarum*. These studies are printed in sep-

arate fascicles, and are chiefly used as exchange publications with other botanical institutions and libraries. A good many of them consist of palm studies, with descriptions and illustrations of real value to serious palm students.

Many of these fascicles are now out of print and unobtainable except in reference libraries, which are not always conveniently located.

It has occurred to some of our young and enthusiastic members that with modern methods of reproduction it might be feasible to reprint the palm fascicles and offer them to Palm Society members who would like to own a set. This project is still in the planning stage, and all details are not yet available, but we hope to have more news for you in a forthcoming issue of PRINCIPES.

#### Charter and By-Laws

Mr. Kenneth C. Foster has very kindly printed a number of sets of the Society's charter and by-laws. We shall be glad to send a copy of each to any member who asks for them.

LUCITA H. WAIT

## Fairchild Tropical Garden —

### A Short History

LUCITA H. WAIT

Fairchild Tropical Garden is a combination botanical and introduction garden, educational and research institution, and beautiful park. It is situated ten miles south of downtown Miami, Florida, quite close to Biscayne Bay and is actually in the municipality of Coral Gables. It consists of eighty-three acres, twenty-five of which constitute the Montgomery Palmetum, one of the more complete palm collections in America. Other palms are to be found growing through-

out the Garden, in the Bailey Palm Glade, in the Garden Club of America amphitheatre and in the lowland area, for example.

This Garden is the creation of two exceptional men: David G. Fairchild and Robert H. Montgomery. It is because of their imagination, enthusiasm and energy that the Garden exists and has become internationally known.

David Fairchild left a record of his life and work in four books, in which



he told in detail about his many travels as a plant explorer. These books are: *Exploring For Plants* (New York, The Macmillan Co. 1930), *The World Was My Garden* (Charles Scribner's Sons, 1938), *Garden Islands of the Great East* (Charles Scribner's Sons, 1943) and *The World Grows 'Round My Door* (Charles Scribner's Sons, 1947). As Chief of the United States Department of Agriculture Seed and Plant Introduction Section and one of its accredited plant explorers he performed a tremendously valuable service to the agriculture of this country by introducing plants of great economic worth. He was keenly interested also in ornamental plants, and very specially the palms. By the time the idea of a tropical botanical garden was put forth he had retired and was living, with Mrs. Fairchild, in an unusual house of Javanese inspiration on Biscayne Bay, near Miami, on four acres of land covered with plants he had collected and introduced from many lands.

Robert H. Montgomery had had a very different life. His father, a Methodist minister, became ill when Robert was fourteen years old, so it was necessary for him to leave school and help support the family. In his autobiography, *Fifty Years of Accountancy* (New York, The Ronald Press, 1939), he tells briefly about those early years of struggle. In 1889, at the age of sixteen, he was hired as office boy by the bookkeeping and auditing firm of John Heins, Philadelphia, Pennsylvania. Earnest and industrious, he rose rapidly to junior, then senior, accountant. On January 1, 1898 he and three of his associates in the Heins firm formed the partnership of Lybrand, Ross Brothers and Montgomery, now one of the oldest and most prominent firms of public accountants in America.

Financially independent at last, he

built a fine home at Cos Cob, Connecticut, where he began to indulge his interest in plants by making a collection of conifers which he eventually donated to the New York Botanical Garden. His old friend, George P. Brett, also a collector of conifers, had built a winter home on Biscayne Bay, not far from Dr. Fairchild's house. Becoming fascinated with palms, he finally persuaded Colonel Montgomery to settle near him and start a friendly rivalry in collecting palms. With his usual intense interest and drive, Colonel Montgomery soon was scouring the world for palms and more palms. In a few years his seventy-acre estate had become known as one of the finest privately-owned palm collections in the world. Now interested strangers appeared at his door, asking permission to see the exotic plants. This became rather a burden, and one day the question arose: "Why is there not a public park full of tropical and subtropical plants which can be visited by anyone without having to ask permission?" No one seemed to have a satisfactory answer, so the two friends began talking to interested groups and individuals, promoting the idea and asking for support. Before long the Fairchild Tropical Garden Association was formed, with a membership which has steadily grown through thirty years until at this writing it numbers approximately one thousand seven hundred. Membership dues are an important element in the support of the Garden, besides which many members make large contributions of money, time and effort in fund-raising projects.

It was now 1937, and time to begin the search for the best possible site. A committee, consisting of Colonel Montgomery, Dr. Fairchild, Mr. George Brett and Dr. Thomas Barbour of Harvard University made a thorough study and concluded that the very strip of land on which the Fairchild, Brett and Mont-

gomery homes were situated was very probably the most frost-free bit of land on the mainland of southeastern United States. One deciding factor was a large and beautiful mamey apple tree (*Mammea americana*) growing there, which evidently had withstood many winters in spite its tenderness to cold. The eighty-three acres immediately adjoining Matheson Hammock (a large tract of undisturbed native growth donated to the Dade County Parks Department by the Matheson family), were acquired. The struggling young Association was not equipped to develop and maintain the entire acreage, so fifty-six acres were deeded to the County Parks Department on condition that they be kept an integral part of Fairchild Garden. The "County side," as it is familiarly known, contains the tree, shrub, vine and succulent collections, which are maintained by the Parks Department; the remaining twenty-five acres, originally owned by Mrs. Montgomery and donated by her to the Garden, were reserved for the Montgomery Palmetum. In their deed of gift Colonel and Mrs. Montgomery specified that the name of their dear friend David Fairchild should remain always a part of the title of the Garden.

On March 23rd, 1938, the Garden was formally dedicated, with a large group of men prominent in the botanical world present. After the speeches\* a number of trees and palms were planted in honor of well-known Florida plant pioneers. With that beginning, a constantly-growing stream of plants has found a home at Fairchild Tropical Garden. In spite of many misfortunes, such as freezes, droughts, lightning, hurricanes and hurricane tides, the Garden has managed

to grow into a world-known institution. Students of tropical plants come to study its collections, a much easier task than going searching for them in far-away jungles.

But in 1938 much preliminary work had to be done before the planting could really begin. A well-known landscape architect with experience in tropical landscape design, William Lyman Phillips, was engaged to draw up the plan. In cooperation with Noel Chamberlain of New York, the entire eighty-three acres were surveyed, the principal features delineated, the future buildings given their locations, the roads and lakes mapped out. A multitude of small stakes were placed, marking roads, paths and irregular planting plots, and there was not much of the look of a garden about it. All this preliminary work was necessary, however, before the planting could begin.

Next came beautiful oolitic limestone ("coral rock") walls, hand-laid by the young men working in the depression-time Civilian Conservation Corps. These impoverished boys, mostly city-bred, performed wonders in setting up the low walls, building rock pillars for the vine pergola, helping to dredge out the lakes, lay water lines and blast holes in the limerock to be filled with rich soil from the lake beds for forthcoming trees, palms and other plants.

Of course, buildings are required, and the first one was a gift from Colonel Montgomery's partners, in celebration of his fifty years in the accounting firm. The \$10,000 built a handsome cream-colored limestone home for the botanical library and palm-products museum, with offices in a wing at the rear. It was necessary to have a caretaker-guardian living on the grounds, so the next building was a two-story house for him. Then came glasshouses and slathouse

\*See Wait, *Fairchild Tropical Garden — The First Ten Years* (New York, The Ronald Press, 1948).



1. Illustrative of how the palms are the predominating plants in this part of the Garden. The building houses the library and palm products museum where the author, Lucita H. Wait, formerly served as librarian and curator. Photograph by Nixon Smiley.

to care for the new plants and seedlings until they were large enough to be set out in the ground. (The early arrivals had been cared for in the propagating houses on the Montgomery estate.)

Already, lectures, classes and plant shows had become a prominent part of the Garden's activities, so an auditorium became a real necessity. Colonel Montgomery owned a piece of business property in New York City which he sold, using the proceeds to build the Nell Montgomery Garden House, an auditorium which has been used many times since for lectures, social functions, art and other types of shows. At one of the plant shows an effect of great dignity was achieved by using floor-to-ceiling columns which were really the trunks of

six magnificent royal palms (*Roystonea regia*) which had been killed by some accident of nature. In all the shows fronds and inflorescences of palms were featured, to the astonishment and delight of northern visitors, many of whom had never seen them before.

Other buildings were added, mostly through the generosity of the Garden's friends; the superintendent's office and records room, a service building, the Hawkes Laboratory donated by Mrs. Forbes Hawkes, the Davis House, given by the late Arthur Vining Davis, and recently a much-needed storage house. The funds for this building were raised by Mrs. O. C. Corbin, widow of a former president of the Garden Association and a member of The Palm Society.



Many other large gifts have contributed to the Garden's growth and to the enlargement of the endowment fund. Thousands of smaller gifts also have been gratefully received.

As was mentioned above, scientists are coming more and more to study the tropical and subtropical plants introduced and collected here. The laboratories which once seemed so ample, have become inadequate. Also, more propagating houses were needed but space was not available on the eighty-three acres. The former Mrs. Montgomery, widow of the Garden's founder and now Mrs. Alvin R. Jennings, has deeded a part of her estate to the Garden, to be known as the Montgomery Foundation, in memory of her first husband. On this land a director's house has been built, supplementary propagating houses and nursery installed, and now, the most ambitious project of all, the William J. Robbins Plant Science Building, with facilities for a number of scientists to work simultaneously. The National Science Foundation, Washington, D. C., allocated a grant of \$153,200 for this building which at this writing has almost been completed and will be dedicated in the spring of 1967. Serious botanical research can now be greatly expanded.

Meanwhile, literally hundreds of thousands of seeds and plants have arrived from the warmer areas of the world. Exchanges have been set up with botanical gardens, many expeditions have been undertaken, by both professional and amateur collectors, and individuals have sent seeds and plants by the thousand. Each shipment has been recorded in the accession books, then the seeds,

etc., planted. With the Garden's limited space only a few of the resultant seedlings can be set out on the grounds. The surplus are offered to the Association's members on Distribution Day, sold to members at certain times, or sold to the public at the time of the "Ramble" (the Garden's large fund-raising event). In this way new plants are disseminated, to be tried in new environments and under new conditions. Unfortunately, many do not survive, but some of them do, to add their distinctive features to the landscape.

A good deal of time is required to introduce and popularize a new plant. In Fairchild Garden's *Occasional Paper No. 1*, September 1, 1938, Dr. Fairchild described a new palm, then known as *Adonidia Merrillii* Beccari. After telling something of its history and stating that in its native Philippine Islands it is found only on limestone soils, he predicted a great future for it in the limestone areas of southern Florida. His prediction came true, for now, twenty-odd years later, this very handsome small palm, its generic name changed from *Adonidia* to *Veitchia*, has become one of the favorite dooryard plants, adding color and form wherever it grows. Because it thrives in limestone areas it will probably continue to be popular for many years.

Palms are the prominent feature of Fairchild Garden; its founders planned it so. They have been gathered together in a great collection where they can be studied at leisure. Having come from many places, their descendants will be disseminated to other places where they have not grown before, to be enjoyed and used by millions.

# Recollections of Palm Collecting

ELEANOR F. JENNINGS

Since I was asked to contribute something written in a personal vein to this issue of *PRINCIPES*, which is mainly about the Fairchild Tropical Garden and its palms, I have here set down a few brief comments to serve by way of preface or preamble to the founding of the Garden.

Robert H. Montgomery and I were married in 1934, soon after he had established his winter home in South Florida. We spent every winter there until his death in 1953. Even though I had lived in Florida nearly all my life I did not know there were any palms except the coconut, the royal, the Washingtonia, and the cabbage (*Sabal Palmetto*). Every day before lunch we took a walk over our place and I began to get interested in my husband's new hobby, collecting palms. At that time we had shiny new aluminum labels on all our palms. The Latin names seemed long and complicated and very hard to pronounce. Dr. Fairchild always teased me about my pronunciation of them. We practised on a few new ones each day, and before long they became like old friends and we began to teach our friends and guests the botanical names. Years later I brought Mr. Jennings' children down for spring vacation and we decided to have a contest with cash prizes for the child who learned the most names. We delayed having the examination until we were in the Miami airport. Suddenly a man stuck his head out of a telephone booth and said, "Say, lady, what language are those children speaking?"

In 1951 Mr. Montgomery and I sailed on the S.S. Caronia on a round-the-world cruise, chiefly to visit some of the old and renowned botanical gardens where

we hoped to collect some new palms for our own place and for the Fairchild Tropical Garden. We found that it had paid to learn the Latin names, for often that was the only way we could communicate with some of the people we met in the various gardens. We sent back large quantities of seeds, and later on many of the young plants resulting were distributed to members of the Fairchild Tropical Garden. The Caronia was not crowded that year, due to the Korean war. We were given an extra stateroom and bath to house some of our living plants. Our stewardess was very good, and helped me keep the things watered. She called it my "tropical garden."

We had a permit from the U. S. Department of Agriculture to bring in palm seeds, but not living palms. To my sorrow a fine specimen of *Erythea armata* given to me by the Director of the botanical garden in Alexandria, Egypt, had to be destroyed on the New York docks. I found upon getting back to Florida that we had a good specimen growing right there, so all was well.

We found that many of the botanic gardens did not have the *Adonidia Merrillii*, named in honor of our good friend Dr. Elmer D. Merrill. The name is now *Veitchia Merrillii*. I know that Dr. Merrill would deplore the change from the generic name *Adonidia*, for it had pleased him very much. We sent many palm seeds back to our friends, hoping that some of them would grow into flourishing plants.

When we visited the wonderful old botanic garden in Singapore we noticed a very large "double coconut" or "coco de mer" (*Lodoicea maldivica*) with fruit. When I asked the Director where

he had gotten the seed, he laughed and said that he had helped to expedite a cask of the nuts through customs and quarantine in Singapore and that my husband had rewarded him with one of the nuts! Unfortunately our two specimens, grown from nuts that came in that same cask, are very slow-growing and seem to have a hard time surviving our chilly winters. Apparently the truly tropical climate of Singapore is more like the climate of the Seychelles Islands habitat than that of Coral Gables, Florida.

We had on our place a large fan palm, with grayish foliage, that we considered the handsomest one we had. The seed came to us from Madagascar under the name *Medemia nobilis*. We were very proud of the palm and always took our visitors to see it. Mr. and Mrs. John W. Galbreath liked it so much that they named one of their thoroughbred horses "Medemia!" The palm is dioecious, and when our tree matured we found it to be a male. We heard that there was a female palm of this same species, which we now know as *Bismarckia nobilis*, at the nearby U. S. Plant Introduction Garden, Chapman Field. By arrangement our superintendent Ray Vernon took pollen from our palm to Chapman Field, where it was used to fertilize the pistillate flowers of the palm there. In due course a number of viable seeds were produced and shared

with us. We have mature fruiting-size palms from that "marriage." They grow very fast in our lowland area. *Bismarckia nobilis* is being widely distributed now and in South Florida is no longer considered rare. It is, rare or not, an impressive and beautiful palm.

Mr. Montgomery started collecting conifers in Greenwich, Connecticut, and palms in Florida as a hobby. That hobby led to the founding of the Fairchild Tropical Garden in 1938. I would like to quote from his autobiography, "Fifty Years of Accountancy," published in 1939. Referring to the Fairchild Tropical Garden he wrote, "At last I have tackled a job the outcome of which I cannot foresee. I pray that the Garden may bring peace and happiness and a sense of beauty to millions of people. I pray that the Garden will be an inspiration to countless numbers who will be led to adopt a hobby which will never let them down."

I wish that he and Dr. Fairchild could see all that has been accomplished since their deaths. We who help to direct the destinies of the Garden are grateful to untold numbers of friends for their support and interest. We need their help now more than ever before because of the greatly expanded activities in scientific research and in the visual aspects of the Garden considered apart from its botanical importance as a garden for all to enjoy.



# About Editors and Editing

DENT SMITH

Of all the useful and more necessary kinds of drudgery, editorial work is perhaps the most difficult and least appreciated.

— Talbot Shote

And also about this issue of *PRINCIPES*, which is produced during the absence of the regular editor, Dr. Moore, and for which he can rightfully disclaim any responsibility. When I told him, just before he enplaned in Miami for South America, of my intention to make it the Dirt-Gardening number and easier to read than *Mother Goose*, he replied with a look of happy indifference that he couldn't care less if it were the *Playboy* number of *PRINCIPES*, or something else equally choice. Although tempted, I suddenly recalled that we were to produce an issue devoted chiefly to the Fairchild Tropical Garden and its palms, and so that is what these pages now come to — the "Fairchild Garden number" of *PRINCIPES*.

Perhaps everyone would like to know what Dr. Moore does with all his spare time between the stints of work occasioned by turning out *PRINCIPES*. He spends most of it on taxonomic studies and many inter-related matters, corresponding, writing technical papers, occasionally going abroad to do extensive field work and mayhap to study plant material in herbaria, and, since becoming the Director of the Bailey Hortorium, in administrative conferences and duties. One may readily see from this partial summation that the demands on his time are heavy, and hence when it was suggested that an assistant editor be found to aid in the work of assembling this journal each quarter, he welcomed the suggestion. Luckily, someone able and willing was found in the person of Mr. Warren J. Dolby, of

whom more later. Just now it might be of interest to say something of Dr. Moore's present travels.

Those travels were to take him first of all, after brief visits to Miami and Nassau, to Panama for one day only, and then on to San José, Costa Rica, from where he would proceed to the Sarapiquí Valley, the type locality for some species of *Chamaedorea*, *Geonoma*, *Bactris*, other genera. Here he would collect flowers, fruits, stems, petioles and roots of the palms, and for Mr. Robert Read pollen to be used in his chromosome work. It should have been said at the outset that Dr. Moore was to be accompanied by Dr. M. V. Parasarathay, a research associate at the Bailey Hortorium, more recently engaged in working at the Fairchild Tropical Garden with Dr. P. B. Tomlinson.

After Sarapiquí, the travelers were next to spend several days with Mr. Robert Wilson, former owner of Exotic Gardens in Miami, at or near Mr. and Mrs. Wilson's home at San Vito de Java, Costa Rica. Then on to Cali, Colombia, and Buenaventura to collect some of the palms that had engaged O. F. Cooke's attention.

The next port of call was to be languid Guayaquil, where Dr. Parasarathay was to return to the States and from whence Dr. Moore would go on alone to Peru — to Iquitos in the upper Amazon basin and to Manaus in Brazil, at the confluence of the Rio Negro with the Amazon, and from thence up the Negro to the Padauri River, to learn more of a mysterious palm, *Barcelia odora*, which



1. "Before-and-after" pictures of the accomplished Swedish botanist Erik Leonard Ekman, 1883-1931. The contrast between his appearance *before* — going to the Antilles and *afterwards* as a plant collector in the Cuban hinterland, is eloquent of the rugged and even dogged kind of work the collecting botanist often undertakes in the wilds. Illustration reproduced from Hermano León's *Flora de Cuba*.

seems to have a strange affinity with the African oil palm, *Elaeis guineensis*. Afterward on to Belem, Rio de Janeiro, and then to Sao Paulo for a closer look at *Lytocaryum*, and then, if all goes according to plan, once again in Ithaca before mid-April. Then there will be the collections to sort out and file, the stacks of papers and letters needing attention, the administrative affairs, the April number of *PRINCIPES* waiting to be born, other things, per omnia saecula saeculorum. But what about Warren Dolby, up there near the Golden Gate and far away from the anacondas, head-shrinkers, hungry jaguars, piranhas and the palms of the Amazon?

Mr. Dolby, as I have been given to understand, will help to put *PRINCIPES* together beginning with the July number, thus relieving Dr. Moore of any necessity to concern himself with suitable articles on palm gardening. Such articles would have to be obtained, for the most part, by direct solicitation, but his taxonomic work does not lend itself to that approach for the sufficient reason that it does not keep him in close touch with large numbers of growers and gardeners whose chief if not sole concern is with the practical side of growing palms for either profit or pleasure. At this point, enter Mr. Dolby.

Warren Dolby grows palms as a hobby at his home in Richmond, California, across the bay from San Francisco. He was one of the earliest members of The Palm Society, and his interest in it and in the palms has never flagged. He is one of that zealous band of Californians who have kept alive that interest with far more zest and sparkle than anyone can detect in Florida — if a Floridian may say so without fear of tar and feathers. We theorize in Florida that the zest is maintained at a higher pitch in California because the difficulties of successfully growing

many kinds of palms there are much greater than in Florida, wherefore the challenge provides all the incentive needed. But it matters little what the reason for this keener zest; what matters is that it does exist, and in a sense Warren Dolby typifies it, and thus it seems not too sanguine to hope that his efforts will stimulate the interests of the gardening readers, help to resolve some of the problems of publication and be of distinct benefit to the Society by helping to fulfill its avowed purpose of catering to all interests in the palms; be they sacred or profane. Varied does not mean at variance, and of course a little more attention to gardening subjects will not mean the neglect of the technical matter upon which the high reputation and worldwide recognition of *PRINCIPES* so largely depend. More accurately, even, its reputation is owing to the guidance given to it by Harold E. Moore and the recognition accorded him in relation to the palms. The Palm Society owes this accomplished man a tremendous debt of gratitude for his labors on behalf of *PRINCIPES*, now entered upon its eleventh year of publication. No better time to make this overdue acknowledgment than during his absence, for any other time he would be certain to expunge it with a blue pencil.

One more thing, totally irrelevant to any of the foregoing discursive matter, and there's an end on't. Lo many a year I have longed to see the before-and-after likenesses of the Swedish botanist Erik Ekman adorning a page of this journal, and now at last here he is, on p. 12 wearing a meek and innocent look on the one hand, and, on the other, looking as if fit to defy all the demons of the earth and air, and even the jaws of hell, or worse. On the long hot afternoons of summer when the cicadas screech, the bulbuls wail down in the



bulrushes and the spirits sink soddenly low, I like to gaze upon this intrepid botanist, this indomitable man radiating a kind of ferocious determination and patently capable of performing his tasks despite any odds. That is the only excuse for his presence in these pages; I have put him there just to please myself, in lieu of any cash recompense for this temporary descent into journalism, that is to say, for wheedling copy from authors and strug-

gling with typewriter, scissors and paste-pot. But at the same time, I dare hope that others will cotton to old Ekman, too. There are two ways of looking at him. One way is to admire his dogged determination so greatly that a yearning arises to emulate him and to be found in those same circumstances. The other is to thank one's lucky stars not to be in his boots. Both ways are eminently satisfactory, depending upon how one looks at it.

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## A Walk through the Fairchild Garden

NIXON SMILEY

Accompanying photographs by the author.

My wife and I never tire of walking through the Fairchild Tropical Garden on a sunny day when a blue sky and a few cottony clouds form a background for the hundreds of palms in the botanical garden's large collection.

In a sense, it is like a visit to many tropical lands, for here are the palms of the world. Here an admirer of this great family of plants can see during an hour's stroll as many species as he would be able to discover on a voyage taking him thousands of miles across oceans and through the jungles, savannas and plains of the tropics.

Several years ago a visitor, inspired by the collection, referred to the palms as the "garden's crown jewels." They are that, and more. They are living jewels — if one finds it necessary to make such a comparison — of fantastic forms.

The great variation in palms never ceases to surprise you. Some are scrubby and could hardly be classed as "jewels." Some are of unusual form, even bizarre. Some are colorful — a surprise to those

who thought all palms were "green." Some are so stately, so graceful, it is difficult to find anything else in nature to compare with them.

But whatever category a palm falls into, I've never seen one that was so objectionable I wanted to dig it up and toss it out because of its ugliness. There's beauty even in the scrub palmetto (*Sabal Etonia*). If you have ever seen extensive colonies of this deep-green, trunkless palm growing on the floor of a leafless hardwood forest in north Florida during the winter you will never forget it.

Everyone who walks through the Fairchild Tropical Garden must enjoy its plant collections from his own viewpoint. The botanist will have his own interests. He classifies the palms as he strolls among them. He notes the shapes of leaves and the sizes and forms of flowers. The horticulturist is interested in how they are grown. It pleases him to see a plant grown well, displeases him to see a sickly specimen.

The landscape architect will see the



1. Species of *Latania* in the left foreground, royal palms (*Roystonea regia*) on the right.

garden from still another viewpoint. If he knew the architect who designed this garden, William L. Phillips, he would admire the way the plants are grouped; the vistas which permit you to view the plants from a distance, before you approach them for a close-up view. And the landscape architect will study the palms as individuals, as candidates for some future landscape job.

Being none of these, I take a non-specialized view of the palm collection, enjoying it in a very general way. While I like to read the labels and become bet-

ter acquainted with the palms, I am not a botanist and therefore know the genera and the species only in a superficial way. For instance, I know the difference between a *Sabal* and a *Pseudophoenix*, a *Rhapis* and a *Chamaedorea*, a *Roystonea* and a *Heterospathe*, a *Caryota* and an *Acrocomia*; and I know the difference between a *Veitchia* and an *Archontophoenix*. But don't ask me how I know. I could not "botanize" the differences between these palms.

If I belong to any classification, I'm a horticulturist. I do know when a palm

is in splendid condition; when it is well grown. I like to see a splendidly grown plant, one which is adapted to the soil and the climate and shows it by its thrifty response. Many of the nearly 3,000 species of palms in the world are not adapted to Florida. Many hundreds of species do thrive in the FTG, though. And, I'm not counting those which have been in the ground only a couple of years, but refer to the species which have been planted long enough to have survived frost, monsoon-like rains and long droughts.

Many of the palms have been in the collection since the garden was started in 1938. These older specimens make splendid background for the palms that have been planted since. Some of the young ones are coming along rapidly. In time they will take the places of the older specimens, which fall prey to diseases and insects, and, in rare instances, to lightning.

Writing this, I find myself thinking along the lines that I think as I walk through the Garden, except the walk is leisurely and relaxed and anything that falls into view is seen and sometimes commented on. There are always different palms in flower or fruit. The flower clusters can be spectacular in size and form. And no other plants have more colorful fruits than some of the palms.

But there are more than palms in the botanical garden. Many kinds of trees, shrubs and vines grow here. The hard-topped road takes you through upland and lowland areas, past vistas and overlooks, through rock gardens, flowering tree collections, cycad collections, vine collections, past lagoons and lakes.

The Garden is a bird sanctuary as well as a plant sanctuary. Bird-watchers are frequent visitors, early of a morning usually. They bring their binoculars to study the birds in detail, especially the

ducks which, in the winter months, are seen in rafts on the lowland lakes. The lakes are also popular places for coots and Florida gallinules. Alligators are sometimes seen sunning on the banks.

Two rare birds are frequent visitors, the Guatemala oriole and the smooth-billed ani. The oriole is one of the most colorful birds in Florida, while the ani, a black bird somewhat larger than a grackle, is of particular interest to a bird-watcher anxious to add another name to his "life list of birds seen." From time to time the big green and yellow macaws from the Parrot Jungle, about one-half mile distant, fly over to the Garden and squawk at you from the tops of trees or palms. They like particularly to congregate in a gumbo-limbo tree and snip off the tips of branches with their sharp beaks. I've seen people standing about beneath the tree as they express "ohs" and "ahs" as they watched with upturned faces the antics of the huge birds.

My wife and I have formed the habit of taking a route through the Garden that we seldom vary from, especially the beginning. We turn right just after entering the main gate, taking a hard-topped road which the tram uses for the guided tours.

Immediately on our left after we make the turn is the large, red-trunked gumbo-limbo tree which the macaws like, and just beyond is Plot 110 in the Fairchild Tropical Garden's Catalog of Plants. Here are species of *Mascarena*, *Pseudophoenix* and the triangular-shaped *Neodypsis*. In this plot there once was a fine specimen of *Jubaea*, the Chilean honey-palm, but it was lost to disease.

On the right is a narrow plot, between the road and the stone wall, containing a variety of palms, including a number of native *Sabal Palmetto* which volunteered. These sabals have been growing here since the time the Garden was





2. A plot containing sundry species of *Thrinax* and *Coccothrinax*.

started. They form a shade and a screen, as well as a "balance" in the landscape design.

Some years ago, while I was director of the Garden, we proposed to remove these native palms and replace them with species of more valuable introduced palms. But the landscape architect, Mr. Phillips, was against it. He thought it would leave an "awkward hole" while the young palms were growing up. Such are the problems of landscape design, and a good reason for having the guidance of a landscape architect. For these

palms do provide a quality which would be a great esthetic loss if they were removed.

From here the stroll offers an increasing variety of palms — species of *Butia*, *Washingtonia*, *Latania*, *Copernicia*, *Aiphanes*, *Veitchia*, *Licuala*, *Thrinax*, *Coccothrinax*, *Chamaerops*, *Caryota*, *Acrocomia*, *Phoenix*, *Dictyosperma*, *Orbignya*, *Attalea*, *Ptychosperma*, *Livistona*, *Corypha*, *Arenga*, *Hyphenae*, *Cocos*.

In an opening, at the bottom of a swale, is a group of four kinds of coco-



3. Four different varieties of the coconut palm, *Cocos nucifera*.

nut palms — the Malay orange, Malay yellow, Malay green and common coconut. Along the route, too, is a *Veitchia Montgomeryana*, named by Dr. Harold E. Moore, Jr., in honor of the founder of the FTG, Col. Robert H. Montgomery. It is located near a stone wall where one may stand to look down into a sunken garden.

The Garden has a very good collection of the *Copernicia*, most of them from Cuba. This excellent collection of over 15 Cuban species owes its existence to the late Cuban botanist Brother León,

an authority on Cuban plants. He was a long-time friend of Dr. David Fairchild, for whom the Garden is named. He attempted to collect the seeds of every *Copernicia* in Cuba. Some of the Garden's most striking palms are *Copernicia* species, including *Copernicia Baileyana*, named in honor of Dr. Liberty Hyde Bailey, and *Copernicia Torreana*\*, commonly known as the petticoat-palm. The petticoat-palm is so named because it holds its old leaves for many years,

\**Copernicia macroglossa*, see PRINCIPES 7: 140, 1963.



4. Several species of *Copernicia*, including the petticoat palm, *C. macroglossa*; two slender *Veitchia* sp. in bloom; and in center a specimen of *Phoenix Roebelenii*.

hiding the trunk and reminding one of a woman dressed in an old-fashioned petticoat. But the *Copernicia* species can be unbelievably slow growers. In 1962 I made a photograph of Dent Smith with two palms in his collection at Daytona Beach. One was an *Acrocomia aculeata* nearly 25 feet tall which he had planted in 1954 and another of a *Copernicia Torreana* some 18 inches tall which he had planted in 1956. Once the *Copernicia* becomes well established its growth is much more rapid. The FTG has a number of fruiting *Copernicia* species,

although some, planted 20 years ago, have not reached fruiting size.

There is a fine specimen of *Copernicia Torreana* in Plot 107 which was one of the most popular palms in the Garden until it lost its "petticoat" a few years ago. When I walk through the Garden and see these fine *Copernicia* palms I recall a trip through the Llanos of Venezuela several years ago. Great colonies of a striking *Copernicia* grow in the fire-swept plains, and in some instances they have been planted about the small thatched homes. (Or maybe





5. Talipot palms (*Corypha* Sp.) and royal palms (*Roystonea regia*) viewed from across one of the lakes.

the homes were built near the palms.) The Llanos palm is *Copernicia tectorum*, but until recently it was known as *Copernicia sanctae-martae*. It is now in the FTG collection but is still small even after several years of striving to establish itself.

One of the Garden's outstanding palms is a native, *Coccothrinax argentata*, the silver-palm, but its fronds are hardly so spectacular in silhouette as *Coccothrinax Miraguama*. The Garden has nearly a dozen of the *Coccothrinax*. Some are such slow growers, like our native, that

one doesn't have enough lifetimes to grow them. I could not, at my age, entertain enough anti-statistical arrogance to plant a *Coccothrinax argentata* with the expectation of seeing it reach robust maturity. But I have enjoyed this palm in the Florida pinewoods and the Florida Keys, as well as in the Bahamas where it thrives among the dune scrub on many of the islands. Its ability to withstand winds is remarkable. Frequently its gale-tossed fronds are seen standing out parallel to the ground; but when the gale stops the leaves fall back



6. Species of *Pritchardia* growing near the lowland section yet to be fully planted.

into perfect form as though they had been touched by only a mild breeze.

In general, the palms seem to be more resistant to hurricane winds than any other trees. The Fairchild Garden's palms were hit by three hurricanes between 1960 and 1965, but most of them suffered only superficial damage. Exceptions were the *Orbignya* and *Attalea* species, whose immense feather-shaped leaves were badly damaged. While the leaves of the royal palm were badly flayed and stripped from many of the palms, recovery was rapid. Hardly any

of the healthy, well-established palms in the Garden were blown down by the high winds. The Garden's collection of trees, on the other hand, took a severe beating in all three storms, especially in the first one. It had been fifteen years since a hurricane had hit the area and a number of the trees had become quite large. Several of these were broken up badly or were toppled.

As already suggested, everyone who strolls through the Garden looks on the palms in a different way, from a different background. The more you know

about them — their history, their botany, their uses — the more you are likely to enjoy these remarkable plants. And if you have seen them in the tropics your memory is immediately transported thousands of miles away to a jungle in Central America, to a plain in South America or to an island in the far-away Pacific.

The less experience you have had with the palms the less you are likely to enjoy them. A member of The Palm Society may find it difficult to believe that some people are capable of walking through the Fairchild Tropical Garden without observing any remarkable differences in these plants.

I used to talk frequently with visitors while I was director. The reactions were sometimes amazing. Some visitors saw “nothing” to the palms. Others were surprised to learn that there were other palms than the coconut. I’ve frequently heard people say that they could not see any difference in the palms after taking a guided tour of the Garden, even after an experienced guide had pointed out the many differences.

But even after you have strolled through the Garden hundreds of times you find yourself discovering new and interesting things about the palms. For one thing, they are constantly growing and the many palm plots are forever changing, giving new landscape dimension to the scenery. New species, being introduced every year, are planted out for testing. It is interesting to anyone who likes the palms to watch these plants as they “take hold” and grow in a new land and in a different climate.

You never know until you plant a palm at the FTG whether it will grow outdoors. Some refuse to grow because they cannot tolerate the cold, but a large number simply can’t survive the dry atmosphere of winter and spring. Many of the palms hail from the moist jungles,

while others are native to higher elevations where the high moisture keeps the foliage moist much of the time.

I remember some years ago how reluctant Stanley Kiem, FTG superintendent, was to plant out in the grounds some very fine palms from New Guinea, for there was good reason to believe that they would not thrive here. The seeds had been sent back by Leonard Brass, leader of the Archbold Expedition to the Far East. One of these palms was a new genus — *Brassiophoenix* — which the German botanist, Burret, had named in honor of the explorer. Others were *Ptychosperma* species which had not yet been described and named. Mr. Brass, a careful collector, had thoroughly cleaned the seeds before sending them by air. When some packages arrived the seeds were already sprouting among the moist sphagnum moss.

Under the protection of the greenhouse the Brass palms — as we called the lot — thrived. Then, guided by notes of Mr. Brass which described the locations where the different species were discovered, the thrifty seedlings were planted where they would receive some shade. A few of them were planted in the deep shade of the Garden’s “rain forest.” Every one of these palms has thrived outdoors almost as well as in the greenhouse. Some have grown into fine fruiting specimens and have been distributed to members of the FTG.

It never ceases to amaze me how much salt so many of the palms can withstand. A large number of palms have been planted in the Garden’s lowland which was subjected to three hurricane tides between 1960 and 1965. Yet the palms selected for this area have thrived amazingly well, even though some of them have been completely inundated by salt water while young. Among these have been the *Paurotis* [*Acoelorrhaphe*], *Arecastrum*, *Coccothrinax*, *Thrinax*, *Co-*



*pernicia*, *Roystonea*, *Corypha*, *Pritchardia*, *Borassus*, *Caryota*, *Chrysalidocarpus*, *Latania*, *Bismarckia*, *Livistona*, *Phoenix*, *Ptychosperma*. And many other species are becoming established in the lowland which, in another decade, will make this newly developed area one of the most striking sections of the Garden.

We frequently walk a mile through the

Garden, often leaving the paved surface to "explore" some area that has undergone changes since we saw it last. And we feel fortunate to live so close to this botanical garden where it is possible to go at any time we feel the urge for a walk and be assured that we will always find something new and interesting.

## Germination Experiments

### The Effect of Scarification on the Germination of Seed of *Acrocomia Crispa* and *Arenga Engleri*

JUAN DE DIOS HOLMQUIST\* AND JOHN POPENOE  
FAIRCHILD TROPICAL GARDEN, MIAMI, FLORIDA

Most research on the germination of palm seeds has been on African Oil palm, coconut, or other palms grown as plantation crops. Some work has been done on ornamentals, however, and most of it is reported in the journal *PRINCIPES*.

From the various studies made on the germination of palm seeds it is found that most species germinate readily and no special treatment is needed to accelerate germination (1, 3).

The methods described for accelerating germination of palm seeds vary from simply removing the exocarp or husk (fleshy part of many fruits) and cleaning the seed to complicated chemical or mechanical treatments such as breaking the seed coat with a hammer and treating the hard seeds with concentrated sulphuric acid. Kitzke (2) working with *Copernicia* got the best germination by scarifying the seeds with 10 per cent sulphuric acid for ten minutes.

High temperatures have also been useful in promoting germination. De

Leon (1) had good results in germinating seeds of two difficult species using a hotbed with electric cables which maintained a temperature of 83° F. This same treatment was later recommended by Loomis (3), Lothian (4), and Yocum (5) for different species of palms.

From among the various species of palm that are difficult to germinate two were selected for this study. *Acrocomia crispa* was selected because it is one of the most desirable of its genus for ornamental purposes and most of the other species of this genus are also very slow in germination. *Arenga Engleri* is one of our most desirable ornamentals because of its attractiveness and hardness in Central Florida and California. *Arenga Engleri* is notoriously difficult to germinate.

#### Experiments with *ACROCOMIA CRISPA*

Fruits were obtained from two palms. The first batch was fully mature and beginning to drop. One hundred of these first fruits were cracked open and the kernels given a visual examination.

\*Present address: Facultad de Agronomía, Maracay, Venezuela.

Ninety-three percent of the seeds appeared to have good embryos, while seven per cent were blanks with no kernel. The second lot of fruits were not as mature as the first and were still a greenish-yellow color. Two hundred of these seeds were cracked to examine the kernels. Twenty-three percent of these seeds were blanks and had no kernel. Approximately 50 per cent had not completed maturation, that is they were still soft. Seeds from both groups were used for the experiments but were kept separate to determine whether or not less mature fruits would germinate satisfactorily.

The husk or fleshy exocarp was removed from all but one lot of the seeds which was used as a control. Then the following treatments were made with 25 seeds from each lot receiving each treatment:

- a. Control — no additional treatment after removal of the exocarp.
- b. Removal of the mesocarp after cracking with a hammer and only kernel planted.
- c. Removal of the mesocarp with a hammer and the pellicle or membrane around the kernel with a knife.
- d. Removal of the mesocarp with a hammer and soaking the kernel in tap water for 12 hours at room temperature.
- e. Same as *d.* but soaking the kernel for 24 hours.
- f. Filing the mesocarp with a file on the side next to the hylum (scar or point of attachment of a seed) until the kernel could be seen.
- g. Cleaning out the hylum with a knife, taking care not to damage the kernel.
- h. Burning the seed wrapped in newspaper for one minute.

- i. Soaking the seeds in concentrated sulphuric acid for 10 minutes.
- j. Same as *i.* but for 20 minutes.
- k. Same as *i.* but for 30 minutes.
- l. Control — seeds planted without removal of husk or exocarp.

After the treatments were made the seeds were planted in ten-inch pots in a mixture of 50 per cent peat moss and 50 per cent vermiculite. Each treatment of 25 seeds was planted in a separate pot. The pots were placed in the greenhouse for germination. The treatments were made on June 4, 1965.

The germination of the *Acrocomia* seeds was recorded on August 26, or a total of 83 days after the treatments were started. At this time the only treatments that showed much germination were where the exocarp and mesocarp or hard shell surrounding the seed had been removed. In treatment *d.* on the mature seeds of the first lot, 15 seeds had germinated. In treatment *e.* of this lot 10 seeds had germinated. Where the kernel was not soaked at all but planted directly, six seeds germinated from the first lot.

In the control where only the exocarp was removed, four seeds germinated from the first lot of seeds. One seed germinated where the channel of the hylum had been cleaned out with a knife. Also in the mature lot of seed one seed germinated in treatment *f.* where the mesocarp was filed down.

In the group of seeds from immature fruits, only two germinated and these were both from treatment *b.* where the exocarp and mesocarp were removed but no further treatment was made.

No statistical treatment was applied to the results because of the lack of replications. Nevertheless, it can be concluded that there is probably a beneficial effect on germination from removing the exocarp, then cracking the

shell or mesocarp with a hammer before planting the seeds. Perhaps soaking the kernel in water is also beneficial and further study should be made on this matter. None of the other treatments seem to have any particular value. The effect of temperature on germination of seeds of this species should be examined also but there is always the difficulty of finding a sufficiently large quantity of seeds of uniform maturity and quality to run valid experiments. If the mesocarp is cracked before planting it is easy to eliminate the blanks and thus eliminate one of the variables in these germination experiments.

#### Experiments with ARENGA ENGLERI

Mature fruits were separated into two groups. The first group was cleaned and then soaked in water for two weeks. The second group was cleaned and then planted immediately after treatment. (Note — There is a substance in the fleshy exocarp of these fruits which burns the skin of a person cleaning the seeds. It is best to wear rubber gloves and take all precautions necessary to protect the skin.)

The following treatments were made on June 9, 1965:

- a. Sanding down the mesocarp with emery paper at the point of the hylum.
- b. Control — no additional treatment.
- c. Filing the seed in a location other than the hylum.
- d. Burning the seed coat with ignited newspaper for 30 seconds.
- e. Soaking the seeds in sulphuric acid for 5 minutes.
- f. Soaking the seeds in concentrated sulphuric acid for 10 minutes.
- g. Soaking the seeds in concentrated sulphuric acid for 20 minutes.

Twenty-five seeds were used for each treatment and each treatment was planted in separate pots and handled the same as the *Acrocomia* seed.

After 80 days the germination was recorded. The most successful treatment was where the seeds had been sanded down at the point of the hylum until the embryo was just visible. In this treatment 15 seeds germinated. With the same treatment but the seeds soaked in water first, eight germinated. With the sulphuric acid treatment for 10 minutes two seeds germinated, and when the seeds had been soaked in water for 15 days first and then treated for 10 minutes with the sulphuric acid only one seed germinated. None of the other seeds had germinated during the 80 days.

Although no statistical treatment of the results was possible it is safe to conclude that sanding or filing down the seed at the point of the hylum until the embryo is just visible is the most effective method of treating the seed and can be recommended for further trial and use.

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## Comments on Shipping Palms

DAVID BARRY, JR.

Palms are more difficult to ship than most kinds of plants and are subject to some special regulations.

To begin, the Regulations of the United States Department of Agriculture prohibit the importation of palms into the United States. The theory to support this regulation is that palms can be grown easily from seed and that the importation of seeds instead of plants puts at a minimum the chance of pest introduction. When a palm will not come true from seed, as, for example, the variegated leaf form of *Rhapis*, a special permit to import a few plants will be granted upon application to the United States Department of Agriculture, Division of Plant Quarantine, 209 River Street, Hoboken, New Jersey. In cases when it is extremely unlikely that seeds of a certain palm can be found, permission also to import plants will probably be given.

As an example, I have in mind a beautiful *Pinanga* that grows in the hills above Penang. It resembles somewhat *Chamaedorea brachypoda* with its thin, reed-like, multiple stems and its simple bifid leaves, which are leathery. This palm would make a delightful tubbed specimen. It was fairly common, even growing conveniently in or near foot paths that ran through the forest. After much searching through many of these palms no seeds nor evidence of flowering were found. Assuming that it was a question of the right time of year to find seeds, I posted a cash reward to be given to anyone on the staff of the botanical garden who could find seeds. After about three years of observation no seeds have been found. This palm should certainly be a proper candidate

for a special permit to import a few plants.

A general requirement by the United States and most other countries, the State of Hawaii, and that of California for shipments from Florida, Hawaii and Puerto Rico, is to remove (wash) completely from the roots of plants all earth including sand and soil. Securing of root systems in original, soil-free sphagnum moss or peat is permitted. California imposes a general quarantine against Puerto Rico and a qualified quarantine against plants from Hawaii and Florida. It is designed to prevent the spread of the burrowing nematode, *Radopholus* species. By "qualified" is meant that entry is permitted into California if respective State Plant Boards issue a certificate of freedom from nematodes to accompany each shipment or lot of plants.

Hawaii provides the service of a microscopic examination of the roots by a nematologist and the issuance of a certificate. This procedure requires a minimum fee of \$2.00, the custody of the plants for four days, and the probability of fatal damage to palm plants by exposure of the root systems during this time to too much air and then to too much water. Florida does not provide such a service for individual shipments of plants. Its certification is based on thoroughly sampling a nursery by taking root and soil samples and examining them for nematodes in the laboratory, or when the plants have been grown from seed in sterile soil in raised benches. I know of no nursery in Florida interested enough in shipping palms to California to have at this time a certification by either of these methods.

The California members of The Palm Society, about 130 in number, are presently unable to use Florida as a source of palms.

Most advanced countries require that a phytosanitary certificate issued by the United States Department of Agriculture accompany each lot of plants shipped. These certificates are issued without charge by the federal government's plant quarantine stations at a representative number of ports of entry.

Written request for the certificates may be made by presenting the original phytosanitary certificate issued on examination of the plants by the state plant inspector. I have found in practice that England, Canada, Australia and New Zealand distinguish between the inspections made by the federal government and those made by the states, and insist on certificates issued by the former. Notwithstanding instructions by other countries that require federal certificates, those issued by state authorities usually suffice.

Canada requires the prior issuance by it of a permit to import plants sent to the shipper to accompany the shipment. Australia requires a permit issued by it before shipment by which the importer arranges for receipt of the plants before ordering them. This permit does not need to accompany the shipment. A year's quarantine period in Australia may be required before final release of the plants to the importer.

No formality is required by England in shipping plants to the Royal Botanical Gardens at Kew. They are a law unto themselves, and the only exception to the rule I can assure you.

So much for red tape, and now let us consider some of the aspects of preparing plants for shipment.

There is no special problem involved in shipping palms undisturbed in the soil and containers in which they have

been growing. Much of this is done by trucking, and crating can often be avoided. Likewise, no special problem arises when palms are mossed and shipped to arrive at destination in a day or so and without involving plant inspection. Some of the legal limitations on these two methods are set forth above. The problems arise when time, distance, and inspections are involved.

Palms are particularly vulnerable to exposure of the root system to air. Such exposure is unavoidable when soil is washed away from the roots. Exposures may be repeated during plant inspections made before shipping and at destination. The first exposure kills usually all of the minute, white, feeding roots. These roots may not be redeveloped by the palm after its preparation for shipping and during the trip. Dicotyledonous plants that have fast-forming cell tissue in their cambium layers, and that can be propagated from cuttings, recover from such exposures and grow new feeding roots much more readily than do palms. Monocotyledonous palms without cambium are stubborn about redeveloping their fine, feeding roots. During shipping, especially with low temperatures, these roots are not developed and the palm will slowly pass away in spite of solicitous care by the recipient. He may regard the extensive system of brown roots as reassuring, but they are not the roots that convey food to the palm. They may keep the palm erect in its container, but the roots that convey food to the palm are minute and white.

Here are recommendations that should bring success in shipping palms:

Minimize the exposure of the root system by washing away the soil from one plant at a time. Immediately envelop the root system in the moist, fresh sphagnum moss or peat in a compact manner to avoid air pockets. Prefer-

ably, insert the palm in a plastic pot of the same size as the one in which it had been growing. Otherwise, wrap the enveloped roots in plastic sheeting, or enclose in plastic bags. The medium should be firmly and solidly packed around the roots. Now is not the time to ship the palm. Put it in a warm, sheltered place for two or three weeks, preferably on bottom heat. During this time it should redevelop new feeding roots. (If necessary, re-moisten the planting medium.) Now the palm is ready to ship. It will never know it has taken a trip. As an additional precaution, just inside the lid, place a card with this message:

*Plant Inspector: Please Minimize  
Exposure of Roots to Air.*

Second, for the receiver of the plants:

On arrival of the palms examine the root systems. If there are no fine, white feeding roots do not plant the palms in soil. To do so is the kiss of death. The typical soil in which the palms would thrive if in thrifty condition will suffocate the plants. Drown them would be another way of saying this. The palms should be handled as unrooted cuttings. Put in coarse sand, sponge rock, or a very loose, open, porous mixture. Oxygenation through aeration in the root system is necessary to produce the development of the essential feeding roots. Again, do not be misled by the presence of an extensive root system of brown roots. They will not provide sustenance for the palm. Use bottom heat if at hand as one would for cuttings. Put the palms in as warm a place as can be found. Cover the palms with a plastic bag to produce maximum humidity to the leafage while the root system remains impotent. When, and not until, the white feeding roots have been developed, the palms may be planted in the soil in which you intend to grow

them. It would help to keep the plastic covers on the palms for a few days after transplanting.

If the palms should have arrived in a dry and weak condition, soak the entire plants for two hours in a solution of sugar in water. The leafage will be able to absorb some of the sugar as a stimulating food, and this preliminary treatment will sometimes make the difference between success and failure.

Incidentally, the above treatments can be effectively used with other kinds of plants.

In general, when shipping plants during hot weather, cut holes in the cartons about the size of a fifty cent piece; during freezing weather completely envelop the carton in newspaper "blankets" made by stapling together not less than eight thicknesses of newspaper.

The United States Department of Agriculture prohibits importation of plants that are in the medium in which they have been growing. The purpose of this regulation is to make it comparatively easy to examine the root systems. With limited staffs it would not be possible to make proper examination of the fine root systems of large quantities of such plants as, say, azaleas, even though planted in a permitted medium such as peat. The fine network of roots would have formed a cage of massed roots difficult to spread apart for examination. I consider that the establishment of feeding roots on the root system of a palm for a period of two or three weeks in a permitted medium prior to shipping is not tantamount to growing a plant in a medium and is not contrary to the intent of the regulation. Besides, the newly applied medium would readily fall away from the not-extensive root system in which the feeding roots may have commenced development, making easy any examination.

One of our Society members, Mr.



Peter B. Dow, of New Zealand, a professional seedsman, has sent to me sprouted seeds in lieu of the seeds that I had ordered, a very pleasant surprise. They were of *Rhopalostylis* species and were in fresh, moist peat, enclosed in a plastic bag. It was like receiving orchid seedlings from community pots. The "seedlings" arrived in perfect condition. They were sustained en route at least in part by the endosperm. No leaf had emerged. The roots were well-branched. From the point of the sheathing structure from which the leaf would finally emerge to the bottom of the root system was about an inch and a half. I would guess that the endosperm was about half consumed. These sprouted seeds were ready to be potted.

It is clearly evident that sending sprouted seeds has great advantages. Viability of the seeds is no longer a consideration. Only one problem presents itself and that is with a few genera in which elongated cotyledons emerge from the seeds and carry the embryos some distance from the seeds before they sprout. These cotyledons are very fragile. They also elongate rapidly once they have started to emerge. Examples of such palms are *Borassus*, *Copernicia*

and *Hyphaene*. In most kinds of palms the elongation of the cotyledon is slight.

Several years ago I collected some *Borassus* seeds on Kandahar Island in the Zambezi River about eight miles above Victoria Falls. Elephants are very fond of these seed. In some way they get over to the island for them. The only seed left by the elephants had been dropped and stepped on by them so that they were level with the surface of the moist soil. The elephants could not pick them up. I had some difficulty in digging them out with a pocket knife. When I put them in a plastic bag germination began immediately and within two days the fast growing cotyledons had emerged so far that the seeds were worthless for shipping.

There should be more activity in the exchange of palm plants between members of the Society. The distribution of seeds through the Seed Bank of the Society is a most valuable facility. It could be supplemented if members would declare themselves willing to engage in the exchange of palms. Two to four years of time could be saved for each palm over having grown it from seed.

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## Our Changing Weather

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The weather: Cold . . . frost warning . . . freezing . . . more of the same.

That forecast could be somewhat premature for Florida. But the experts say cold warnings will be more frequent for the Sunshine State.

The state spends huge sums to advertise sunshine, glittering beaches, a benevolent sky that guarantees a coppery skin, and the unspoiled beauty of wild-life sanctuaries of semi-tropical birds

and animals, all of which can be enjoyed during the season when much of the rest of the nation shakes and shivers and huddles next to the floor furnace. But even the most optimistic interpretation of what is happening to our climate stirs a vague worry when the facts are known.

To begin with, the facts themselves seem contradictory. A century ago the world emerged from the Little Ice Age,

and temperatures have been getting milder most of the time since then. For a while, the world temperature went up one degree but the temperature rose four times as much in the Arctic as near the Equator, and none at most of all around the North Atlantic. Also, winters in most places accounted for all the change. It was in Spitsbergen, an island northeast off Norway where the most radical jump took place. It seemed that on this island all of the trends combined. In one twenty-year period there, winter temperatures went up 24 degrees.

In our Northeastern and North Central states, average winter temperatures have climbed 3.5 degrees during the last 50 years or so. Southern winter temperatures rose a little more than 2.5 degrees in the period between 1894 to 1954. In the Southwest, however, the temperature rise there was but an average of one degree.

Summer temperature trends are up everywhere by less than one degree except in our North Central states where the increase seems to have been a little more than that.

Significantly, tropical and sub-tropical zones have become if anything, a little cooler in the last half century. What has brought about this change in climate?

This is where the trouble lies. If we knew precisely what caused climatic fluctuations, we might be in a better position to forecast whether warmer, colder, wetter, or drier weather is ahead. Present theories of why climates change involve the wobble in the earth's spin on its axis, differences in the amount of dust in the air, shifts in ocean currents, changes in the quantity of carbon dioxide in the atmosphere and the elevation or depression of the continents.

Climatologists say there is no doubt that all of these factors have played some role in influencing the earth's cli-

mate at particular times and places. But even the best weather prognosticators admit that the problem of world-wide climatic change is still very much of a mystery. Each time a cause of change is investigated somehow an alibi is developed for it.

The business about the eccentricity of the earth's orbit in space producing a variation in the rate at which radiation is received from the sun does not seem to be a satisfactory explanation for the sweeping climatic changes that are being foretold.

It is true that presently the earth swings closest to the sun in January and farthest in July, making seasonal changes milder in the northern hemisphere and more severe in the southern.

But this is of little consequence unless you want to take the long view. In 100,000 years the phases will shift so that the reverse will be true. Summers in the northern hemisphere will be hotter and the winters colder. Then in about 21,000 years we will be back to January for the closest approaches of the sun again.

The most promising theory for a decline in temperatures is that carbon dioxide is the culprit of change.

When trees are chopped down, when once rural land is open to new suburbs, when factories and refineries continue to pop up it becomes apparent that the amount of carbon dioxide taken from the air by growing plants is decreased. At the same time the amount added through fuel consumption is increased. In a sense, carbon dioxide has a greenhouse effect. It lets sunlight in, but won't let heat rays out.

If industrialization continues at the present rate, the theory would suggest that by the year 2080 temperatures might be up by as much as four degrees. A four degree rise, if maintained a few thousand years would surely melt

a great portion of the six million square miles of ice and snow now collected at the poles. This would have the effect of raising the levels of the oceans around the world.

Such an increase would very likely bring tropical conditions to most of the earth. Carried far enough, though no one knows precisely what this might be, ten degrees would be enough to melt all of the gigantic ice sheets of the South Pole.

If this happened ocean levels would rise a couple of hundred feet, for these ice sheets are as much as two miles thick. In such an event coast lines would change enormously, ocean currents would shift and the whole pattern of climate as we know it would be altered.

Lest anyone become apprehensive that in the near future Miami will disappear in the ocean or that steaming jungles will overrun Chicago, he can take heart from the fact that nature would require at least five thousand years to bring about such a dramatic climatic change.

But going back to the carbon dioxide theory, if this gas were, in fact, a regulator of climate then the increase of carbon dioxide in the air from burning coal and petroleum would neatly coincide with the warming trend the world has experienced. Unfortunately, the theory has some serious holes in it because despite increased carbon dioxide, the world is getting colder.

The fact of the matter is climatologists don't know really what is changing our climate. They must rely on historic cycles to predict what the future might hold. We do know that the United States experienced a warming trend until about the second half of the 1950's.

The early fifties were warmer than ever in the United States. By all the signs it had to end. To our north, Canada has turned colder. To the east, the

ocean temperature plummeted to what it had been 25 years before. To our west, in the Rocky, Cascade and Olympic Mountains, glaciers that had been slowly thawing in balmy weather started advancing again under new accumulations of ice.

In any case, the trend maps of the climatologists showed the world's warm spell ending. Although the cold has yet to hit us hard, the evidence is indisputably that 30 per cent of the warm trend has been slowly cancelled by colder weather.

In Florida, birdwatchers for the past several years have discovered the conspicuous absence of many feathered creatures that used to winter here.

The cardinal, tufted titmouse, mocking bird, and hooded warbler, once regarded as southern inhabitants, have been found in recent years in north central states and even in New England.

The Gulf Stream, which constantly replenishes the seafood basket in the Gulf of Mexico, has been getting warmer. But if the cold trend continues in the southern hemisphere, it is possible that the Gulf Stream, which has helped push back the Arctic ice pack hundreds of miles, would cool off.

The effect would be that the ice pack would start advancing south again. At the forefront of it icy air masses would make a Siberia of northern states and the continuation of such fronts would drop temperatures down even farther in the south.

But the economic effect would be catastrophic to Florida's seafood industry. The Gulf of Mexico produces one-fifth of all the seafood consumed in the United States annually.

Cooling of the Gulf Stream would kill much fragile life which matures in the womb of the great current. Fish would retreat farther south, the nurseries of marine life, bays and estuaries,



would become virtually barren due to intruding cold water.

As an example, the growing Florida oyster industry would be seriously affected. Due to relatively constant temperatures ranging from 75 to 80 degrees, Florida oysters mature in a year to eighteen months. It is conceivable that colder weather would lengthen the time it takes our oyster crop to mature.

In Chesapeake Bay, where temperatures are much lower the growing season for oysters is four to five years. In terms of dollars and cents, Florida's commercial and sports fishing industry pumps over \$400,000,000 annually into our economy. The effect of colder weather cannot be estimated in terms of what it might do to this important source of income.

Climatologists are suggesting, however, that the Gulf Stream is already undergoing an almost imperceptible change. This is due to a phenomenon with which pilots have been familiar for years.

This is called the jet stream. Airline pilots have hitched rides on the jet stream to speed them along on flights. The jet stream marks the southern boundary of the polar air mass which expands when it is cool and contracts when it is warm.

Thus, pilots will have to fly farther south to hitch a ride on this swift air current.

And at sea, since the limit of the polar air mass is set at the edge of the Arctic ice pack, ship captains will again have to watch out for icebergs as the pack grows southward. Icebergs that have almost vanished from the sea lanes to Europe may become serious navigational hazards again.

Of course, many of the things that happened in the warm trend will reverse. Birds, animals, fish and plants will retreat south. As the glaciers grow,

the sea level will drop, the growing season will be shorter, and so will the ice-free season on the Great Lakes to the north.

While it is true that all of the United States seems to be in for a cycle of cold weather, southern climes such as Florida will still be the warmest areas in our country, but even so we can expect less warm weather than in previous years.

The Florida Department of Agriculture suggests that if the state is to have cooler nights and days, then tomato farming may replace growing oranges as a major crop. Tomato plants will not grow unless there is a daily fluctuation of temperatures. It is doubtful though that tomatoes could replace the value of the Florida citrus industry which contributes \$1,167,000,000 annually to our economy. Freezing nights could virtually ruin this important segment of Florida's economy.

In addition, a shorter growing season could affect the whole agribusiness of the state. The cattle industry, truck farming of vegetables and melons, would be altered. At present, agribusiness represents annual sales of 4 billion dollars and a total investment of 12 billion.

Climatologists, being, however, human don't mean to scare by making cold weather predictions. But if in fact colder weather is ahead, there is another, brighter perspective in which it should be viewed.

As our climate has grown increasingly variable, plant and animal forms have become more capable of adaptation. Having to respond to changing conditions has caused plants to become more hardy and animals more intelligent. And man, who has been able to develop a technology that enables him to control more and better the environment in which he lives, may, by the time the cold is upon us, reverse the conditions that produce it.

## Two Cold-resistant Palms

When any palm confined in nature to the tropics or near-tropics can be successfully cultivated in a much colder environment, the fact should be publicized once it is known to be a fact and not just a hopeful theory. It becomes news. This seems to apply to two palms of the southern hemisphere, *Neodypsis Decaryi*, endemic in Madagascar, and *Copernicia alba* (*C. australis*, syn.), native in southern Brazil, Paraguay, northern Argentina and perhaps southeastern Bolivia.

The palm first mentioned, *Neodypsis Decaryi*, was introduced in cultivation in the United States by the Fairchild Tropical Garden some years ago and has since been rather widely distributed. It was described in *PRINCIPES* 5: 71-74, under the title "Madagascar's Three-sided Palm — *Neodypsis Decaryi*," by Robert W. Read, who states that palms of this species in the Fairchild Garden were subjected to temperatures as low as 28° F. without resulting injury. More recently a cold test of greater severity occurred and was reported upon in the Fairchild Garden *BULLETIN*, as follows:

"In a letter to F. T. G. superintendent Stanley Kiem, Mr. Edward F. Thayer of the Thayer Nursery in Stuart, Florida, described his experience with the triangle palm (*Neodypsis Decaryi*) during the cold weather of last winter (1966). On April 30th, 1966, Mr. Thayer wrote:

"We were unable to visit the Garden this spring because of all the extra work created by the 26° freeze in January. After dumping 1,500 plants, mostly palms of the *Veitchia*, *Cocos*, *Archontophoenix*, *Chrysalidocarpus*, *Ptychosperma* and *Pritchardia* genera, we decided that it would be best not to grow any more of the tender palms. *Neodypsis*

*Decaryi*, however, came through fine, almost as hardy as *Arecastrum Romanzoffianum*, and of the couple of hundred that I sold and gave to people none was killed and very little foliage damaged'."

It should be kept in mind that the palms referred to by that correspondent were still quite young and therefore presumably not so tough as older plants would have been.

Two young palms of this species in Daytona Beach were subjected to the same freeze mentioned above, but the minimum temperature was 25° F., or one degree lower than at Stuart, and very likely the twelve-hour duration of the freeze at Daytona Beach was several hours longer than at Stuart, which lies 157 miles to the south and commonly has much warmer winter temperatures. One of the two palms was near but not directly under the foliage of an oak, and the other was well out in the open — yet neither was injured in the least. Whether *N. Decaryi* can tolerate deeper cold is conjectural, but it now seems fairly well substantiated that it can withstand moderately hard freezes. Not quite all the island of Madagascar is within the tropics. According to Jumelle, this "palmier tres ornemental" was planted in the southernmost part of the island below the Tropic of Capricorn, and perhaps some inference as to its hardiness can be drawn from that. Moreover, Dr. Moore has said it is found as a wild palm at altitudes much above the 100 meters assigned to it by Jumelle (in *Flore de Madagascar*, q.v.).

All the species of *Copernicia* have proved to be either too tender, unless afforded protection, for the climate at Daytona Beach, or at best only marginal there, with the sole exception of *Coper-*



1. Of seven species of *Copernicia* grown outdoors at Daytona Beach, this eleven-year-old example of *Copernicia alba* was the only one to survive, without any form of protection, the record freeze of 1962, when the mercury dropped as low as 22° F. Photograph by Dent Smith.

*nicia alba*, the Caranday wax palm. Though a close relative of the Carnauba wax palm, which has proved not to be one of the hardier palms, *C. alba* is able to withstand hard freezes down to 22° F., and perhaps slightly lower, even though the foliage may be badly burned. A young plant in Daytona Beach (Fig. 1) has weathered all the rigors of winter there for a decade, including the record-breaking freeze of December, 1962, when the temperature remained below freezing for fourteen hours and reached a minimum of 22° F. About two-thirds of the foliage was destroyed



2. This young plant of *Neodypsis Decaryi* located in Daytona Beach, Florida, has survived unharmed twelve consecutive hours of below-freezing temperatures, with a minimum of 25° F. Photograph by Dent Smith.

by that freeze, but there was no vital injury to the palm and its recovery was rapid. Its rate of growth in the locality, however, has been only about half of that to be expected at the plantation of S. C. Johnson and Son, Inc., in Ceara, Brazil (see PRINCIPES 10: 100, for note and photographic illustrations). Mr. E. D. Kitzke, Biology Supervisor for that corporation and past President of The Palm Society, had this among other things to say about *Copernicia alba* (PRINCIPES 10: 36): It “. . . occurs as the largest stand of any species in the genus and occupies substantial areas in three countries. Dr. Klare Markley con-





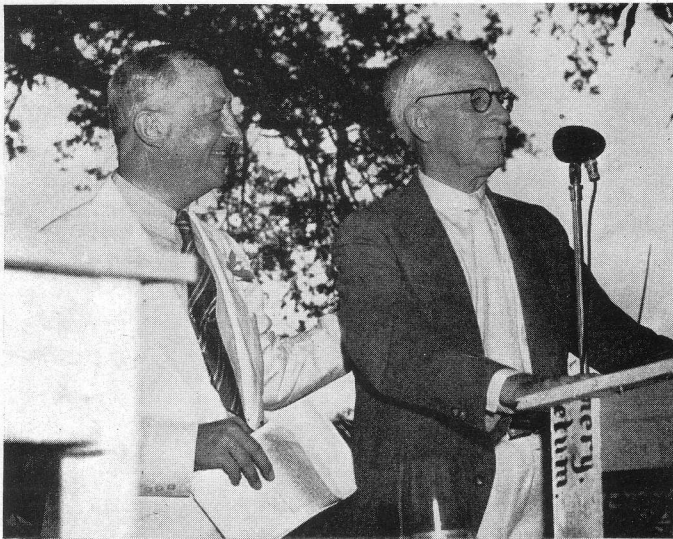
3. Perhaps not so handsome as before it had erected a few feet of trunk, this specimen of *Neodypsis Decaryi* in the Fairchild Garden is nevertheless a palm of distinctive form and "personality."  
Photograph by Dent Smith.

servatively estimated from aerial reconnaissance photographs that over one billion trees occur in the Gran Chaco region. It is also the fastest growing of the *Copernicia* species, attaining 8 feet in 3 years." Of course the palm will not grow so rapidly in regions cold enough in winter to slow down the growth rate of plants generally, but the slower growth does not affect its vitality and appearance.

For those who cannot grow other species of *Copernicia*, *C. alba* would seem to fill a void if yet another fan palm is desired. It is of moderate size, with a leaf crown considerably smaller

than that of *Livistona chinensis*, and apparently less than a third so large as that of the massive *Sabal causiarum*. Cold tolerant, rapid growing and resistant to drought, *C. alba* has much in its favor for dooryards and gardens. The leaf petioles are armed, nevertheless, with strong recurved spines capable of inflicting severe wounds upon the unwary. Apart from this defect, if it is one, the plants are not believed to be now available in the nursery trade, and so to grow this palm would probably mean starting from scratch with the seed.

— D. S.



Robert H. Montgomery and David Fairchild  
March 23, 1938