



PRINCIPES

Journal of The Palm Society

July, 1962
Vol. 6, No. 3

THE PALM SOCIETY

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

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PRINCIPES

JOURNAL OF THE PALM SOCIETY

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:

Paul H. Allen, David Barry, Jr., Duncan Clement, Walter H. Hodge, Eugene D. Kitzke, Harold F. Loomis, Nixon Smiley, Dent Smith.

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Cover Picture

A branched *Coccothrinax argentata* photographed at Eleuthera Island, Bahama Islands, August, 1961, by Nixon Smiley, Director of the Fairchild Tropical Garden

Mailed at Miami, Florida, July 2, 1962

NEWS OF THE SOCIETY

REPORT OF THE BIENNIAL MEETING

At 10:00 a.m. on Saturday, April 14th, 1962, members began to gather for The Palm Society's official meeting, which takes place in alternate years. An hour earlier those who were acting as hosts and helping in many other capacities had already arrived to put the finishing touches on exhibits, man the registration tables and do all the last-minute chores. The Garden House at Fairchild Tropical Garden had been transformed, through many hours of hard work, into a series of palm gardens and exhibits which enchanted our visiting members and their guests.

John E. Turner was chairman of the exhibits and decorations committee. He and his committee made some ambitious plans, which were carried out with great success. Mrs. George F. Adams volunteered to take charge of arranging the palm fronds, inflorescences and fruits, most of which were obtained from the estate of Mrs. Alvin R. Jennings, a director of the Society, through her generosity and the valuable help of the estate superintendent, Mr. Ray Vernon. Truckloads of material arrived, and Maria Adams, with the help of the strong backs and willing hearts of P. B. Tomlinson, James R. Coad, Melvin Andrews, Harold White, Russell Lawrence, Mrs. W. C. Gorman, Mrs. Richard Hoeller and others, lugged large palm trunks, huge fronds, colorful inflorescences and fruit clusters, placed them artistically against woven palm matting on, in front of, and at each side of the speakers' platform. The fragrance of some of the palm flowers, notably the orange *Arenga Engleri*, permeated the entire auditorium, even filtering out into the Fountain Court to greet arrivals as they entered the grounds. The many genera and species were clearly labeled with black-and-

white plastic markers, made by Scott Donachie, staff member at Fairchild Garden.

Registration tables, on the loggia outside the auditorium, were "manned" by members Mrs. F. E. Harlow, Mrs. T. R. Baumgartner, Mrs. M. S. H. Kneale and Mrs. H. L. Nies. As members registered, they were presented with name badges beautifully lettered by Harvey Beswick.

As they entered the auditorium, they were greeted by two lovely palm gardens. The one on the right was the work of Alix, Landscape Decor, who used tall stalks of *Paurotis Wrightii*, massed chamaedoreas and other small palms, with orchids and bromels for color. Opposite this small garden was a charming bamboo fence, backed and fronted with various unusual species of small palms, and hung with orchids and bromeliads. This was created by Ray Stoner, who at the time was associated with R. G. Wilson, owner of Fantastic Gardens. Alix and Mr. Stoner were ably assisted by another of our members, Helmuth Dressler. Attractive signs for these and some of the other exhibits were furnished by Mrs. E. G. Piper.

In another corner, member Robert W. Read had established a colorful coconut display. A full-grown dwarf Malay coconut towered over a thatched hut where commercial palm products were arrayed—hearts of palm, coconut candies and flakes, etc. Jim Coad presided over the green coconuts, opening them, adding a straw and offering them to visitors for a taste of the refreshing milk. Some of the out-of-town guests received gifts of freshly woven coconut leaf hats.

From Fairchild Garden's greenhouse and slathouse John Turner and Maria Adams had brought some of the rarest and choicest infant palms, such as *Cyrtostachys Lakka*, *Areca Langloisiana* and a dozen others, to be admired and

coveted by our avid collectors. Enlargements of color photographs of the mature plants, gave an idea of their beauty when fully grown. Nat De Leon brought a table-full of miniature palms, with a sign saying: "Who says a palm *has* to be big?," which attracted attention.

Among the economic exhibits was a handsome rattan chair, made of a species of *Calamus*, with rug, drapery and lamp forming a harmonious group. A small golden coconut and a spray of the orange flowers of *Arenga Engleri* added the final touch to the handsome group loaned by Richard Plumer, Interiors. There was also a collection of brooms and brushes made of the fibers of the piassava palm (*Attalea funifera*), courtesy of the Fuller Brush Company.

A popular feature of the show was a contest among local members, showing their favorite palm, with any accessories which might add to its educational or artistic values. These, of necessity, were young plants in containers, and some very outstanding palms were entered. This contest was under the direction of Mrs. R. C. Robertson. The judges, all from out-of-town, were the Society's president, Eugene D. Kitzke, Dr. Frits Went, Director of the Missouri Botanical Garden, and the eminent botanical painter, member Lee Adams. First prize ribbon went to Lucita Wait, second to Mrs. George F. Adams, third to Mrs. Paul Buhler and honorable mention to Mrs. Theodore Buhler.

After seeing the exhibits inside the building, members were invited to tour the Garden's palm collection aboard the Fairchild Rambler, with Nat De Leon as able guide. The tour ended at the Garden's new laboratories, where Dr. P. B. Tomlinson and Robert Read were hosts in their respective offices, showing and describing the scientific research they are conducting.

Tables and chairs had been set up under the large *Phoenix canariensis* beside the Garden House; about 90 persons were served a picnic lunch and had further opportunity to visit and exchange palm talk.

The formal meeting began at 2:00 p.m. Nixon Smiley, director of the Fairchild Garden, welcomed the Society. The minutes of the previous meeting were read and approved. Then the President, Secretary and Treasurer presented their reports for the biennium. In the absence of the Treasurer, who could not be present for business reasons, Robert Lair read his report. The President thanked Mr. Murray for the outstanding job he has done, and thanked Mrs. Murray also, for her work as "assistant treasurer."

The President then called on Dent Smith, chairman of the nominating committee for his report. He presented the following slate of officers for the coming biennium:

President: David Barry, Jr., Los Angeles, Calif.

Vice-president: Nat J. De Leon, South Miami, Florida.

Treasurer: Mrs. Malcolm S. H. Kneale, Coral Gables, Florida.

Secretary: Mrs. L. H. Wait, South Miami, Fla.

The President called for nominations from the floor. There being none, Mr. Billings MacArthur moved for a unanimous vote in favor of the slate as presented. The motion was seconded and carried. Mr. Smith then presented the list of names to be voted on for directors of the Society: Paul H. Allen, David Barry, Jr., Nat J. De Leon, Mrs. David Fairchild, William Hertrich, Walter H. Hodge, Mrs. Alvin R. Jennings, Eugene D. Kitzke, Harold F. Loomis, Harold E. Moore, Jr., Nixon Smiley. Nominations from the floor were called for. Col. E. G. Piper nominated Walter J. Murray and

Dent Smith. Mr. John T. Ogden nominated Mrs. E. G. Henriquez. Mr. Willard Hubbell moved that the nominations be closed. Mr. MacArthur moved that the slate be put to the vote. The motion was seconded and passed. The slate was elected.

* * *

Following a ten-minute break, the audience returned to hear the program.

Nat De Leon told about some experiments he is carrying on in the use of the new systemic insect poisons, which are absorbed into the plant tissues and from them into the bodies of chewing and sucking insects with fatal results. Rows of small palms were arranged, and alternate rows were treated with two different makes of systemic poisons in varying dosages: $\frac{1}{4}$ teaspoon and $\frac{1}{2}$ teaspoon respectively. Alternate rows were left untreated as controls. Twenty-one days later the treated rows were free of pests, while the untreated rows were infested. The amount of dosage apparently did not affect the results. These tests are incomplete, he said, as only a few species of palms were tested. The systemics are still in the experimental stage and are available only to commercial growers. Being extremely poisonous to human beings as well as insects, they must be used with great caution.

Dent Smith spoke on some remarkable cases of the regrowth of palm buds after seemingly total destruction. He indicated that we should not despair of the life of some palms if the dead and decaying material is carefully cleared away down to live tissue. He also suggested that further study of this regeneration should be made, and that we need not blindly accept the dictum that "once the bud is dead the palm is dead."

A round table, moderated by Nixon Smiley, followed. Brief talks were given by T. R. Baumgartner on palm nutrients,

H. F. Loomis on using the proper palm in the proper place and James Vosters on the problems of the wholesale palm grower. A question and answer period followed. The meeting was adjourned at 5 p.m.

* * *

We met again for dinner in the Starlight Room of the Biscayne Terrace Hotel. Mrs. George Simmons made an exquisite arrangement of silver palm (*Coccothrinax argentata*) leaves for the speakers' table, and the place cards, made by Mrs. H. F. Loomis, were tiny coconut palms with heads made of living *Tillandsia fasciculata*. Centerpieces for the smaller tables were boat-shaped spathes of *Attalea* species, filled with colorful fruits, chiefly *Ptychosperma elegans*. Mrs. Loomis and Mrs. Harvey Beswick helped with the decorations.

After dinner we had the pleasure of hearing a most witty as well as informative illustrated lecture by Dr. Frits Went, Director of the Missouri Botanical Garden, St. Louis, Mo. He told and showed how the fabulous new Climatron has replaced the huge old glasshouse there, and of the method used to create individual climates to suit the requirements of various climatological types of plants.

* * *

On the following afternoon, Sunday, the Society's exhibit at Fairchild Garden was opened to the public. Several hundred persons came to see and lingered, admiring and asking questions.

Members divided into two groups; one group spent several hours looking at mature palms in the collections of the A. R. Jennings estate and the U. S. Plant Introduction Station (Chapman Field). The other group visited nurseries to see young palms in containers and in the field. The weather was good, and everyone apparently had an enjoyable time. However, we missed the several hundred

of you who were not able to attend. Perhaps two years from now? We hope so.

LUCITA H. WAIT

REPORT OF THE SECRETARY

April 23, 1960—April 14, 1962

Under the able guidance of our president, Eugene D. Kitzke, and with the staunch help of many other members, your Society has moved along, making progress in several areas, during the past two years. To our sorrow, several members passed away during the biennium: Mr. F. Cecil Baker, of Florida and Vermont, Dr. H. H. Bartlett of the University of Michigan, Dr. B. E. Dahlgren of the Chicago Museum of Natural History, Mr. A. C. Margraff of the U. S. Plant Introduction Station, Miami, Mr. Robert H. Ohlinger of Babson Park, Fla., Mr. Seimei Oshioka of Osaka, Japan and Mr. Ralph Peer of California.

The number of members has remained fairly constant. We have added 148 new members. There have been 22 resignations, and more than 100 members have simply dropped out, but we are never willing to give them up entirely, and continue to hope that some, at least, will decide to resume their memberships. The total membership today is 451, of whom 54 are citizens of countries other than the United States. In the near future we shall publish a new roster of all members with their addresses. Seventy universities, botanical institutions and other scientific organizations subscribe to *PRINCIPES* for their libraries.

The Seed Bank, a service of the Society which is very popular with many of our members, especially where seeds and plants are hard to obtain, has been operating at a greatly increased rate. There are 69 actively participating members, while several others are on the list

only for the very new and rare species which are occasionally received. Due to the generosity of Fairchild Tropical Garden, Mrs. A. R. Jennings and the U. S. Plant Introduction Station, Nat De Leon has been able to secure a steady supply of seeds as they ripen. After being cleaned and dried they are turned over to the secretary, who packages and mails them and keeps the records. She has sent out 648 packages, and the Society has been reimbursed for 478 of these. Mr. R. H. Nelson has filled requests for seeds of species which fruit more prolifically in California than in Florida. We have received seeds of palms which are rare on the mainland of the United States from Mr. Ernest Todd of Australia, Mr. Hein Wicht of South Africa and the H. L. Lyon Arboretum of Hawaii. We are grateful to all these gentlemen for their interest and help.

The out-going treasurer, Walter Murray, and his wife Evelyn did an outstanding job, working long hours on the change in fiscal policy, keeping a beautiful set of records, and generally maintaining the solvency of the Society, which was greatly aided by the substantial grant from the S. C. Johnson & Son Fund. Mrs. Murray made many trips to the bank with deposits, mailed the membership cards and helped in many other ways to lighten the load of a very busy husband. We cannot thank them enough for their faithful and valuable assistance.

To all the other friends who helped mail out *PRINCIPES*, addressed and stuffed envelopes, worked hard on the preparations for the biennial meeting and served in other ways, and to Fairchild Garden Superintendent Stanley Kiem and his helpful and cooperative staff, my sincerest gratitude.

LUCITA H. WAIT

REPORT OF THE TREASURER

For the Term April 23, 1960 to April 14, 1962

Balance April 23, 1960			\$1,297.99
Operating funds	\$868.99		
Reservations biennial meeting	429.00		
Income:			
Members' contributions	\$8,467.90		
Grants from The Johnson Wax Fund	1,000.00		
Subscriptions to Principes	829.20		
Publications	411.47		
Advertisements	38.45		
Seeds	278.30		
Miscellaneous	19.87		
1960 biennial meeting receipts	111.00	\$11,156.19	
Expenditures:			
Printing	\$5,957.15		
Postage	274.00		
Secretary's salary (net after taxes)	2,300.00		
Income and F.I.C.A. taxes withheld, and employer's F.I.C.A. tax	416.93		
Miscellaneous (petty cash, office equipment, bank charges, membership in American Horticultural Society, etc.)	913.68		
1960 biennial meeting	560.34	10,422.10	
Excess of income over expenditures		734.09	
Balance April 14, 1962			\$2,032.08

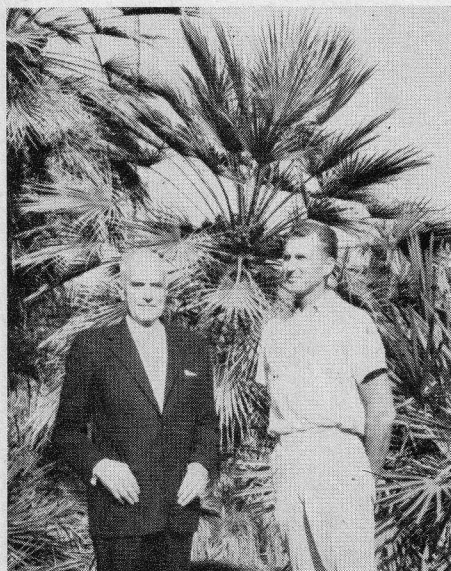
Respectfully submitted,
WALTER J. MURRAY, *Treasurer*

THE SOCIETY'S NEW TREASURER

Mrs. Malcolm S. H. Kneale was born Maria Eddelia de Cardenas, a native of Havana, Cuba. She graduated from the Collegio de la Inmaculada there, with a degree in business, then attended Miami University, Oxford, Ohio, where she majored in English. She came to Miami, Florida in 1958, and married attorney M. S. H. Kneale in March, 1959.

Mrs. Kneale is a pianist, flamenco dancer and singer. She confesses that when she was married she knew nothing at all about plants. Now, however, she takes a great deal of interest and pleasure in her husband's collection, which includes 159 species of palms.





49. William Hertrich and Edwin Moore at Huntington Gardens, California.

The California group met recently at the Los Angeles State and County Arboretum. Officers elected to serve for the coming year are: Leslie H. Miller, Costa Mesa, Chairman, and Mrs. Edwin W. Moore, San Diego, Secretary. All California members who wish to be notified of meetings and trips, please send Mrs. Moore, at 1159 Missouri St., San Diego 9, several postcards addressed to yourself. Those who do not send the cards run the risk of missing some good times. Edwin Moore showed his slides of Mexican palms. There was a sale of palms donated by members to raise funds for the expenses of the group. After refreshments, the Arboretum's palm collection was toured.

* * *

The Florida group has toured several palm collections in recent months, including the Jennings estate, the U. S. Plant Introduction Station, the Sub-Tropical Experiment Station and the gardens of Mr. and Mrs. M. S. H. Kneale, Rev. and Mrs. F. E. Harlow and Mr. John E. Turner. Secretary of this group

is Mrs. T. C. Buhler, 1320 S. Venetian Way, Miami 39. She will be glad to receive self-addressed cards from Florida members.

* * *

Mr. William T. Sisson, of Fort Lauderdale, Florida, died suddenly, recently, at the age of forty-four. Mrs. Sisson has presented to the Society, as a memorial, his beautifully bound set of *PRINCIPES*. Our sympathy to her and to her daughters.

* * *

Count F. M. Knuth, of Knuthenborg, Denmark, has sent to the Society a series of color photographs taken by him on a recent visit to the Seychelles Islands, as he returned from the Cook Islands.

* * *

Mr. and Mrs. A. C. Langlois are on their way to Madagascar. They left Nassau, Bahamas still without visas for the Mali Republic, but were hoping to secure them in France. We wish them good fortune on their long-desired visit to the home of the *Neodypsis* and many another gorgeous palm.

LUCITA H. WAIT

BROR ERIC DAHLGREN

March 17, 1877—December 16, 1961

Dr. Bror Eric Dahlgren died suddenly of a heart attack at his home on Saturday, December 16, 1961. He will be remembered for his lifetime work with plants, particularly with palms.

Thus has ended a long and varied career that began with emigration from his native Sweden to the United States when he was in his teens. He did his graduate work at the University of Minnesota and also pursued elective studies at Cornell and Columbia Universities.

At the turn of the century, he became interested in museum work through acquaintances on the staff of the American Museum of Natural History. During this early period he volunteered a

great deal of his time and natural talent to assisting in problems of museum exhibition. In 1904 he accepted the position as Curator, Department of Preparation and Installation, at the American Museum of Natural History.

In 1909 his work had become widely appreciated and the Field Museum in Chicago induced him to accept the position of Head, Division of Modeling, Department of Botany. Thus was initiated a program of botanical exhibition that has resulted in the Stanley Field Collection of Plant Models and botanical exhibits considered to be the finest anywhere. Dr. B. E. Dahlgren progressively became Assistant Curator of Economic Botany in 1911, Associate Curator of Economic Botany in 1921, and Acting Curator of Botany in 1924. He became Curator of Botany in 1935, a title that was changed the following year to Chief Curator of Botany in connection with a reorganization of Museum staff.

In the period between 1912 and 1917 Dr. Dahlgren was also connected with the Wister Institute of Anatomy and Biology of Philadelphia, and also engaged in the preparation of exhibits for the United States Public Health Service and the Pennsylvania State Board of Health for display at the San Diego Exposition in 1916.

Dr. Dahlgren conducted a number of botanical collecting expeditions beginning in 1909 in Jamaica to obtain material for models of tropical and semi-tropical fruits. Collecting trips to British Guiana and Brazil resulted in an extensive collection of palm materials for the express purpose of exhibition.

The need to organize and identify the palm collections made in British Guiana and Brazil led to the publication of an "Index of American Palms" in *Fieldiana: Botany* in 1936. During his work on the Index, he encountered a publication in Spanish by Hipólito Ruiz

López, "Travels of Ruiz, Pavon and Dombey in Peru and Chile (1777-1788)" which he felt merited translation into English. In order to do this, he studied Spanish and his translation of this work was published in 1940.

Among the more spectacular exhibits planned and directed by Dr. Dahlgren is that of the restoration of a Carboniferous forest, on display at the Chicago Natural History Museum. This restoration has been accepted as a valid attempt to visualize the vegetation of a past era, and illustrations of the groups have appeared in most textbooks of geology published since the completion of the exhibit.

During the past 25 years the major efforts of Dr. Dahlgren have been field and taxonomic studies of palms. Particularly special emphasis has been given to the South American palms and intensive studies devoted to the genus *Copernicia*.

This special interest in *Copernicia* began in 1935 when he joined the Car-nauba Expedition made by personnel of the S. C. Johnson & Son, Inc. Observations during this period began an unraveling of a skein of field observations that were to involve palms in Brazil, Colombia, Paraguay, Haiti, and Cuba. It is in Cuba that the puzzle became especially challenging since over 20 species were reported. The entire South American continent on the other hand has only three species in genus *Copernicia*, each isolated from the other by large land areas. The widely known commercial wax-producing palm *Copernicia cerifera* Martius is found only in Northeast Brazil. The interesting *Copernicia tectorum* is found in two separate areas in Venezuela and Colombia. The largest stand of *Copernicia* in the world occurs in a sprawling distribution of *Copernicia alba* over most of Paraguay into Bolivia, Argentina and Brazil.

The recent publication in *Gentes Herbarum*, Vol. 9, Fasc. 1, August 1961 of "A Revision of the Genus *Copernicia*, 1. South American Species," provides insight into this work.

Dr. Glassman, his co-worker in recent years, is completing their joint effort, and a second part dealing with West Indian species is forthcoming. These two works will serve as monuments to a man whose modesty and unwillingness to talk about himself also tended to restrain early publication resulting from his scientific research.

Those of us who had the pleasure of working in the field with this gentleman-botanist know that his fine hand and eye required many hours in the hot sun to achieve the perfection of record that would satisfy him. He spoke fluent Spanish, a talent that won him friends among the professionals and rural peoples alike. Cubans were his co-workers for years in gaining access to remote parts of the island to collect leaves, flowers, seeds. This entailed many visits to the same sites to collect different stages and sometimes an entire year was lost when flowers of a particular species were the prize sought and for lack of information the timing of the field trip fell weeks short.

The precision and comprehensive details that he required necessitated many repeat visits and collections and photographs resulting in the largest and most diversified assemblage of *Copernicia* material. These have been most important in the recent publications in his name.

Those of us who were on field trips with him could give lengthy accounts with ample details to delineate his character. However, the quotation below from H. F. Johnson's "Carnauba Expedition" perhaps will suffice. It crystallizes a Dr. Dahlgren of 1936 who was just beginning to embark on an adven-

ture with *Copernicia* that was to last until his death last December. Interestingly it very nearly describes the Dr. Dahlgren of 1961.

"... because of his knowledge of plant life in Brazil, his sympathetic understanding of the natives and his ability to speak Portuguese fluently.

"He was a tall, rangy individual, with clothes hung loosely on his lean body. Hawked nose, small piercing eyes. He was the eldest member of our group now and by far the most energetic. He was always in a hurry."

It was in 1890 that Dr. Dahlgren married Miss Jane Means of Geneva, New York, and it is in Geneva that he is buried at the Means family cemetery plot.

E. D. KITZKE

THE EDITOR'S CORNER

The Editor's Corner is a handy way of filling the odd bit of space that remains when PRINCIPES has been pasted up for the printer. The Editor has several messages for July. Firstly, the supply of articles not used for the handbook "Cultivated Palms" but appearing in PRINCIPES is dwindling rapidly. Members who have articles in mind but unwritten are urged to put them on paper for consideration by the editorial board.

Secondly, members who miss accounts of all new officers (see page 83) may wish to read again the earlier biographical sketches of officers who are serving in new capacities for the next two years: David Barry, Jr., in PRINCIPES 4: 80, 1960; Nat J. De Leon and Lucita H. Wait in PRINCIPES 1: 75-76, 1957.

Some time ago Dent Smith sent a photograph of Mr. William Hertrich, author of *Palms and Cycads*, and Ed Moore thinking that members might enjoy seeing these California members. The photograph appears on page 84.

The Possibility of Mycorrhizae in Palms

DAVID BARRY, JR.

In 1935 I secured seeds of *Pinanga Elmeri* from Baguio, Island of Luzon, Philippines, through the cooperation of their Department of Agriculture and Commerce. I had sought this palm because Baguio is semi-tropical. It has pine trees and occasional frosts. I had hoped to find another exotic palm that would live in the semi-tropical climate of Southern California. The seeds produced about twenty plants which died as soon as the endosperm in each seed became exhausted, in spite of every cultural effort known to me.

In 1957 I went up from Manila to Baguio to see this palm. It is pinnate, with a smooth green trunk about one and one-half inches in diameter. The leaves are attached to the trunk with wide spacing, giving the plant an open, scraggly appearance.

About twenty-five years ago I secured seeds of the "Robinson Crusoe Palm," *Juania australis*, from the islands of Juan Fernandez, 365 miles off the coast of Chile. It was on one of these islands that Alexander Selkirk, reputed hero of Defoe's romance, was put ashore in 1704 and taken off in 1709.

Again my objective was to find a new palm for the coastal belt of Southern California. In the case of this species, the prospect of success seemed good, as the Juan Fernandez Islands are in 30° South Latitude, and are bathed in the cold Humboldt Current. Much to my delight, the seeds germinated readily. They were about the size of the seeds of *Archontophoenix*, and the development of the seedlings was in the same manner as in that palm. Martius called the palm *Ceroxylon australe*.

When the third leaf began to emerge, and when the endosperm in the seed was consumed, the plantlets died. I tried in vain a series of different potting mixtures in an attempt to save some of the plantlets.

I had sent some of the seeds to Julien Marnier-Lapostolle, a skilled horticulturist of St. Jean Cap-Ferrat on the French Riviera. After good germination he lost his seedlings.

From time to time during the last twenty-five years I have had good success in germinating seeds of several species of *Ceroxylon*, the South American wax palms native to the mountains of Venezuela, Colombia, Ecuador, and Peru. In one experience the plantlets died as described above. In others, the plants were grown large enough to transfer to gallon containers. Some of the plants were distributed and further experience with them is not known. No plants remain on hand, as all gradually declined and died.

These and other palms are a great challenge to any one working in the field of palm introduction. Dr. Miriam L. Bomhard, in *The Wax Palms* (*Smithsonian Publication* 3429, 1937), designated species for different areas along the Pacific coast from Washington to San Diego.

Her enthusiasm for these palms was without limit. She wrote, "... the wax palms ... are not only beautiful columnar trees but are probably the most remarkable palms in the world. They far exceed the most hopeful anticipations of the palm enthusiast; they are the princes of the 'Principes'!" Perhaps her predictions of establishing these palms will

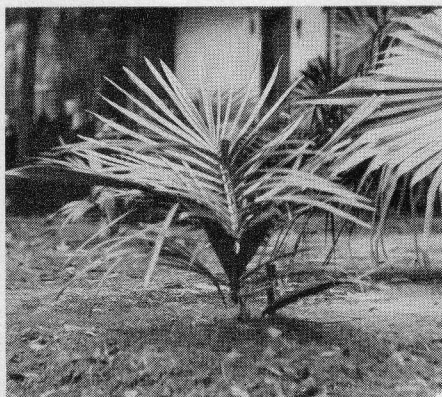
some day come true when the problems involved are better understood.

The failures described above were taken more or less in stride, with the run of luck that is part of plant introduction. However, a recent adventure has about changed my attitude toward such losses. Perhaps they may be prevented.

Last year I secured from Nairobi several hundred seeds of *Colvillea racemosa*, a close and attractive relative of *Poinciana regia*, and also native to Madagascar. The leguminous, hard seeds were scored with the sharp edge of a three corner file before being placed in a seed bed. Germination was quick and uniform. The plantlets reached a height of five inches, consumed the endosperm, and died. However, this story does not end here. I was then offered some seeds by a Japanese seed house, bought them, planted in the same manner as the first lot, and in the same propagating house. These plantlets did not die. The reason that the second lot of plantlets went on to live may be that a certain fungus accompanied the seeds from the Japanese source, whereas the seeds from Nairobi were free of the fungus. In both seed lots the seeds were clean to the eye, and had been removed from the pods.

The experience with the first lot of *Colvillea* seeds was similar to my failures with the palm seeds. The success with the second lot suggested that I might have succeeded with the palm seeds if I had found a favorable condition, or had supplied some missing element.

The conclusion, or conjecture, at this writing is the possibility in some palms of the existence of a mycorrhiza, a fungus which lives in close relationship with their roots. It is known that certain



50. A young plant of *Ceroxylon* sp. at the Riverside home of J. Harrison Wright about 1917.

trees introduced from certain parts of the world must be accompanied by a certain fungus that does not exist in the new area.

Other palm growers have tried to introduce *Ceroxylon* to California. According to an historical account in *Southern California Gardens*, by Victoria Padilla, Francesco Franceschi, of Santa Barbara, the proprietor of the Southern California Acclimatizing Association, introduced *Ceroxylon alpinum* (*C. andicola*) in 1908. He maintained that this introduction was one of his greatest triumphs. None of his plants is known to have survived. One echo remains. Franceschi's friend, J. Harrison Wright, of Riverside, an ardent and successful worker in palm introduction, grew a *Ceroxylon* species outdoors from 1909 to 1917. ⁽¹⁾ The accompanying photograph of this plant was given to me by Mr. Wright who stated that it died during a period of excessive heat in the summer. It can be presumed that this plant was one of Franceschi's, for Mr. Wright bought plants from him.

How did this palm live for eight years without its essential fungus? The answer

⁽¹⁾ This incident referred to in a footnote by Bomhard in "The Wax Palms."

is that it probably had its fungus. The Plant Quarantine Act was not passed until 1912, with the resulting practice of seed-cleaning and fumigation. Franceschi grew the palm in 1908. It is likely that the seeds sent to him were picked up from the ground around the parent plant or plants where they had been inoculated with the fungus. The alternative for the seed collector would have been to fell the tree. If Mr. Wright's palm had been planted in the coastal belt, and not in an interior valley of hot summers, it might be alive today.

There is much to be done in the world wide distribution and dissemination of palms. The introduction and establishment of such palms as *Ceroxylon* to the coastal area of the Pacific states is a very small part of the whole. Overcoming the apparent problems related to *Ceroxylon* may point the way toward solving problems that relate to palm introduction in general.

Dr. Edward HacsKaylo, Plant Physiologist, Division of Forest Management Research, to whom this subject was referred, states that he has "no definite information regarding the essentiality of mycorrhizae in the survival of palms. We have no record of such studies having been made anywhere." He suggests that a method of "inoculating seedlings is by introduction of small quantities of the soil from beneath a native stand of the host tree." Dr. HacsKaylo does not know whether the fleshy or fibrous seed coats would carry the desired organisms. Although this method has been often suggested, it is probably not very sure.

As a condition of entry of palm seeds into the United States, and into many other countries, the fibrous or fleshy coverings of palm seeds and all soil must be removed. However, from information furnished by F. A. Johnston, Chief, Technical Services, United

States Department of Agriculture, Plant Quarantine Division, permits will be issued for the entry and clearance of mycorrhizal fungi and soil samples containing fungi, humus, leaves, plant litter and other organic matter. His department will provide an application form for such permits, entitled "Application for Permit to Move Living Plant Pests." Shipment under such permits could accompany the shipment of seeds with the permits regularly used for seed importations.

The routine fumigation of palm seeds as a condition of entry would destroy any accompanying essential fungus. Mr. Johnston added the information that his department would be agreeable to the proposal that small quantities of palm seeds and their seed coverings which were separated from the seeds before shipment, be released without fumigation of the seed coverings if a thorough inspection should reveal no injurious pests.

Through such cooperation experiments are now possible. It would be evident to the experimenter that the seed beds should be inoculated with the fungus-carrying soil, seed coverings, or litter.

It is possible that I have been confusing the lack of trace elements in the soil with the lack of fungus. However, within the last three years the application of trace elements to *Ceroxylon* plants did not appear to help them, so I am inclined to discount this possibility.

Dr. HacsKaylo, in an article on mycorrhizae that appeared in *The National Horticultural Magazine*, July, 1958, stated that, "Mycorrhizae of trees develop most extensively in acid soils, probably because the fungi, at least those studied so far, all require an acid medium. It has frequently been postulated that the acid soil requirements of

many species of plants, such as azaleas and rhododendrons, are really the requirements of their mycorrhizal fungi." This statement should influence the grower to use an acid medium.

I hope that the problems involved will be a ready challenge to fellow palm growers, and that our society will be a clearing house for the reporting of their experiences.

Exotic Palms in the Western World II

ARECA LANGLOISIANA

HAROLD E. MOORE, JR.

An account of some palms introduced into cultivation by the Fairchild Tropical Garden Expedition of 1940 appeared in *Gentes Herbarum* 8: 295-315, 1953, wherein *Drymophloeus* and *Siphokentia* were considered. Another handsome palm collected on the expedition (Number 208) and successfully grown by Mr. and Mrs. A. C. Langlois at "The Retreat," Nassau, Bahama Islands, has recently been described as a new species by Dr. Eva Potztal of the Botanical Museum at Berlin-Dahlem, Germany, under the name *Areca Langloisiana* (*Willdenowia* 2: 628. 1960). Specimens for Dr. Potztal's study were provided by Mr. Langlois from the plant in his garden at Nassau. Apart from one plant on the grounds of Mrs. Archbold's estate at Nassau, no other survivors from the original lot of seed, sent also to Florida and the Philippines, are known to exist, but offspring from the Langlois' plant are now grown elsewhere.

Seed of *Areca Langloisiana* was collected by Hugo Curran and Edward P. Beckwith in February, 1940, on the slopes of the volcano Sapoetan above a rest-house at Noongan back of Manado on the Minahassa Peninsula of Celebes Island (Sulawesi), Indonesia. Dr. David Fairchild described the event on page 105 of his delightful book *Garden Islands of the Great East* (Charles Scribner's Sons, 1943) as follows: "Hugo and Ned set off up the slopes of Sapoetan with cameras . . . Quite unexpectedly

they discovered three other very handsome palms; one an *Areca* with lacquer-red sheaths, reminding me of the famous "lacquer palm," *Cyrtostachys lakka*, rare even in botanic gardens. This is a larger palm with stilt roots and large fruits an inch long, a beautiful red in color like the stem on which they are borne."

From the time I first saw *Areca Langloisiana* at The Retreat in 1951, I have been perplexed by the difference in color between the lacquer-red sheaths described by Dr. Fairchild and the orange sheaths of the cultivated *Areca* "208" as it has been called. A very pleasant afternoon spent with Mr. Beckwith at his home in Garrison, New York, in early June of this year has answered my questions at least in part. He not only gave me his account of the day when 208 was collected from memory and his journal, but had set up projectors for color transparencies and for movies in color.

Mr. Beckwith recalled the day as a rainy one when he and Hugo Curran set out. On the way, they added to the party two local helpers who assisted in clearing the dense undergrowth to make photography possible. A color transparency was obtained of the red-sheathed *Areca*, and a handsome tree it must have been. In addition, both a color transparency and movies were obtained of a second *Areca* not mentioned by Dr. Fairchild which had taller, slender, clus-



51. *Areca Langloisiana* at Springfield Estate, Dominica, twelve years old. Photograph by W. H. Hodge.

tered stems tipped with crownshafts of orange sheaths and rather dense crowns of leaves. Several clumps of this orange *Areca* grew on the same slopes but in a location removed from that of the red *Areca*. Mist covers these slopes a large part of the time making them damp and chilly and rendering photography difficult, yet the orange sheaths of the second *Areca* were in marked contrast to the red sheaths of the first. I concur with Mr. Beckwith in thinking the two clearly distinct, at least so far as color is concerned. Whether two species or

color variants of a single species are represented by these photographs cannot be stated without revisiting Sapoetan for no specimens, which might have given a clue, have been preserved.

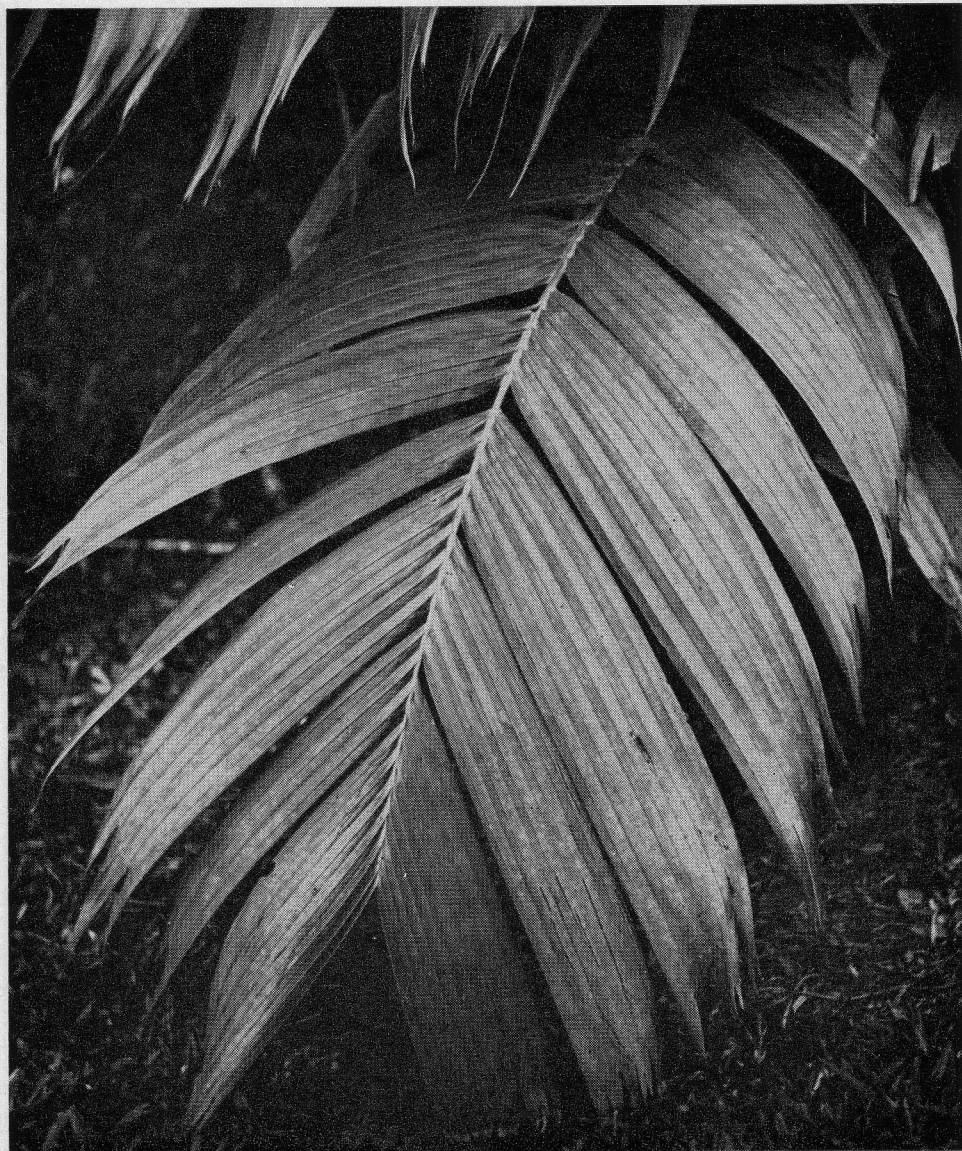
Dr. Walter Hodge, while visiting Dominica in 1961, photographed a second-generation plant of *Areca Langloisiana* grown at the Springfield Estate of Mr. John Archbold from seed sent to Dominica by Mrs. Langlois in August, 1949 (Figs. 51, 52, 53). Color transparencies show the persistence of orange sheath-color in this plant, albeit some-



52. A young plant of *Areca Langloisiana* on Dominica shows beginnings of aerial roots and inflorescences below the leaves. Photograph by W. H. Hodge.

what more intense than in my color transparencies of sheaths of the Langlois' plant taken for specimens in 1951. Mrs. Langlois writes: "I have seen with our plant that the orange can change into a deep orange-red." One may now only hope that someday it will be possible to collect and study again the arecas of Sapoetan to determine whether sheath-color is truly of specific import,

ance thus suggesting that seed of the two arecas was confused in 1940. Even more, one may hope that a study of *Areca* in Celebes and nearby islands will clarify not only color differences but the relationship of *Areca Langloisiana* to the very closely allied *Areca vestiaria*, *A. paniculata*, *A. Henricii*, and *A. leptopetala* with which it belongs in the section *Mischophloeus* of the genus.

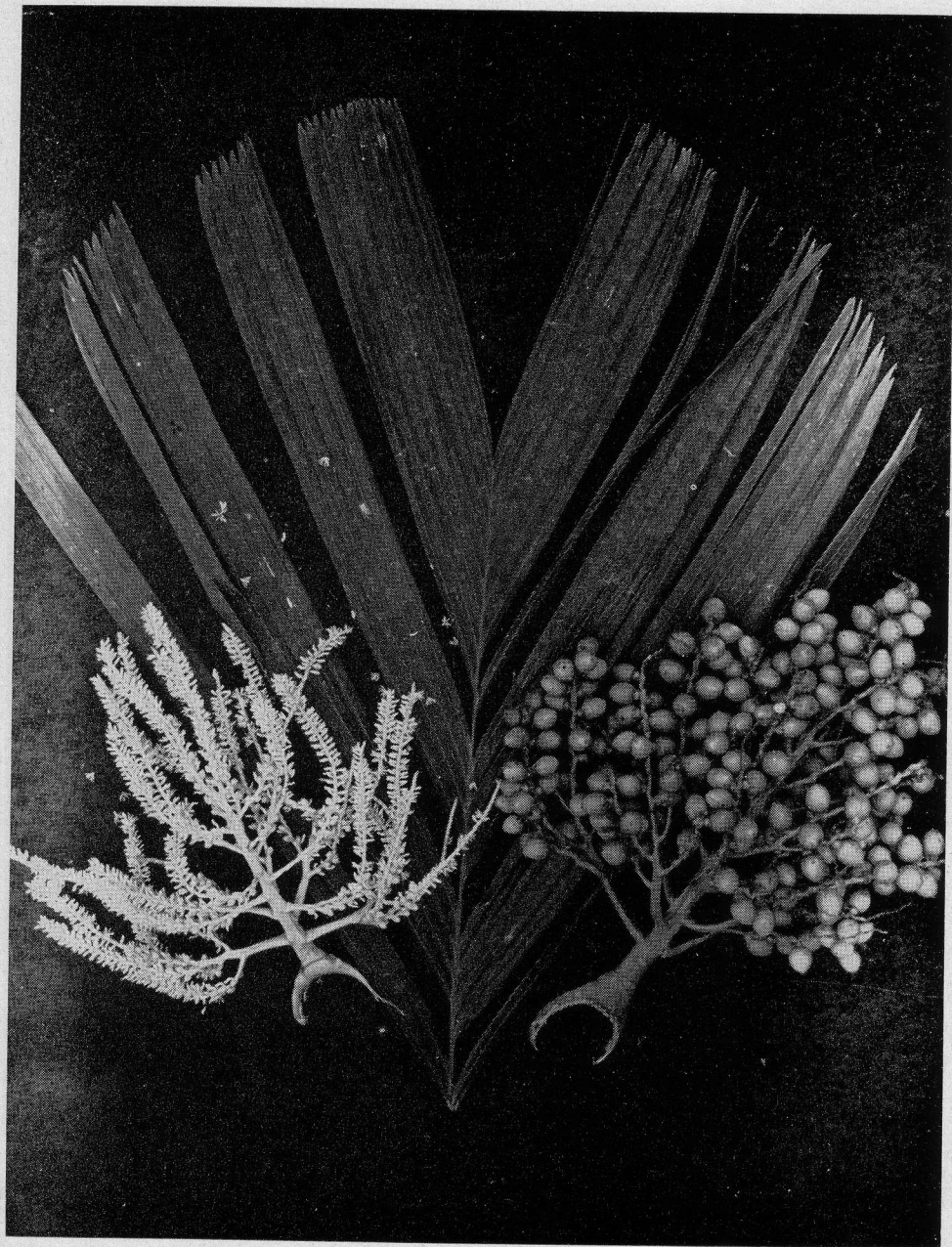


53. The upper part of a leaf of *Areca Langloisiana*. Photograph by W. H. Hodge.

In the meantime it will be of interest to watch further the color of plants in cultivation.

Areca Langloisiana, as we thus far know it in cultivation, is a species of moderate size with trunks not yet reaching the height suggested by Mr. Beckwith's movies. The clustered stems are

dark green, prominently ringed and, in Dominica, begin to show the development of aerial roots. Leaves have orange to orange-red sheaths about 2 ft. long flecked with minute dark brown scales, orange petioles about 14 in. long, and a rachis to 6 ft. long or more. In mature leaves 14-15 pinnae are borne on each



54. Flowers, fruit, and tip of leaf of red-sheath stilt *Areca* from Mt. Sapoetan. Photograph by Edward P. Beckwith.

side of the rachis, these being green and 1-nerved to mostly 2-3-4-nerved with sharply incised oblique apices. The

apical pinnae are about 10 in. long on their inner margin and about 10-nerved; the central pinnae measure about 28 in.



55. Aerial roots of red-sheath stilt *Areca* from Mt. Sapoetan. Photograph by Edward P. Beckwith.

long, to $2\frac{1}{2}$ in. wide; the lower are shorter and narrower.

Inflorescences, borne below the leaves, are encased in a single deciduous orange to yellow two-edged bract about 14 in. long, 3 in. wide. The entire inflorescence may measure nearly a foot in length and is canary yellow in flower with the lower rachillae once-branched, the upper unbranched. Flowers are

borne in spiralled clusters of two male and a central female except toward the tips of the rachillae where male flowers alone occur. The latter are about $\frac{1}{4}$ in. long with 6 stamens. Yellow female flowers are about the same length as the male and have the sepals united at the base. These, with the petals, form a yellow cup about the base of the inch-long shining red fruit.

Palms of Africa

P. B. TOMLINSON

Compared with the American and Eastern tropics, in which extensive speciation of palms has taken place, the palm flora of continental Africa is poor. In fact, that of Madagascar, the Seychelles and Mascarene Islands of the Indian Ocean is much richer than that of the whole of the African continent and shows a much greater degree of endemism. This is but a general reflection of the poverty of the whole African flora compared with the rich floras of tropical America and particularly of the Malay Archipelago. Plant geographers have not explained this fact satisfactorily apart from making the suggestion that the flora of tropical Africa is a relatively young one in which evolution of new plant forms has not been proceeding for as long a period as in other parts of the tropics.

Comparing the palm flora of Africa with that of the rest of the world, it is evident that it is made of outliers from richer palm floras elsewhere. The subfamily Borassoideae is the best represented group and three (*Borassus*, *Hyphaene* and *Medemia*) of its seven genera occur in Africa. Of the remaining genera *Bismarckia*, *Lodoicea* and *Lattania* are restricted to Madagascar and the nearby islands of the Indian Ocean, while *Borassodendron* is Malayan. *Medemia* is entirely African. *Borassus* in

West Africa represents the westerly limit of this genus which extends eastwards as far as New Guinea. *Hyphaene* has its maximum development in East Africa.

Phoenix, which is the sole member of the subfamily Phoenicoideae, has three of its twelve species in Africa, most of the others being in Asia Minor and the Indian continent. The subfamily Lepidocaryoideae has its center of development in the Eastern tropics but is represented in Africa by four genera of scandent palms and by *Raphia*. *Ancistrophyllum*, *Eremospatha* and *Oncocalamus* might be thought to represent an African offshoot from the group of scandent palms of Malaysia, but their different leaf morphology suggests that they may have had a separate origin. The fourth scandent palm, *Calamus deerratus*, is the sole African representative of the genus *Calamus* which has very many species in the Indo-Malayan region. *Raphia* is probably the largest genus of African palms and elsewhere is represented only in Madagascar, together with a single species, *R. taedigera*, in South and Central America, which forms one of the rare links between the palm floras of America and Africa.

Elaeis and *Jubaeopsis* are the only two African genera of the subfamily Coccoideae, although they seem but dis-

tantly related. *Elaeis* is rather isolated in a taxonomic sense and includes *E. guineensis* of West Africa. *Jubaeopsis* is a recently discovered palm of South-East Africa which is said to have affinities with the Chilean *Jubaea*.

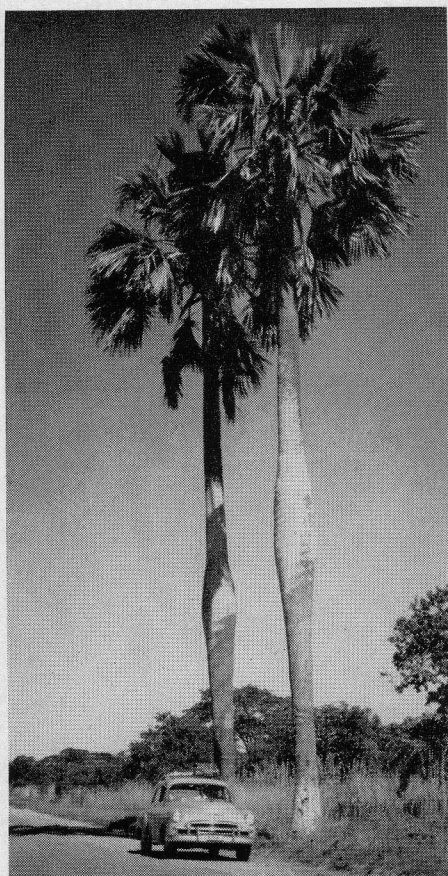
The Coryphoideae are imperfectly represented in Africa. *Chamaerops humilis* is a small Mediterranean palm which occurs on North African shores as well as in Southern Europe. *Wissmannia* is a little-collected palm of Arabia and Somaliland which was at first associated with *Hyphaene* in the Borassoideae.

The group *Areceae* in Drude's sense is not represented in continental Africa, which is very surprising because many of its genera are endemic to Madagascar, the Seychelles and Mascarene Islands, e.g. *Acanthophoenix*, *Deckenia*, *Dictyosperma*, *Dypsis*, *Neodypsis*, *Nephrosperma*, *Phloga*, *Roscheria*, *Stevensonia*, *Vershaeffelia* and *Vonitra*. However, there are two small palms of forest shade and swamp in the Congo Basin, *Podococcus* and *Sclerosperma*, which have some affinity with this group. Even so, they are rather isolated and the nearest relationship is probably with *Geonoma* and allied genera from South and Central America.

Apart from these indigenous palms, the coconut, *Cocos nucifera*, is cultivated and abundant on both western and eastern coasts of tropical Africa, as indeed it is on all tropical seashores. Although the true home of the coconut is in dispute, the main choice lies between American and the eastern tropics, and it is certainly not African. *Areca Catechu*, the betel-nut palm, is cultivated in East Africa.

In spite of this small palm flora, its study is not easy because its members are widely scattered, imperfectly collected and occupy a variety of habitats. The wide distribution and sparsity in

species are evidence that African palms were originally derived from the richer palm floras of America and Asia and only *Hyphaene* and *Raphia* have undergone marked speciation within tropical Africa.



56. African fan palm, *Borassus aethiopum*, near Lusaka, Rhodesia. Photograph by W. H. Hodge.

The Ecology of African Palms

One can divide the palms of Africa, very roughly, into two groups according to their ecological preferences. One group, which includes *Borassus*, *Hyphaene*, *Jubaeopsis*, *Medemia*, *Phoenix* and *Wissmannia*, consists of those palms which are tolerant of dry, exposed situations and are never found in dense for-

est. They show various xeromorphic features, particularly in the anatomy of the leaf. The second group includes *Podococcus*, *Raphia*, *Sclerosperma* and the scandent palms which are all forest inhabitants and intolerant of exposed situations. Most of them, in fact, will only grow in the more swampy parts of lowland forest. *Phoenix reclinata* is somewhat intermediate between these groups because although it will grow in full sun it always occupies marshy places which are often inundated during the wet season. *Elaeis* is the least conservative of African palms and will occupy a wide variety of habitats. It will grow in quite dense secondary forest but on the other hand will also flourish in exposed, but not too arid, situations. Some small *Raphia* species grows outside the forest, but always beside water courses or in savanna swamps. Even so, many African palms are remarkably adaptable so that peculiar admixtures may be found. I have seen *Raphia sudanica*, *Phoenix reclinata*, *Elaeis*, *Borassus* and planted *Cocos* all growing near together in and around a small savanna swamp in northern Ghana.

The Genera of African Palms

Subfamily Borassoideae

Borassus: This genus is represented in Africa by *B. aethiopum* (African fan palm), formerly considered to be only a variety of the Indian *B. flabellifer*. It has tall, columnar, solitary stems and large palmate leaves. It is widely distributed in Tropical Africa as far west as Mauretania, and this also represents the most westerly limit of distribution of the genus as a whole. Eastwards, *Borassus* extends as far as New Guinea where it is represented by *B. Heineana* and such a wide generic distribution is unusual amongst palms. *B. aethiopum* is common in open secondary forest and savanna, where it often forms extensive

groves. Like all members of its tribe it is dioecious and at a distance male trees can often be recognized because they mostly retain the old leaf bases. In female trees the large axillary fruiting branches possibly cause the early leaf fall. Also the timber of female trees is supposed to be much more termite-resistant than that of male trees, which is a useful property in tropical Africa. As in some other palms, the columnar stems often have a distinct swelling some distance above ground level apparently resulting from a period of vigorous vegetative growth at the stem apex. Two, or even three, successive swellings may be developed. I am told that the Asian *B. flabellifer* never shows these swellings. The African fan palm is not used so extensively by native people as is its Asian cousin. It is tapped to some extent for palm wine and its timber has limited uses. The pulpy pericarp of the fruit is sucked for its sweet sap and the fleshy hypocotyl of young seedlings is sometimes eaten. The "cabbage" is also edible. The leaves are used for thatch and the dried lamina is a raw material for plaited work.

Hyphaene: This is a large genus with over twenty species, most of them African but with some occurring in Arabia and India. They are known as doum or gingerbread palms. The leaves are costapalmate. The species are divided into two groups by the habit of the stem. In one group the stems remain unbranched whilst in the other the aerial stems become dichotomously branched in a very characteristic manner; in fact, such branching is not known to occur naturally in any other palms. In both groups the erect stems appear to be somewhat caespitose and may sucker at ground level. Although these palms flourish only in dry areas and never grow in dense forest, they themselves may form dense stands. The majority

of species occur in central and East Africa, Sudan and Upper Egypt, but *H. guineensis* extends westwards as far as Northwest Nigeria and it is sometimes met with farther west around villages in northern Ghana where it has been introduced, probably because of its ju-ju value. *Hyphaene* is dioecious but the fruits are much smaller than those of *Borassus*. The leaves are used for thatch and plaited into domestic ornaments and the trunk may have local uses. The hypocotyl of the seedling is edible and seeds are often earthed up in quantity to produce this vegetable. The endosperm of ripe seeds is horny and forms a local "vegetable ivory." *Hyphaene* gets its name, gingerbread palm, from the pericarp of the fruit although the similarity of this to gingerbread is one of consistency and general appearance rather than one of taste and palatability.

Medemia: This genus is allied to *Hyphaene* and contains two species of which *M. argun* is best known. It resembles an unbranched species of *Hyphaene* and is restricted to a few dry localities of North-east Africa.

Subfamily Phoenicoideae

Phoenix: Three species of *Phoenix* are known from the African continent and a fourth, *P. canariensis*, of the Canary Isles. *P. dactylifera*, the date palm, is extensively cultivated in North Africa. The date is important to many North African peoples (and their animals) as an article of staple food, since it will flourish in areas which are too dry for the existence of other food plants. The date palm today only exists in cultivation and although its true home is unknown it is doubtful if it originated on the African continent, but most probably it is a native of Asia Minor. It is little grown south of the Sahara although it will flourish there, since occasional plants are found, probably

having been introduced by Arab traders. I have seen at least one fine tree in Northern Ghana.

P. reclinata is the most common African *Phoenix* and is widely distributed in tropical Africa as far south as Natal. It is a caespitose palm whose stems rarely exceed 15 feet and it forms small thickets protected by the spinous leaflets of the leaf bases. It is most well known in swampy areas near the coast, but is equally common in similar situations inland. It is little used, although it may occasionally be tapped for palm wine and the dried leaflets are plaited into mats and baskets. *P. abyssinica* of Eritrea is considered by Drude to be a distinct species.

Subfamily Lepidocaryoideae

Raphia: Except for representatives in Madagascar and one species in South America, this large genus is entirely African. The American species, *R. taedigera*, seems to be most closely related to *R. vinifera* of West Africa. The palms form dense, almost pure stands in swampy parts of lowland forest and produce a dense carpet of erect negatively geotropic roots above the surface of the water in which they grow. The leaves of *Raphia* are the longest known to be developed by flowering plants, and those of some species have a recorded length of over fifty feet. The stems of forest species are often quite tall and may be tufted or solitary, but it is often difficult to decide the true habit of a *Raphia* because of the numerous fallen fruits which, germinating in abundance around the base of the parent stem, simulate vegetative suckers. Most forest species, e.g. *R. vinifera* and *R. gigantea*, have tall stems, although because of the long crown of leaves the length of the stem is always much less than the full height of the palm. On the other hand, a few short-stemmed raphias are known and one can quite clearly trace the evo-

lution of these "stemless" species from tall forest raphias. Outside the forest are *R. sudanica* and *R. humilis* which have very short stems so that the crown of leaves is borne almost at the soil surface. The former inhabits savanna swamps and the latter is common in southern Nigeria and the Cameroons along the sides of water-courses in areas north of the forest zone. The stemless habit seems to be an adaption to the requirements of a new environment.

Many species of *Raphia* undoubtedly exist, but the confusion in their identity and nomenclature is considerable. Apart from variation in overall size, leaf morphology is very uniform. Species have usually been characterized by fruit shape and general habit. However, size and shape of fruits does vary considerably on a single individual and, as already indicated, the general habit may not be easy to recognize. On the other hand, the most marked differences between species are to be found in the general appearance of the spadix and the size of its branches, and these provide the most useful diagnostic features. Unfortunately, such parts are neither well-collected nor well-preserved in herbaria, so that the taxonomic revision which the genus so badly needs would be a difficult task and impossible without access to wild palms.

The spadices of *Raphia* palms of many species are extensively tapped as a source of palm wine. This process is not destructive since *Raphia* is monocarpic and once the massive terminal raceme is developed the palm dies. In any event, untapped raphias are abundant so that as one drives through forest areas their long pendulous infructescences with loads of cone-like fruits are common objects to be seen by the wayside at the bottom of each dip in the road. In fact, the forester regards *Raphia* as little more than a weed. The leaves are used for

thatch and old leaf bases provide a coarse fibre. *Raphia farinifera* of Madagascar is the source of the commercial "raffia." This is the surface layers stripped from young leaves and dried, and is a binding material extensively used in horticulture.

The scandent palms

Ancistrophyllum, *Eremospatha* and *Oncocalamus* are common climbing palms of West African forests, all with narrow stems and long internodes enclosed by persistent tubular leaf bases. Although they closely resemble the scandent rattans which are abundantly developed in the Eastern tropics, the two groups may well have had an independent origin because of differences in the morphology of the long whip-like cirrus into which each leaf rachis is extended and by which the palms are supported. In the Eastern rattans each cirrus is armed only with claw-like emergencies. In the African climbing palms on the other hand, the cirrus is provided with distant pairs of grapnel-like spines which are equivalent to pairs of leaflets. In this they resemble *Desmoncus*, a genus of American scandent palms, although this is a member of the cocoideae and is not at all related. The three African genera are distinguished from each other by floral characters but are difficult to identify in the field because inflorescences only appear in the forest canopy at the ends of the long stems. *Eremospatha* is most easily recognized since its tubular leaf sheaths are unarmed and not spinous as in the other two genera. Botanists recognize several species in each genus, of which *Eremospatha* is the largest. *Oncocalamus* is said to contain two species but one of them, *O. acanthocnemis* is known only in the vegetative condition and it seems likely that it is actually the juvenile foliage of the other species, *O. Mannii*, or even of another genus. This is an



57. *Podococcus Barteri* (left), *Sclerosperma Mannii* (center), *Ancistrophyllum laeve* (upper center with terminal inflorescences,) and *Ancistrophyllum secundiflorum* (upper right) reproduced from *Transactions of the Linnaean Society of London* 24: pl. 38, 1864.

indication of the way in which juvenile and adult leaves in these scandent palms differ.

Calamus, which is a very large genus of the Eastern tropics, is represented in Africa by one species, *C. deerratus*, the

sole member of the subgenus *Afrocalamus*. It is easily distinguished from other scandent palms because the clawed flagellae which support the stems appear to arise from the side of the leaf sheaths and are not extensions of the rachis. Each flagellum is actually a reduced, unbranched, axillary inflorescence which is adnate to the stem internode immediately above and the leaf sheath above that.

Apart from these morphological differences the general habit and ecological requirements of all four genera are similar. Individual erect stems in all species appear to be monocarpic but they arise from underground rhizome systems and are continually replaced. They are all members of the *Raphia* association characteristic of swampy forest areas. Apart from some use of the canes they have little application. Subfamily Coccoideae

Elaeis: The African oil palm (*Elaeis guineensis*) is native to and widely distributed in West tropical Africa. It has been introduced into South America and in Malaya and Indonesia. Its cultivation is practiced on extensive plantation scale. In Africa, on the other hand, the cultivation of the palm is largely in the hands of native farmers and well-ordered plantations are not common. The oil-palm is solitary-stemmed and grows to a height of about 60 feet with a symmetrical crown of long pinnate leaves whose basal margins are armed with short spines. This symmetrical crown is not seen in tended trees from which the older leaves are removed to release the axillary fruit clusters. The palm is monoecious and produces a regular succession of male and female inflorescences, each of which is enclosed within the broad base of the axillary leaf, individual fruits of the female spadices being subtended by a short spinous bract.

The natural habitat of the oil palm is not known. Although it is common in forest areas and sows itself profusely, it cannot persist in closed primary forest. In fact, the presence of old oil palms in forest is a sure indication that the forest is not virgin and that it must have been cultivated within the last 80 years, that period being the approximate life span of individual palms. Although it also grows quite well in exposed situations, it seems to require some shade, especially when young. Perhaps the original habitat was rather specialised and may have been on river banks or in the fringing forest of savanna areas.

Elaeis is one of the world's most important sources of vegetable oil and equals *Cocos* in this respect. Palm oil from Africa and the Malay Archipelago is widely used for the manufacture of soaps and margarine and has specialized industrial uses. Oil is extracted from both the pericarp (pericarp oil) and the endosperm (kernel oil) although the two are often mixed together. Several varieties of oil palm are recognised, differing chiefly in the thickness of the shell which surrounds the seed. Since, however, the palm is propagated by seed produced through uncontrolled pollination, populations are very mixed and varieties are not easily maintained. Apart from its commercial importance, palm oil is used locally for food and as an illuminant and medicine. The leaves are valuable for thatch and the leaf stalk is used for stakes and in palisades. The palm is often tapped for palm wine.

Jubaeopsis: This contains one little known species, *J. caffra*. It is the only other representative of the Coccoideae in Africa, but is only remotely connected with *Elaeis* and its spadices, according to Beccari, show it to have most affinity with *Jubaea chilensis* of Chile. It is re-

stricted to rather inaccessible areas of South East Africa and consequently is a relatively recent discovery. It is a small, rather short-stemmed palm and it may previously have been confused with *Phoenix reclinata* because Beccari suggests that the plate to illustrate the latter species in Martius' *Historia Naturalis Palmarum* actually shows *Jubacopsis*.

Subfamily Arecoideae

Sclerosperma: This genus of little-known palms contains three species. All these are small, caespitose palms with short stems scarcely three feet high and having congested internodes. The leaves are small, irregularly pinnate and with broad leaflets. The spadix is simple and because of this Drude placed *Sclerosperma* near to *Geonoma* of Central America, but the relationship may not be close. All species are palms of the forest undergrowth. The best known is

S. Mannii, first described by Wendland and Mann from the Gaboon. I have seen it in primary forests in the Cameroons.

Podococcus: This resembles *Sclerosperma* in its stature and general appearance but the leaflets are narrower and the stem is more cane-like with distinct internodes and may reach a height of eight feet. The original description referred to one species, *P. Barteri*, of swampy areas in the Niger delta and a second species, *P. acaulis*, has since been described. Botanically, *Podococcus* is allied to *Sclerosperma* whose isolation it shares.

Subfamily Coryphoideae

This group of fan palms, is virtually without representation in Africa, although *Chamaerops humilis* does occur along the north African coast. A second genus, *Wissmannia*, with one species, *W. carinensis*, is known from Somaliland.

Livistona Jenkinsiana

ROLLA SESHAGIRI RAO* and J. JOSEPH**

Botanical Survey of India, Shillong, India

Livistona Jenkinsiana, the only wild Indian species of the genus so far recorded, is an erect graceful palm of about 7 to 10 meters high (to over 30 feet) with an unbranched cylindrical stem and a terminal crown of fan-shaped leaves. This beautiful palm is named after Major Jenkins, whose early plant collections in Assam are well known. The reniformly flabellate leaves measure to 1.2 meters (six feet or slightly more) in diameter and the margin of the blade is toothed nearly half its radius (Fig. 58).

The young stems are covered with dry leaves or rather with the lower parts of the petioles, while the older stems are marked with the hard, black, long and

narrow scars of the fallen petioles. Consequently, the stem surface is rough, and the diameter of the stem is seldom more than a foot.

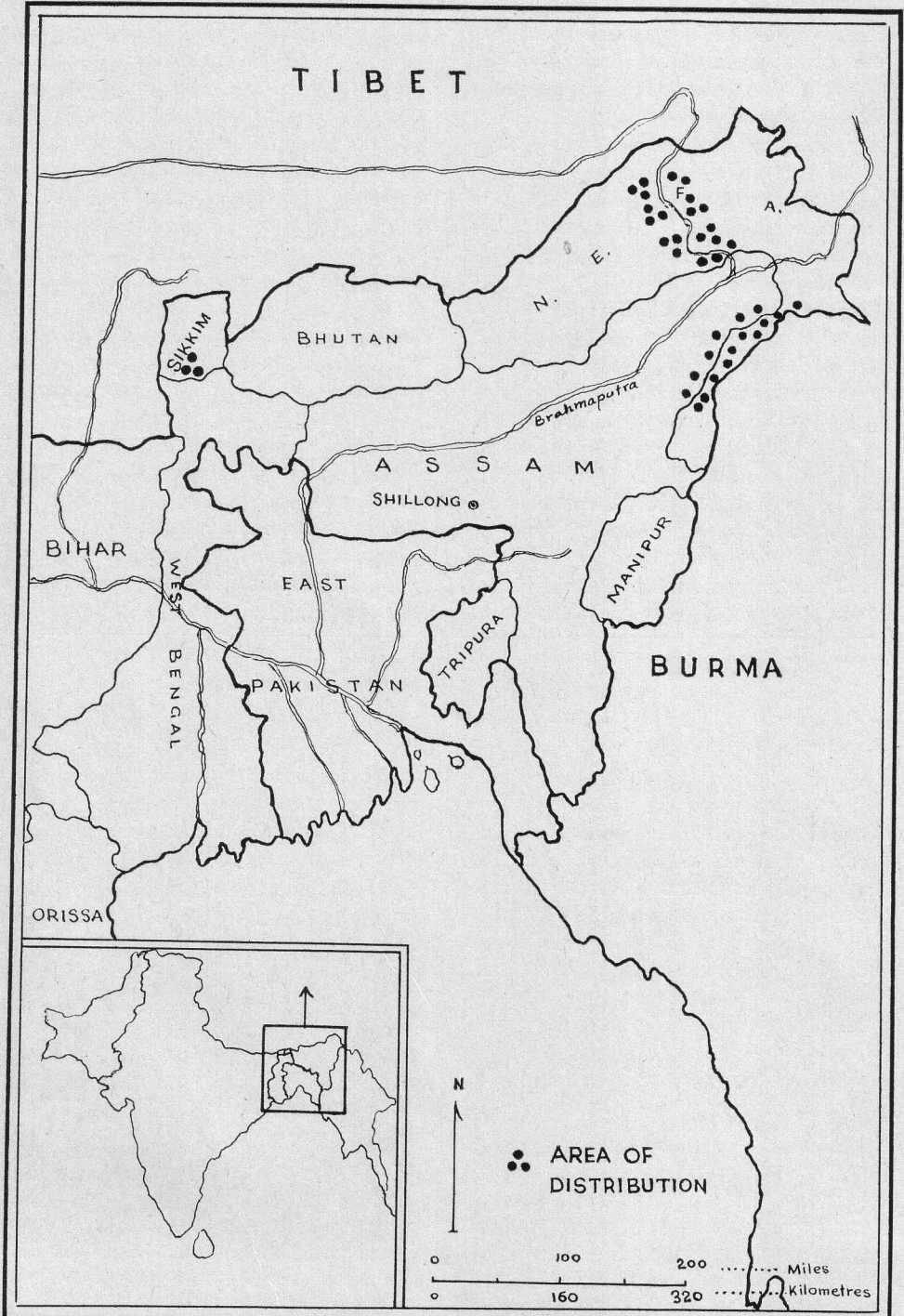
The inflorescence of this palm is interfoliar, producing many bisexual pedi-



58. Seedlings of *Livistona Jenkinsiana* grown in a shady corner near Eyo village at 400 meters altitude, Siang Frontier Division, NEFA. Photograph by R. S. Rao.

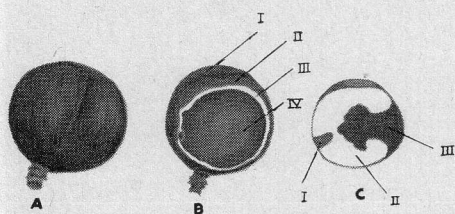
*Now at Botanical Survey of India, Poona, India.

**Now at Botanical Survey of India, Coimbatore, India.



59. Map of eastern India showing the distribution of *Livistona Jenkinsiana* in Sikkim, NEFA and upper Assam.

cellate flowers in July and August. Only a few bunches of fruits are produced in October and November. The drupe with its single seed is globular and nearly an inch in diameter. The pericarp of a mature fruit consists of three distinct layers, the bluish-black epicarp, a fibrous and succulent mesocarp, and a white and stony endocarp. The brown inner integument of the seed is much thickened at the chalazal end and grows into the endosperm as a convoluted stalklike structure (Fig. 60).



60. *Livistona Jenkinsiana*. A, mature fruit. B, fruit with a portion of pericarp removed (I, epicarp; II, mesocarp; III, endocarp; IV, seed). C, longitudinal section of mature seed (I, embryo; II, endosperm; III, invaginated integument).

This palm is distributed sparsely in the Teesta Valley of the Sikkim area, along the foot hill region of Assam and in the outer Himalayan valleys of Siang, Lohit and Tirap frontier divisions of North East Frontier Agency (NEFA) and also the adjoining Naga Hills area (Fig. 59) up to an altitude of 1000 meters where the rainfall is 250-350 cm. per annum and the soil conditions are mostly sandy loam with a laterite mixture. In the wild state, the species has been observed by the writers during their explorations in NEFA growing in small groups along the slopes, separated from one another and usually mixed with wild species of *Musa* and other plants of moist evergreen forests (Fig. 62). The fruits from some of the wild plants have been collected and sent to Nat J. De Leon, Miami, Florida, for germination and further study. It was reported by

him that this species is a new addition to the cultivated palms of the United States. Due to the utility of the leaves, this palm is also cultivated in small groves near most of the tribal villages in these areas, sometimes in combination with areca nut palm, *Areca Catechu*.

The fan-like leaves are primarily used for thatching the huts of the Lepchas of Sikkim and of the tribal peoples of NEFA areas. They are used in many ways in upper Assam as they are admirably adapted by their lightness, toughness and durability for covering the roofs of palanquins (boxlike structures with handles formerly used as transport), for the roofs of boats and also for making umbrella-like hats. The endosperm of the seed is also edible.

The writers express their grateful thanks to Dr. J. C. Sen Gupta, Chief Botanist, Botanical Survey of India, for his kind encouragement.



61. A grove of *Livistona Jenkinsiana* with one tree of *Areca Catechu* in foreground, cultivated at Chengland village, 800 meters altitude, Tirap, Frontier Division, NEFA. Photograph by R. S. Rao.



62. A large grove of *Livistona Jenkinsiana* seen along with wild *Musa* species in evergreen forests near Eyo village, Siang Frontier Division, NEFA. A small patch of millet is cultivated in foreground. Photograph by R. S. Rao.

A NOTE ON *LIVISTONA JENKINSIANA*

Thanks to the kindness of Dr. R. S. Rao, *Livistona Jenkinsiana* is at long last being established in South Florida. When I first opened the parcel he sent, I was immediately impressed with the deep blue color of the ripe fruits and couldn't help think what a welcome change this color would be to the reds and blacks of most ripe palm fruits here.

The seeds germinated readily and I am happy to report that first-leaf seedlings came through the severe winter of

1959-60 with no visible signs of injury. Young seedlings have been distributed to several enthusiastic palm growers in various sections of Florida and California to test the hardiness range of this interesting palm.

Plants are now beginning to take on a definite leaf character that seems distinct from most species of *Livistona* that I am familiar with. *Livistona Jenkinsiana*, especially because of the deep blue coloring of the fruits, should make a welcome addition to the cultivated palms.

NAT J. DE LEON

Two New Species of *Chrysalidocarpus*

HAROLD E. MOORE, JR.

Years ago, a flourishing garden surrounded the home of a Dr. Cabada in Cienfuegos, Cuba. Dr. Cabada had assembled an unusual collection of plants, but chiefly palms, from many parts of the world through his own travels and

correspondence. Unfortunately, the garden was neglected after his death, but from it seeds of an unusually lovely but unidentified palm were collected by Mr. Robert M. Grey and seedlings planted in March 1932 on the grounds of the

vivienda of the sugar mill and the Atkins Garden and Research Laboratory of Harvard University at nearby Soledad. This same palm has since been seen planted in Mérida, Yucatán, and at the Mayaland Lodge, Chichen-Itza, Yucatán, Mexico.

When I first visited Soledad ten years ago, mature trees of this palm were a striking sight with their clusters of graceful green or bluish-green stems, their crowns of arching leaves and their much-branched inflorescences then loaded with bright crimson fruit. During the course of another visit to the garden, flowering material was also secured. Study of the specimens clearly indicated that the palm was a species of *Chrysalidocarpus* but one differing from other described species, all from Madagascar or the Comore Islands, in its red fruit. The "Cabada palm" or *Chrysalidocarpus* 'Soledad,' as it has been called for convenience, seemed closest to *Chrysalidocarpus Humblotianus*, a species from Grand Comore described only from fragments of a leaf and portions of an inflorescence in very young bud and which, moreover, was supposed to have a solitary trunk. Without mature fruit of *C. Humblotianus* no completely reliable comparison could be made even though material of the type number was studied at Paris in 1956. In past years unsuccessful efforts have been made to obtain fruiting material of this species from the Forêt de Combani on Grand Comore through the offices of the local authorities and more recently those of Dr. Harold St. John who visited the island in August, 1961. Dr. St. John wrote that the forest "... had been lumbered and since then has long been plundered by cutters of firewood. There is some forest left, but it is a poor remnant, and much of the area is open pasture or banana plantations. We found only one feather palm, several trees, none over 6

meters tall, and none old enough to flower."

The discrepancies between the Cabada palm and *Chrysalidocarpus Humblotianus* as I now understand it, the difficulty or perhaps even impossibility of ascertaining the character of the fruit in the latter species, and the increasing use of the former in horticulture all suggest that the Cabada palm be formally described despite its unknown origin. It is, therefore, described as *Chrysalidocarpus Cabadae* below, acknowledging a slight possibility that it may eventually prove identical to *C. Humblotianus*. Perhaps even more likely is the possibility that ultimately it may be shown to be a variant of the next, *C. pembana*, to which it assuredly is closely related but from which it differs in characters that seem significant in the light of our present inadequate knowledge of species criteria in the genus.

Specimens of a second red-fruited *Chrysalidocarpus*, described herein as *C. pembana*, were collected as early as 1901 in the Ngezi Forest on the island of Pemba, which lies north of Madagascar, the Comores, and Zanzibar at 5° South Latitude off the coast of Tanganyika in East Africa. Foliage only was collected by R. N. Lyne and sent to the herbarium of the Royal Botanic Garden, Kew, England. Photographs had also been sent to Kew by J. T. Last. In 1929, Dr. P. J. Greenway collected specimens of this same palm and in 1957 he forwarded specimens collected by Mr. R. O. Williams for study at the Bailey Hortorium. Examination of the Williams specimens and comparison with specimens of *C. Cabadae* show the two taxa to be similar in habit but markedly different in characters of the leaf and fruit. The species has been informally described as *Chrysalidocarpus* sp. in R. O. Williams, *The Useful and Ornamental Plants in Zanzibar and*

Pemba 190. 1949. Though *C. pemba* is not cultivated in the United States, it is said to be cultivated in Pemba and Zanzibar.

Chrysalidocarpus Cabadae and *C. pemba* differ from each other as noted below but both share the graceful habit of *C. lutescens*. The latter, however, has larger fruits which mature purplish-black and pinnae with usually several very prominent scales on the midnerve near the base below as well as many minute shining chestnut-brown scales on the secondary and some tertiary nerves. *C. glaucescens*, which may be only a form of *C. lutescens*, differs in the yellow-green fruit.

Pinnae lacking scales on the under-surface except for a few large scales on the midnerve; leaf-sheath bright green with a glaucous bloom and sparsely dotted with minute rusty hairs when young, the peduncle of the inflorescence sparsely rusty-tomentose, the rachis and primary branches glabrous from the first: fruit 10-11 mm. long, 4.5-5 mm. in diameter at maturity *C. Cabadae*

Pinnae copiously dotted with minute shining brown linear scales on all the nerves of the undersurface and with usually a few large medifixed scales on the mid-nerve below; leaf-sheath, and peduncle, rachis and primary branches of the inflorescence copiously rusty tomentose at least

when young; fruit 14-15 mm. long, 7 mm. in diameter at maturity

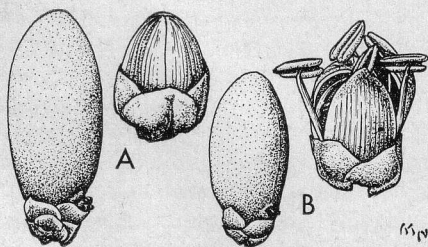
C. pemba.

Chrysalidocarpus Cabadae

Chrysalidocarpus Cabadae H. E. Moore, sp. nov.

Palma caespitosa *C. lutescenti* affinis sed fructu rubro, minore, 10-11 mm. longo, 4.5-5 mm. diam., pinnis subtus sparse squamosis vel esquamosis, rachillis ad anthesim glabris differens.

Caespitose with as many as 14 trunks to 10 m. high or more, 9 cm. in diameter at breast height, concentrically and prominently pale-ringed, smooth, glossy, green, straight, the internodes 9-12.7 cm. long. Leaves about 10 in a spreading elongate crown, the sheaths 50-75.5 cm. long, bright green with a glaucous bloom and, when young, floccose with rather dense brown fimbriate-tomentose scales, at first closed, at length splitting opposite the petiole and eventually deciduous with the blade, the petiole short, 25-32.5 cm. long or to 60 cm. long in young leaves, with a prominent callous pad at the base and canaliculate above, convex below, unarmed, the rachis to 17 dm. long, bifacial and green above, convex and glossy yellowish below, arcuate at the tip; pinnae from 24 in leaves from young plants to about 60 on each side of the rachis at maturity, regularly spaced in one plane but ascending from the rachis, darkish green and glossy above, paler below with prominent yellowish midvein and marginal veins essentially glabrous except for a few medifixed scales on the midnerve near the base, stiffish, acute, 10.8-57.7 cm. long, 11-25 mm. wide, the tips arcuate but soon split and pendulous. Inflorescence interfoliar, glabrous except for the sparse to dense cover of minute fimbriate rusty scales, at least when young, on lower part of peduncle and bracts, about 1.5 m. long, erect from the leaf-



63. Fruit ($\times 2$) and staminate flower ($\times 5$) of *Chrysalidocarpus pemba* (A) and *C. Cabadae* (B).

sheath, green, unarmed, subtended by an outer persistent ancipitous green or glaucous bract inserted about 13.5 cm. from the base of the peduncle and measuring ca. 38 cm. long, 4 cm. wide, splitting obliquely at the apex, and an inner rounded or slightly two-edged green or glaucous short-rostrate bract inserted ca. 33 cm. from the base of the peduncle, measuring ca. 54 cm. long, 4 cm. wide, inserted below the rachis, splitting on one side as the inflorescence expands and eventually caducous; peduncle 67.5 cm. long; rachis 70 cm. long, glabrous at anthesis, primary branches of the inflorescence about 30, glabrous, the lower branches to 55 cm. long, again branched with compound, furcate, or simple shortly and slenderly spine-tipped rachillae, the uppermost 8-10 all simple or furcate; flowers in triads spirally arranged and about 2 mm. apart throughout the rachillae, the staminate flowers about 4 mm. long when fresh, 3.2 mm. long when dry, fragrant, the sepals imbricate, green, 1.8 mm. high, the petals valvate, yellow-green, 3 mm. long, spreading, stamens 6, spreading, with slender white filaments connate basally and adnate to petals and pistillode for about 1 mm., distinct above, anthers short, oblong in outline, introrsely dehiscent, exerted from the flower and exceeding petals by ca. 1 mm., pistillode 3-angled, columnar, white, equalling the petals; pistillate flowers observed only in young bud, the perianth in dried fruit shining straw-colored with brown margins, the sepals ca. 1.4 mm. long, petals ca. 2.4 mm. long, staminodes dentiform. Fruit oblong-ovoid, scarlet with dark basal stigmatic residue, 10-11 mm. long, 4.5-5 mm. in diameter, the exocarp smooth, mesocarp thin, fleshy, reddish, fibrous, endocarp thin and more or less adherent to seed; seed oblong-ovoid, ca. 8 mm. long, 4 mm. in diameter with lateral embryo in homogeneous endosperm, the



64. *Chrysalidocarpus Cabadae* at Soledad, Cuba.

raphe branches ascending from the base and loosely anastomosed. Seedling with furcate first leaf, occasionally a few castaneous scales present on the lower surface.

CULTIVATED: Atkins Garden and Research Laboratory of Harvard University, Soledad, Cienfuegos, Cuba, nativity unknown, Feb. 20, 1953, *H. E. Moore, Jr.* 6517 (holotype, BH); Feb. 26, 1952, *H. E. Moore, Jr.* 6101 (paratype, BH).

Chrysalidocarpus pambana

Chrysalidocarpus pambana H. E. Moore, sp. nov.

Chrysalidocarpus sp. in Williams, *The Useful and Ornamental Plants in Zanzibar and Pemba* 190. 1949.

Palma caespitosa *C. Cabadae* affinis sed fructu majore, ca. 15 mm. longo, 7 mm. diam., pinnis subtus squamis nitentibus brunneis linearibus copiose vestitis, rachillis ad anthesim ferrugineo-tomentosis differens.

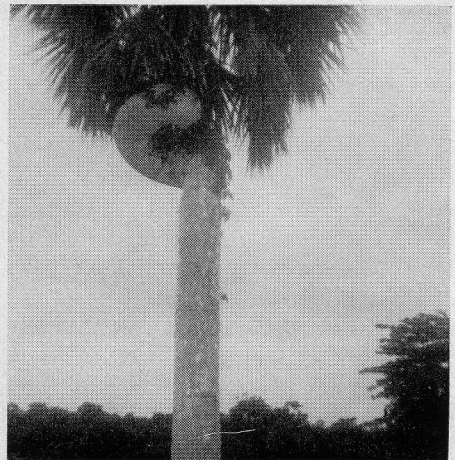
Stems several, green, clustered, to about 18 m. high, to 15 cm. in diameter,

strongly ringed, the internodes to 24 cm. long. Leaves to 2.4 m. long, the pinnae 40-50 inserted in the groove on each side of the rachis, linear-attenuate, regularly disposed at intervals of 4-5 cm., dark green and glabrous with a prominent elevated midnerve above, somewhat glaucous below with a dense cover of minute waxy peltate hairs (when dry) and, on all the nerves, numerous shining brown linear appressed scales lacking a hyaline margin, the midnerve rarely with one or a few irregularly placed, large, medifixed scales with brown center and broad irregularly lacerate margins or ends, the lowermost pinna narrow, ca. 76 cm. long, 1.3 cm. wide, the lower ca. 70 cm. long, 2.8 cm. wide, the median ca. 90 cm. long, 3.2 cm. wide, upper 45 cm. long, 2.4 cm. wide, and the apical pair 14.5 cm. long, 1.4 cm. wide, the marginal nerves and midnerves stout, the 4-5 secondaries on each side slender, interspersed with about 10 very fine tertiary nerves between each pair of secondaries. Inflorescence 3-4 times branched, the peduncle stout, more or less flattened, densely ferrugineous-tomentose, more than 30 cm. long, bending at right angles below the first branches with the fruiting branches pendant, the branches densely ferrugineous-tomentose in flower becoming pale-tomentose to glabrescent in fruit, the lower branches ca. 90 cm. long with ca. 15 secondary branches, the ultimate rachillae to 15 cm. long, 2 mm. in diameter, the upper branches furcate to simple, outer bract glabrous but dull waxy, inner bract not seen: triads of flowers 2-3 mm. apart, the staminate flowers (in bud) with sepals 1.6 mm. long, 1.8 mm. wide, 1.6 mm. deep, keeled and basally umbonate, glabrous except for very minutely denticulate lateral margin, the outermost sepals only about 1 mm. deep, petals 2.8 mm. long, 1.6 mm. wide above the base, the

stamens 6, nearly as long as the petals in bud with the anthers infolded, the pistillode angled-columnar, nearly as long as the stamens in bud: fruit "sealing-wax" red, oblong-ovoid, 14-15 mm. long, 7 mm. in diameter when dry, the stramineous persistent cupule ca. 2.5 mm. high. PEMBA: Ngezi Forest where common with *Phoenix reclinata* and *Elaeis guineensis*, R. O. Williams H177/56-7, Jan. 21, 1957 (holotype, BH; isotype, EA). Ngezi Forest, July 1901, R. N. Lyne 100 (K). Ngezi Forest, Feb. 18, 1929, Greenway 1488 (K).

Chrysalidocarpus pembana is called *mpapindi* on Pemba where it grows wild in the Ngezi Forest, but the species is also cultivated according to Williams.

I am indebted to Dr. William J. Dress for assistance with Latin diagnoses, to the American Philosophical Society for grants (nos. 1183, 1951, and 1522, 1952) that made possible study of living material of *C. Cabadae*, and to the John Simon Guggenheim Memorial Foundation for the opportunity to study material of *Chrysalidocarpus* at Kew and Paris in 1956. I wish also to express my gratitude to authorities on Grand Comore and to Dr. Harold St. John for their efforts in my behalf.



65. Even *Sabal* does the "twist."

LETTERS

JENSEN BEACH, FLA. Feb. 17, 1962

Please find enclosed a snapshot of a *Sabal* palm. Is it usual for this type of palm to twist itself around another tree or object?

This snapshot was taken three years ago west of Palm Beach. I gave the negative to Mr. Edwin A. Menninger, "The Flowering Tree Man" of Stuart who remarks that it's a fine addition to the freaks.

Sincerely,
A. J. WHITE

* * *

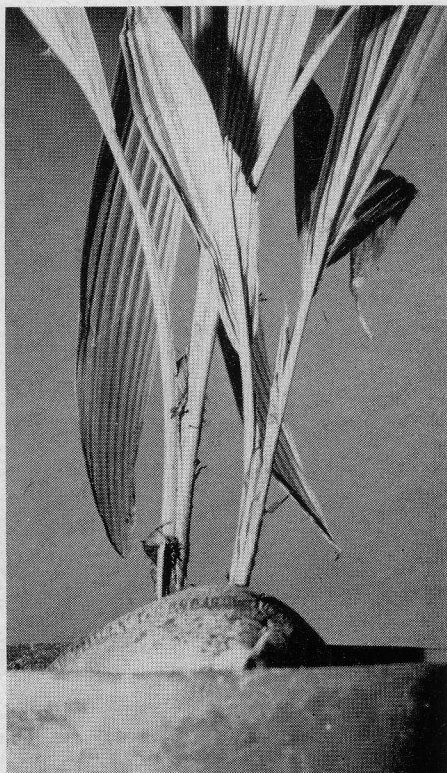
STUART, FLA., Feb. 2, 1962

The enclosed photograph of a two-timing coconut is unusual enough that I thought you might like it for your collection.

Sincerely yours,
EDWIN A. MENNINGER

WHAT'S IN A NAME?

Ceroxylon (ser óx i lawn) is composed of the Greek words *keros* (wax) and *xylon* (wood), in allusion to the layer of wax which encases the trunks of these extremely lofty pinnate palms native in the heights of the Andes in northern South America. One species, the *C. alpinum* (formerly *C. andicola*), is reported to thrive at an altitude of 10,000 feet. Attempts to grow these South American wax palms in the low elevation of Florida and California have failed, but it has been suggested that the palms might be given a trial in some of the heights of California, Oregon or Washington state. Imagine a drive from sequoias to ceroxylons all within a day! The Latin specific epithet *alpinum* originally conveyed the restricted sense of "Alpine, pertaining to the Alps Mountains" but, by extension, the adjective came to be applied to any towering peak or mountain range, synonymous for all purposes with the more prosaic *montanum*.



66. A "two-timing" coconut.

Copernicia (ko per nish ee a) was created by Martius to honor the memory of Nicolaus Copernicus (1473-1543), the Polish astronomer whose heliocentric theory of the movements of the earth and planets supplanted the older geocentric Ptolemaic system. His theory was brought to full fruition decades later by Tycho Brahe and Johannes Kepler. The numerous *Copernicia* species are handsome palmate palms of the New World tropics with a particularly diversified representation on the island of Cuba. A Brazilian species, the *C. cerifera*, is the famed carnauba wax palm which is grown commercially in vast groves and furnishes one of the world's most useful natural waxes.

Daemonorops (dee máwn o rawps), a large genus of very spiny, climbing

feather palms, is basically a combination of the Greek *daimon* (a deity) and *rhops* (bush). These plants with their slender, pliable stems have been referred to as "Sumatran rattan palms", but the range of their native habitat extends from mainland tropical Asia southeastward into Indonesia, of which Sumatra itself is but one component. In Bailey's *Standard Cyclopædia of Horticulture*, the article on *Dæmonorops* contributed by Jared G. Smith and revised by Norman Taylor explains that the technical name "probably means *God-like, of divine appearance*." Certainly no one will dispute the poetic appeal of this interpretation, but the Greek word *daimon* became *daemon* in its Latinized form and denoted an evil or malignant spirit. In truth, the generic term as compounded by Karl Blume simply means "demon bush" in unmistakable reference to the sharp spines characteristic of the genus. To the ancient Greeks, a *daimon* was an unpersonified divinity in the form of a supernatural power. Plato explained that each man might have his own *daimon*, good or evil, which acted as an intermediary between him and the gods he worshipped. Typically, the Romans reduced this Hellenic subtlety to the baser notion inherent in *daemon*. The Bible has occasional references to the casting out of devils, and during the Middle Ages the mentally ill were thought to be possessed by demons. But before we laud our own sophistication in such matters, let us recall that at least nineteen "witches" were either

hanged or pressed to death in Salem, Massachusetts as late as 1692!

Elaeis (ee lée iss) is derived from the Greek *elaia* (olive tree, olive). Both the Classical Latin *oliva* and *olea* found in the writings of Virgil and Pliny are doublets derived from the Greek word, but Jacquin, who established our palm genus, returned to the original Greek form, Latinized the diphthong ai to ae and appended the -is to effect correspondence with other generic terms ending in -is; for example: *Iris*, *Eucharis*, *Amaryllis*, *Pteris*, et al. A commercial oil used in making candles and soap is extracted from the fruit pulp and also from the seed kernels of the *Elaeis guineensis*, popularly known as the African oil palm.

Gaussia (gáw see a), a genus comprising but two species as now understood, the *G. princeps* of Cuba and the *G. attenuata* native to Puerto Rico, was erected by Hermann Wendland to honor Karl Friedrich Gauss (1777-1855), German scientist ranked with Archimedes and Newton as one of the three foremost mathematicians in history.

Scheelea (shé lee a), a genus comprising about 40 species of American palms with very long, stiffly ascending pinnate leaves, was founded by Karsten to honor Karl Wilhelm Scheele (1742-1786), a German-born chemist who worked most of his life in Sweden. He is credited with the discovery of the elements of chlorine, barium, and manganese.

BRUCE H. BEELER

Classified Section

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