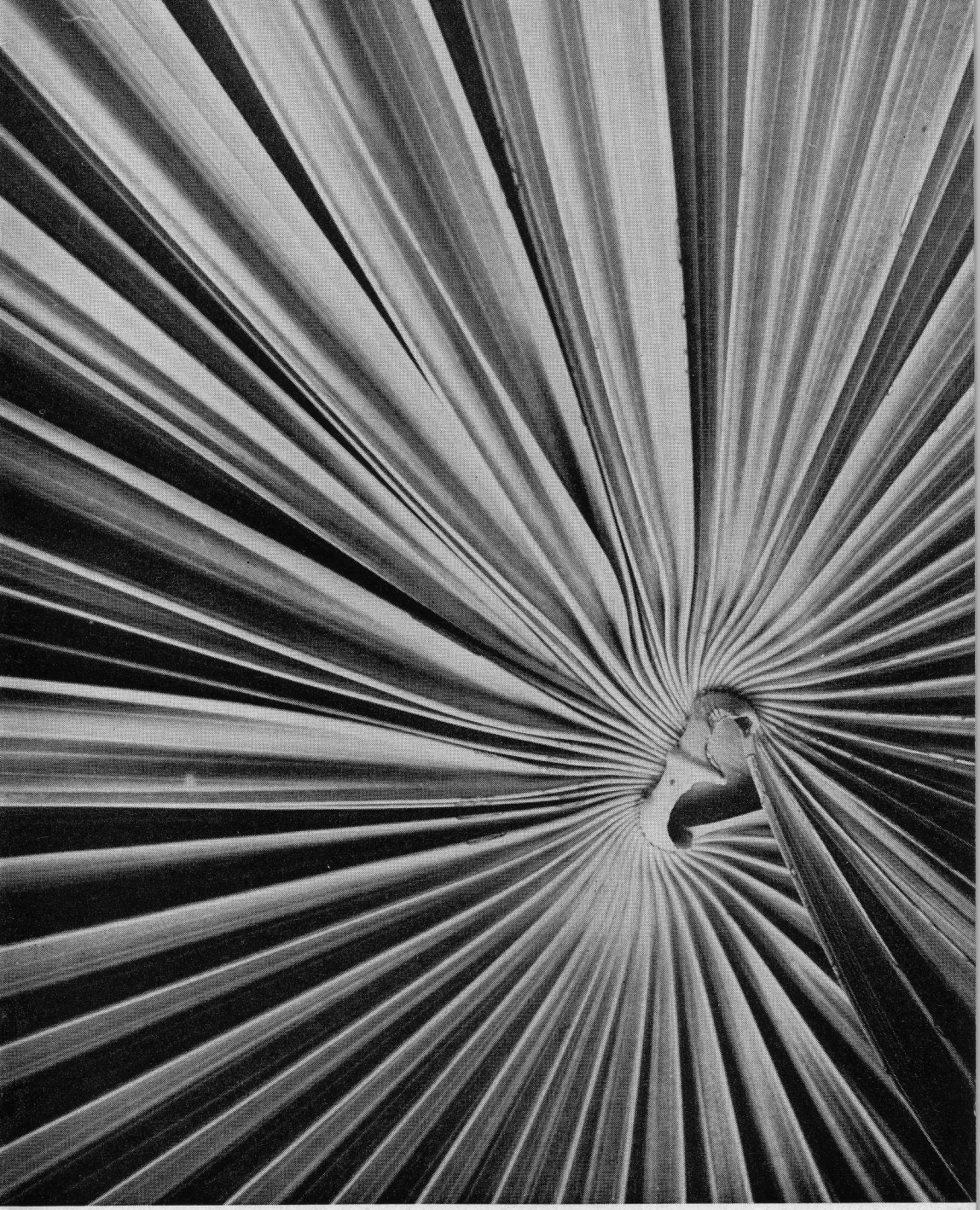

PRINCIPES

Journal of The Palm Society

January, 1961
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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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Contents for January

Cover Picture

The leaf of *Thrinax parviflora* makes an interesting pattern. For use of palms in decoration see page 20. Photograph by Walter H. Hodge.

NEWS OF THE SOCIETY

October thirtieth was a red-letter day for the more than one hundred members who were able to accept the invitation of Mr. and Mrs. Dent Smith and Miss Margueriete Martin to spend the day as their guests. All those members who live within a reasonable distance of Daytona Beach, Florida, were invited. Some came from as far away as California, Pennsylvania, New York and the Bahamas, others from as near as "down the street." All had a most enjoyable day (see photos, pages 3-7).

The morning was spent in studying the Smith-Martin collection of more than seven hundred plants of palms. Many of these were of special interest to members living in locations where frost is expected, since they had survived the low temperatures of three winters ago. All had just passed through the ordeal of hurricane "Donna" in early September. Viewers were quick to comment on the good condition of the palms in spite of the high winds, although the owners told us that six hundred loads of debris had been removed from the property following the storm.

After a picnic lunch under the trees a motorcade was formed and we were shown the unique "serpent palmetto" which was pictured in PRINCIPES of October, 1960. This palm lies prostrate on the ground, making a 360-degree circle around an enormous buttressed tree-trunk, finally raising its head vertically to a height of about ten feet. It is impossible to do more than guess at its age and the circumstances causing this peculiar growth, but possibly hundreds of years have passed while the palmetto attained its strange shape.

In the evening Mr. and Mrs. Smith were hosts at a banquet, after which Dr. H. E. Moore, Jr. told about his recent three-months' stay in Peru, showing color slides of the country and its vegetation. Mr. Edwin Moore of San Diego showed slides of Mexican and Californian palms and their habitats.

1. Past-President Walter Hodge and Leonard Brass, New Guinea explorer, compare notes at Dent Smith's Palm Party. Photograph by Nixon Smiley.

On the day previous to the above-mentioned Palm Party, Mr. and Mrs. Smith were hosts to the Society's officers, directors and their wives who were present, and to some of the visitors from afar, entertaining them with a boat trip upon the Halifax River and an oyster roast at Gene Johnson's Place. On the way to Gene's, Mrs. Eileen Butts and her family graciously received the visitors at their beautiful home in Ormond Beach.

* * *

Your Secretary spent part of September and October on a pleasant and profitable trip to Brazil, visiting Belem, São Luis, Fortaleza, Rio de Janeiro, São Paulo and Brasilia. She made the acquaintance of Palm Society members, acquired some new ones, visited botanical gardens and agronomical institutes, looked at palms. It is hoped that by making known the Society's existence and objectives to botanists and plantsmen in this palm-rich part of the world much that is mutually advantageous may result.

2. Guests assembled to hear schedule of events before lunch. Photograph by Nixon Smiley.

On November 9th she went to California to attend the meeting of The American Horticultural Society (of which The Palm Society is an affiliate) and to assist in the debut of the volume "Cultivated Palms," which is the special issue of the *American Horticultural Magazine* for January, 1961. The Begonia, Fern, Bromeliad and Palm Societies staged attractive exhibits in the patio of the hotel where the meetings were held. Mr. Charles Hallberg and Mr. John R. Lodge placed The Palm Society exhibit, which consisted of potted representatives of the more ornamental small palms, such as *Rhapis, Chamaedorea,* etc. Each palm was accompanied by a beautifully lettered sign giving its name and place of origin. This exhibit brought to the attention of the members of the American Horticultural Society a number of the palms less known to cultivation yet of great value as ornamentals.

Following this meeting, Mrs. Wait remained in California for ten days, making the acquaintance of as many Palm Society members as time permitted and learning about palm growing conditions there. Many members living between Los Angeles and San Diego were visited. Mr. and Mrs. Gunter F. Herman entertained with an open house for members in and near Los Angeles, the weather cooperated beautifully and much information which will enable her to be of better service to California members was obtained.

LUCITA H. WAIT

Palm Handbook Published

Members of The Palm Society should be both proud and happy to learn that a handbook on palms entitled "Cultivated Palms", is now a reality through the combined efforts of The Palm Society, The American Horticultural Society, and The Fairchild Tropical Garden. This is the first modern handbook devoted primarily to the horticulture of palms.

3. Dent Smith viewed with satisfaction a handsome specimen of *Arenga*. Photograph by Nixon Smiley.

This 192-page work, making up the January, 1961, issue of the *American Horticultural Magazine*, was prepared by a Palm Society committee working under the guest editorship of the late Dr. Bruce Ledin, former vice-president and director of The Palm Society. Included in this palm handbook are a number of articles prepared by specialists on the botany and horticulture of palms, a fine portfolio of palm portraits plus illustrations demonstrating the main characteristics of these plants.

In order that Palm Society members may have an idea of the type of information to be found in "Cultivated Palms", two articles, "Palms in Decorative Arrangements" and "Palms for Home and Greenhouse", are being reprinted in this issue of PRINCIPES.

It is to be hoped that all Palm Society members will wish to support this joint venture in publication by purchasing a copy of "Cultivated Palms". The regular magazine issue is available at the nominal price of $3.00 per copy, while a very limited hard cover issue sells for $4.95. Orders for handbooks will not be handled by The Palm Society, but can be placed either with the Fairchild Tropical Garden (10901 Old Cutler Road, Miami 56, Florida), or with the American Horticultural Society (1600 Bladensburg Road, N. E., Washington 2, D. C.). It should be mentioned that an annual membership in the American Horticultural Society ($6.00 per year), if started in 1961, automatically would bring not only a copy of "Cultivated Palms", but also three other issues of the quarterly journal, the American Horticultural Magazine.

W. H. HODGE

4. Californians W. F. Sinjen, Bob Nelson and Ed Moore studied *Chamaedorea brachypoda*. Photograph by Nixon Smiley.

THE EDITOR'S CORNER

Members of The Palm Society will rejoice at the appearance of "Cultivated Palms" as the January, 1961, issue of *The American Horticultural Magazine*. Two articles by Lucita H. Wait and David Barry, Jr. are reprinted with minor changes in this issue of PRINCIPES. Limitations of space precluded the publication of articles on palm collections at various botanical gardens throughout the world. These will appear in PRINCIPES. The first, concerning the Huntington Botanical Gardens, was written by William Hertrich, Curator Emeritus of the Gardens. Mr. Hertrich's long interest in palms is evidence not only in this article but in his book *Palms and Cycads* which was reviewed in PRINCIPES for July, 1960.

Harrison G. Yocum, an enthusiastic member who has grown palms in his home in Tennessee, contributes from his experience in germinating seeds. Mr. Yocum now resides in a climate more suitable for palms, that of Arizona where he is working on pollen as a technician at the University of Arizona, Tucson.

Dr. Tomlinson's articles continue though now from the Fairchild Tropical Garden where he is engaged as Botanist

5. Floridians Marion Sheehan, Drs. Sam McFadden, Tom Sheehan and Ray Noggle admired *Chamaedorea microspadix*. Photograph by Nixon Smiley.

continuing his anatomical studies of palms and other plants. Another Palm Society member, Robert W. Read, joined the staff of the Garden in September as Taxonomist.

PALM LITERATURE

Macbride, J. Francis. "Palmae" in Flora of Peru, *Field Museum of Natural History, Botanical Series* 13(1): 321-418. 1960. Publication 895 of the Chicago Natural History Museum, Roosevelt Rd. and Lake Shore Dr., Chicago 5, Illinois. Price $1.75.

The Flora of Peru is appearing serially. Part 1, No. 2 deals with the Palmae and was published on August 17, 1960. The account is chiefly technical, without illustrations, and based largely on the literature.

In introductory paragraphs, Dr. Macbride has written "The generic key, traditionally usable only by those whose vocation is the study of palms, has been devised with some sacrifice of precision for the benefit of those whose interest in them is a hobby . . . " Regrettably, this lack of precision makes the key at best misleading, at worst useless for either amateur or professional botanist. Palms, like most other kinds of plants, cannot be satisfactorily identified with-

out recourse to and understanding of the flowers and fruits. Therein lies the challenge to those who desire to study them as a hobby. To wish otherwise will not change their essential nature.

Certainly not all students of the palms will agree with the union of *Socratea* and *Iriartella* with *Iriartea*. These genera are abundantly distinct in the field and herbarium when inflorescences, flowers and fruits can be observed. Several errors should be noted. *Chamaedorea* and *Maximiliana* are misspelled throughout. *Morenia* does not normally have inflorescences of both sexes on the same plant as stated in the generic key. In the same place, characters of *Tessmanniodoxa*, excluded from the Peruvian flora, are attributed to *Tessmanniophoenix* which Macbride maintains as a genus distinct from *Chelyocarpus* though Burret, in 1941, considered *Tessmanniophoenix* synonymous with *Chelyocarpus*. A real understanding of these fan palms and of the Peruvian palms in general still requires much more study of them in the field.

Weber, Claude and Shirley C. Tucker. *Flowers and Botanical Subjects on Stamps*. 164 pp. American Topical Association, 3300 North 50th Street, Milwaukee 16, Wis., 1960. Price $5.00.

For the philatelist interested also in palms, pages 73-84 of this handbook contain a listing of stamps adorned with palms. Mrs. Weber wrote "Palms on Postage Stamps" in *Principes* 4: 9-16, 1960.

Predictably, the coconut, *Cocos nucifera*, the date palm, *Phoenix dactylifera*, and the African oil palm, *Elaeis guineensis*, lead the list. Others are *Areca Catechu*, *Arecastrum Romanzoffianum*, *Borassus aethiopum*, *B. flabellifer*, *Calamus* spp., *Chamaerops humilis*, *Jubaea chilensis* (as *J. spectabilis*), *Lodoicea maldivica* (as *L. callipyge*), *Maximiliana Martiana* (as *M. regia*), *Metroxylon Sagu*, *Nypa fruticans*, *Orbignya Cohune*, *Phoenix canariensis*, *Pritchardia pacifica*, *Raphia vinifera*, *Roystonea oleracea*, *R. regia*, *Sabal Palmetto* and *Washingtonia filifera*.

H. E. MOORE, JR.

Essays on the Morphology of Palms

P. B. TOMLINSON

III. SEEDLING LEAVES AND JUVENILE FOLIAGE

It is useful to consider the first leaves developed by seedling palms in some detail because they are likely to be familiar objects to nurserymen who raise palms from seed and also because they are much easier to understand than are complex adult palm leaves. Having understood seedling palm leaves it then becomes easier to comprehend adult palm leaves.

Palm leaves, like those of many other monocotyledons, consist of four main parts (Fig. 6A). There is a sheathing base which encircles the stem, a long narrow petiole which extends into the rachis bearing pinnae or segments together forming the blade or lamina. The first plumular leaves are peculiar since they have no blade (see *Principes* 4:56-61. 1960). They are reduced scale-like structures and probably have a protective function. Their number is always small but seems to be constant for each species. These scale leaves are soon suc-

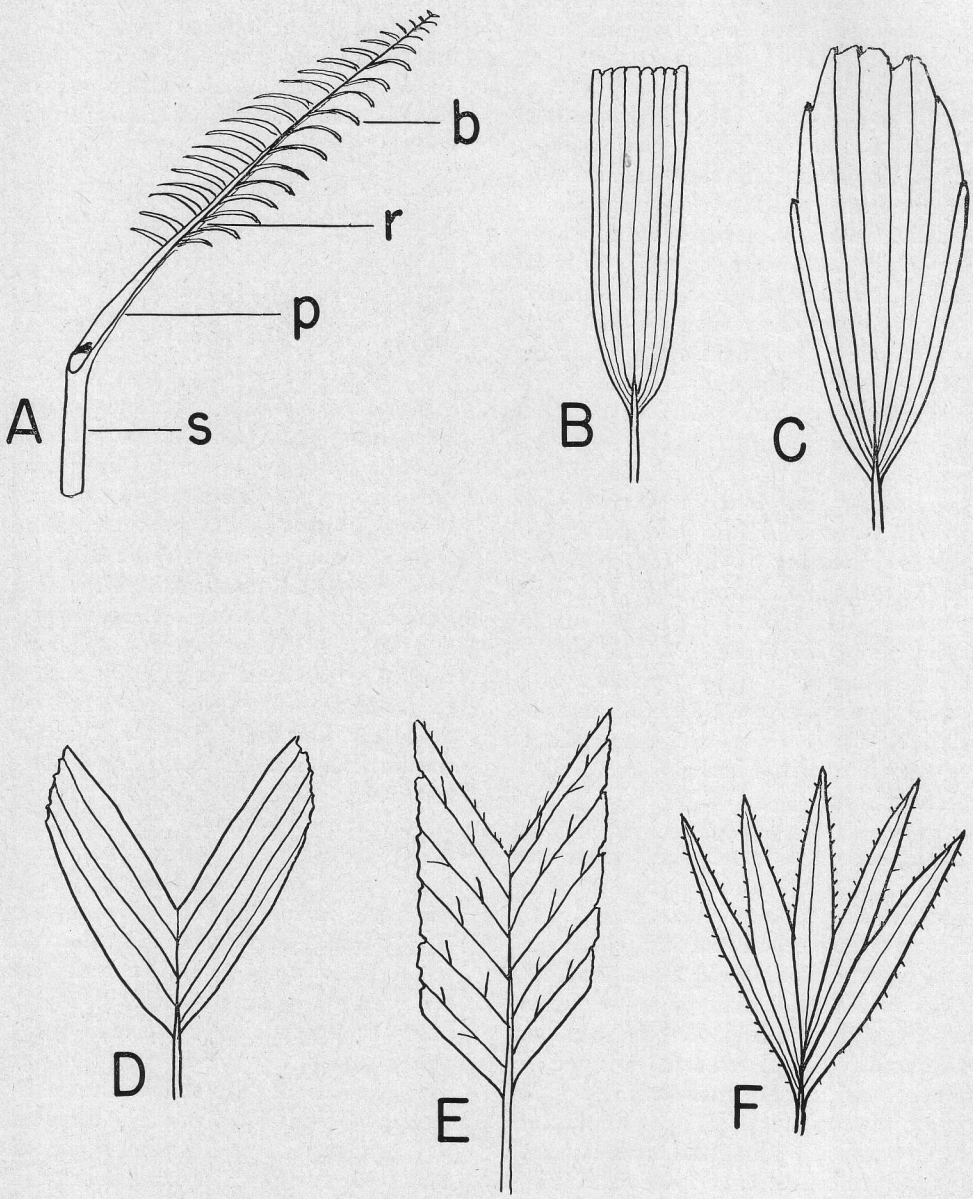
ceeded by true foliage leaves with green blades and in speaking about the latter it is necessary to refer to them as the first foliage leaves to distinguish them from the earlier, bladeless leaves.

Although there is a considerable range in blade shape of first foliage leaves in palms, it is very constant for each species. Detailed information about seedling foliage in palms is not often recorded in taxonomic writings. This is rather unfortunate, because familiarity with seedling palms soon suggests that it is possible to recognize the genus or even species to which an individual belongs from an examination of its first foliage leaves, a fact which must be well known to nurserymen. Thus the possibility arises of recognizing wrongly identified palms in their youngest stages and so preventing wastage caused by the unnecessary cultivation of valueless plants. Apart from the general shape and size of the blade, the distribution and frequency of hairs, prickles and other appendages are all useful diagnostic features. However, the general shape of the first foliage leaves is our immediate concern.

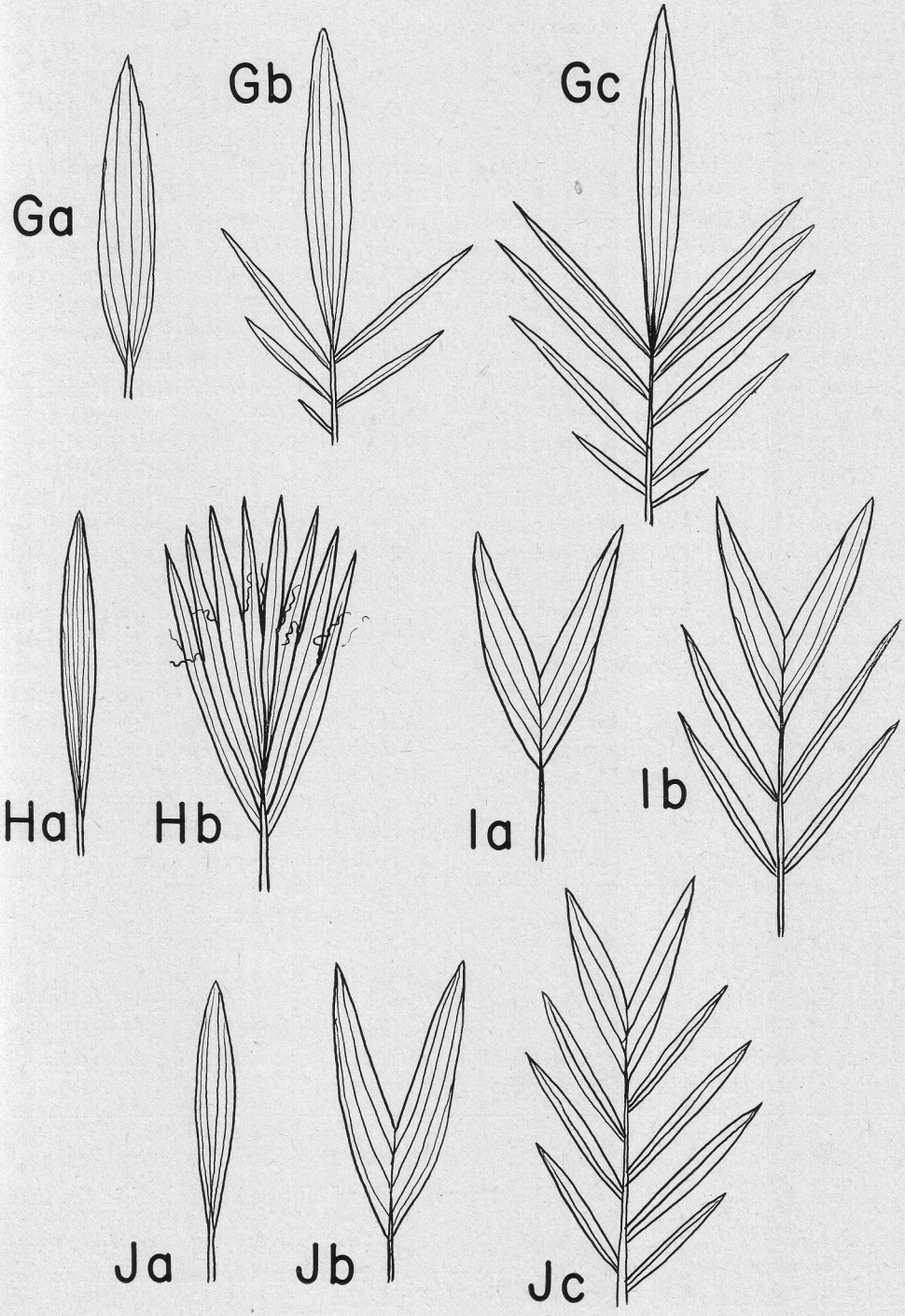
The first foliage leaf of any palm can be placed in one of a few classes. It is usually simple, rarely compound. If simple it may be either narrowly lanceolate (spear-shaped) (Fig. 6Ga), or bifid (Fig. 6Ia) i.e. having two segments separated by a deep median incision. Lanceolate blades sometimes have a notched or truncate apex, as in *Licuala* and *Livistona* (Fig. 6B); sometimes, as in the caryotoid palms, the blade is more broadly flabellate than lanceolate (Fig. 6C). In the bifid type of leaf the shape of the two segments varies enormously. Thus in many ptychospermate palms the apex of each segment is truncate instead of pointed (Fig. 6D), in *Aiphanes* the margin of the blade is notched (Fig. 6E) whilst in the iriartoid (stilt-) palms the blade is irregularly toothed and sometimes the apical incision is so shallow that the blade seems to be entire. These differences are but the earliest expression of leaflet shapes characteristic of all later leaves.

Compound first foliage leaves may have a digitately divided blade, as is not uncommon in the borassoid fan palms (Fig. 6F), whilst in the feather-palms the blade is sometimes pinnately divided as for example in *Raphia, Nephrosperma* and *Howeia Belmoreana* (Fig. 6Ib).

The long series of leaves developed by seedling palms may be referred to as juvenile foliage in order to distinguish them from the adult foliage developed by well-grown palms. In some palms juvenile foliage may be quite different from the adult type of leaf. This is most striking in the climbing palms (rattans) and it is not unknown for a "new" species to have been described from non-flowering material which has turned out to be the juvenile foliage of a known species. Between the very first foliage leaf which is always small and usually simple and the very large, compound leaves of the adult foliage there is a long series of transitional forms of gradually increasing size and complexity. It would be impossible to describe in detail here the complete transition for even a single series but this is unnecessary because it is possible to divide palms into a few classes according to the sequence of leaf shapes shown by their juvenile foliage. If one watches the development of a young palm it is soon easy to decide to which class it belongs. One interesting observation that is likely to be made is that palms with a similar first foliage leaf have different leaf successions. Six main classes can be recognized.



6. Palm leaves, very diagrammatic and not to scale, blade only except A. A, leaf illustrating use of terms—sheathing base (s), petiole (p), rachis (r), and blade (b) which is rarely entire and may be segmented as shown. B-F, first foliage leaves of palms: B, *Licuala*; C, *Arenga*; D, *Ptychosperma*; E, *Aiphanes*; F, *Latania*. G-J, juvenile palm leaves, first foliage leaf (a) and later juvenile leaves (b,c): G, *Phoenix;* H, *Washingtonia;* I, *Chrysalidocarpus;* J, *Roystonea*.


Ga
Gb
Gc
Ha
Hb
Ia
Ib
Ja
Jb
Jc

1. In *Phoenix* the first foliage leaf is lanceolate (Fig. 6Ga). Eventually compound leaves are produced in which lateral leaflets are inserted below a terminal leaflet. (Fig. 6Gb). Later leaves have more lateral pinnae which are reduced to spines at the base (Fig. 6Gc). This type of pinnate leaf with an odd terminal leaflet is described as imparipinnate and all adult leaves of *Phoenix* are clearly imparipinnate. A similar transition is found in all the caryotoid palms, with the exception of *Caryota* itself, but it is often difficult to recognize the odd terminal leaflet in adult leaves.

2. In the borassoid and sabaloid fan-palms, which have an entire, lanceolate first foliage leaf (Fig. 6Ha), the transition series usually includes a succession of broader blades which are split into an increasing number of "fingers" or segments (Fig. 6Hb) until the broad fan of the adult foliage is produced.

3. In the majority of feather palms belonging to the arecoid, bactroid, chamaedoreoid, iriartoid and lepidocaryoid groups in which the first foliage leaf is bifid (Fig. 6Ia), it is followed by pinnate leaves with a series of lateral pinnae inserted below a pair of equal terminal pinnae (Fig. 6Ib). Such a leaf is described as paripinnate. Adult leaves which terminate this series are also paripinnate.

4. *Roystonea* and *Stevensonia* are the only representatives known of a small class which is unique in that it also ends with paripinnate leaves (Fig. 6Jc) but starts with a simple, lanceolate leaf (Fig. 6Ja). In between is a series of bifid leaves (Fig. 6Jb). Consequently this series contains a greater number of different leaf types than is found in any other series.

5. One other series begins with a lanceolate first foliage leaf. This occurs in the majority of cocoid palms, but not in the coconut itself. In this type the lanceolate leaves are succeeded by leaves which are irregularly pinnate since the arrangement of segments on opposite sides of the rachis is very inconstant and uneven and the leaves are neither pari- nor imparipinnate.

6. There still remains the transition series exhibited by those palms in which the first foliage leaf is already compound. In these, whether they belong to fan or feather palms, there is a gradual increase in size and complexity of successive leaves and no new types of leaf are involved.

Taken by itself, a knowledge of the different shapes of leaves produced by seedling palms does not mean very much. However, it is hoped that these notes will be a useful introduction to the study of the adult palm leaf which will appear in the next essay. In addition, the subject is of considerable theoretical importance and leads to a better understanding of the probable evolution of the palm leaf as I have tried to indicate in a separate and much more detailed article (Tomlinson, 1960).

Literature Cited.

Tomlinson, P. B. 1960. Seedling Leaves in Palms and their Morphological Significance. *Journal of the Arnold Arboretum 41*:414-428. 1960.

Ceroxylon alpinum, the Correct Name for the Quindío Wax Palm

The genus *Ceroxylon* is usually attributed to Humboldt and Bonpland in the first volume of their *Plantae Aequinoctiale* (1805). Bonpland, however, had anticipated this publication in the *Bulletin des Sciences, par la Société Philomathique, Paris* 3(91): 239. Sept.-Oct. 1804. Thus *Ceroxylon alpinum* Bonpland, used there, is the earlier and correct name for *C. andicola*. H. E. M., Jr.

Palms for Home and Greenhouse

by David Barry, Jr.

Reprinted with additions from *American Horticultural Magazine*, January, 1961.

Palms are an essential to the planting of a conservatory. There is no substitute for the grace and beauty of their curving fronds. In fact, one cannot visualize a conservatory without seeing palms—grouped together, lining paths, or soaring on slender trunks high above the rest of the plants. Just as a conservatory needs palms to complete its effect, the general aspect of a home can be greatly improved and made a more friendly place with a palm or two in the house or garden.

Not only are palms beautiful to behold in homes and conservatories, but they are also of easy culture. Palms are "used to people." An old saying goes that the coconut palm will not live beyond the reach of the human voice, meaning that its welfare depends upon the attention given to it by man. Nature is often careless in providing food and water when needed, while the palm grower, if he follows a few rules, can easily take care of these matters, as well as those related to planting and potting.

Palms do well as container plants because they put up with crowding and have no tap roots. They can be grown thriftily in containers that are small in relation to the size of the plant. When planting palms, however, or especially when re-potting them into a larger container, be sure to compact the soil with great firmness, otherwise the roots will not penetrate into the fresh soil. They will grow instead round and round in the old ball and the plant will eventually die. After the soil has been firmly compacted colored pebbles may be placed on top of the soil to provide a decorative touch. These pebbles, graded in size, color, and texture, are imported from Japan and Mexico for this purpose.

When palms are grown in planters, leave them in pots so that they can be revolved from time to time to prevent their leaning in the direction of the strongest light. Thus the natural erectness and symmetry of the plants can be maintained. If the plants are in pots, furthermore, they can be taken outside for spraying with insecticides without first having to be dug out of the planter. To give such plants in pots the appearance of growing naturally in the planter, place moss or peat moss between the containers and level it off at rim level to the trunks of the plants.

The most difficult problem facing the grower of palms and other indoor plants is how much, and how often, to water them. When a potted plant is given insufficient water the small feeding roots dry up and die. Then the plant cannot feed itself until water is provided and new feeding roots are formed. This process takes time, and the plant suffers meanwhile. In order to avoid this drying out of the feeding roots, which will likely be located at the bottom of the pot, give water two or three times a week in sufficient quantity so that all of the soil in the container becomes moist. A test is to be sure that water emerges from the drain hole. Two or three fillings of the pot to the rim may be necessary. A little experimenting with each potted plant will help the grower develop a watering routine. Bear in mind also that the water requirement may change with the seasons. Frequence of watering can be reduced if containers of wood or tin are used in place of porous clay.

Palms will grow well in a variety of soils. Nevertheless, even though a palm may grow naturally in a heavy soil, the rule to follow in container culture is to use a soil mixture through which water will pass readily. To a light, porous, or sandy soil, add humus, peat, or leaf mould. In general, good drainage is essential to permit aeration between waterings, letting in the oxygen that is essential to root development. In particular, in some areas, such as Southern California where the water is alkaline, lack of good drainage in a potted plant will trap the alkaline salts and the plant will become unhealthy. A usual sign is the brown-tipping of the leaves. Salt accumulation may be visible on the surface of the soil, and may form a crust which should be replaced with fresh soil.

With potted palms there are no problems in fertilization that are peculiar to the palm family. Simply follow the directions of the manufacturer of any fertilizer that is fairly balanced between the essential elements. If possible alternate between the organic and inorganic kinds. If growing palms in a temperate zone stop feeding with the advent of cold weather and resume in the spring with the beginning of warmer weather.

Among the few pests that may afflict household palms are mites known also as red spiders, mealy bugs and scale. When a leaf area begins to lose its green color and to turn brownish examine the underside for minute crawling "insects." You may expect to find mites especially when the air is dry. An infestation may attack the leaves of a palm severely enough to change markedly its appearance within two or three days. Lose no time in spraying the entire plant, with thorough attention to the underside of the leaves. Repeat twice at four day intervals to extinguish completely the infestation. Use a miticide, a specific for mites. Malathion and other insecticides may have no effect on mites. Pests other than mites may be controlled without haste as they are slow to disfigure a palm. Use any of the spray insecticides on the market for the purpose. Malathion is excellent. A word of caution: an oil-base spray suitable for woody plants outside should be used half-strength on palms, whether interior or exterior plants, to avoid the chance of burning the leaves. If mealy bugs get down between the trunk and the dry leaf sheaths, loosen the sheaths so that the spray can reach the insects.

An easy way to kill mealy bugs on a palm or two is to touch the insects with rubbing alcohol, applied either with a small cotton swab or brush.

When palm leaves become old, a natural process, they become dry, begin to lose their green color, sag or may break at the stem. Cut off any old unsightly leaves. In doing so do not remove the leaf sheaths prematurely. Wait until they are dry and easy to loosen for if pulled away forcibly while still green, strips of trunk below the ring of attachment will be torn off with the sheaths, forming permanent scars. The immaculately clean and smooth trunk of a palm is an element in its beauty.

Over the years the premier indoor palm, especially in public places, has been the so-called kentia: *Howeia Forsteriana.* The popularity of the plant justly rests on a combination of beauty and durability. The dark green, arching leaves are thick and hard-finished. They resist cold, lack of light, and neglect. This *Howeia* is not tropical, but semi-tropical. It comes from Lord Howe Island off the coast of New South Wales where the mean temperature is too low for the coconut palm. It will withstand several degrees below freezing, a resist-

7. Chamaedoreas planted in groups, with *C. elegans* in the foreground, on display at the Fairchild Tropical Garden. Similar effects can be obtained in the greenhouse. Photograph by Nixon Smiley.

ance that is important when the plant is used in buildings where heating is not maintained through the night. *Howeia* is usually planted three or four to the pot to create a many-leaved, full-foliage effect, and thus the palm appears to be a clustered type.

When the climate is warm and tropical, the commonest palm is *Chrysalidocarpus lutescens*, a native of Madagascar. It is a tropical plant and will not stand frost. It makes a very fine pot plant, and is a common house plant in many parts of the world. In large containers the smooth trunks reach a diameter of two or three inches, arching out at soil level to form beautiful, multiple-trunk, candelabra forms. In small containers, the trunks are much more narrow. Sometimes the plant is grown in a profusion of narrow trunks as many as twenty to a five inch pot. This style is common in Hong Kong where the plant is everywhere—inside, outside, low in gardens, and high on balconies.

Among single-trunk palms that do provide a desirable thickness of foliage are the many-leaved date palms of the genus *Phoenix*, and *Syagrus Weddelliana*. Most of the date palms are too large for tub plants. Sometimes young plants of *Phoenix canariensis* are used around public buildings, at the bottom of light courts for example, to provide greenery. The commonest *Phoenix* for interiors is *P. Roebelenii*, the dwarf date palm. It makes a splendid house plant. The crown of a well-grown plant will comprise thirty to forty leaves with a diameter of from four to six feet, and the slender trunk a diameter of around four inches. The plant will withstand at least 18°F. in the open. In Japan, especially, this species is grown to robust and pleasing proportions for interior use.

Syagrus Weddelliana provides somewhat the same appearance as *Phoenix Roebelenii*, but with more open and delicate foliage. It is likewise slow in growth. *Syagrus* is more difficult to grow and is more susceptible to attack by mites. Formerly in large production in the United States its popularity should be restored by increased production.

The palm that in a few recent years has gone to the head of the list in American house palms is *Chamaedorea elegans* which is most frequently sold under the erroneous name *Neanthe bella*. *Chamaedorea elegans* has become a chain store item and is raised by the hundreds of thousands principally in Florida. It is used as a solitary pot plant, and when very small as a dish garden plant. Sometimes it is assembled in groups. The species is fast-growing, and is easy to grow. The popularity of this plant is richly deserved as it is truly a horticultural gem. When young it provides the charm of a miniature. When in a three inch pot, with a width and height of only a foot, and a trunk diameter of half an inch, the plant will go through its reproductive cycle, forming floral branches and flowers that extend up among the green, feathery leaves. Such precociousness in a palm so small! Ordinarily years must pass before a palm is old enough to flower.

Very popular house and conservatory palms are *Rhapis humilis* and *Rhapis excelsa*, clump palms with fan-shaped leaves. These species give a bushy, bamboo effect and will luxuriate in shade or semi-shade in the semi-tropics. They are slow-growing, and hardy, withstanding at least 18°F.

Palms of the American genus *Chamaedorea* are deservedly growing in popularity as house plants. In Europe they have been used as such for many years. The virtues of *Chamaedorea* palms for interior use are many. The most important is their ability to grow thriftily

where the amount of light is deficient. They will also stand considerable neglect in watering, as many species come from regions of prolonged dry seasons. The dozens of species present a great variety of appearance. The most popular kinds are the clump-forming types. The reed-like stems and feathery leaves remind one of bamboo which, as a decorative motif, is much sought after. Such a resemblance is a valuable characteristic of these palms, as bamboo is not suitable for the interior because it sheds brown leaflets profusely and requires bright light. Many *Chamaedorea* species will withstand several degrees below 32°F. They should not be grown in full sun. Single-trunked species can be planted together in one container to make a thicker foliage.

At the present time multiple-stemmed species *Chamaedorea erumpens, C. Seifrizii* and *C. costaricana* are commonly used in Florida and in California. The last is the best palm of the three in growth habit, leaf pattern, and depth of color. Single-trunked *Chamaedorea* species now in commercial production are *C. Ernesti-Augusti, C. Klotzschiana,* and what is erroneously referred to in the trade as *C. cataractarum.* Each species has its own distinctive foliage characteristics, and is to be highly recommended as a house plant.

In addition to the naturally lower growing palms, many tall tree palms will make attractive container specimens for interior use as juvenile plants. Examples are palms of the genera *Archontophoenix, Dictyosperma,* and *Ptychosperma.* Among other clump-forming palms that are justifiably popular for similar use are the fish-tail palms, *Caryota,* and several species of *Ptychosperma* of which the most common is *P. Macarthurii,* the Macarthur cluster palm.

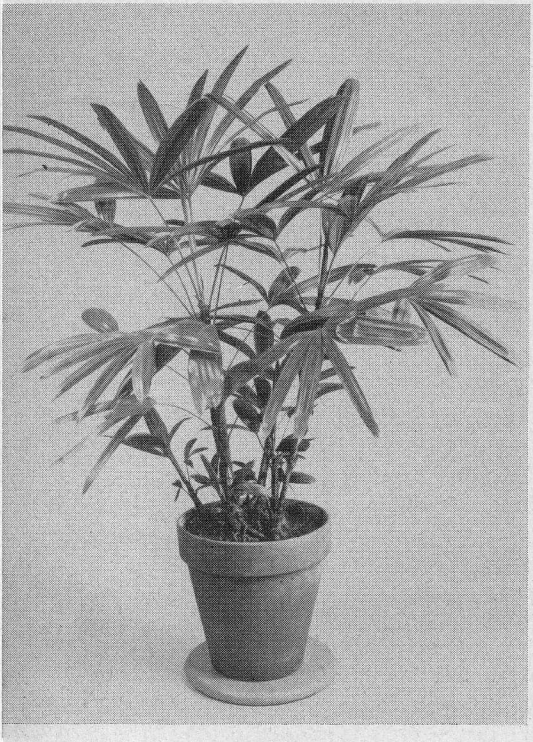
One of the most delightful palms for interior use is *Livistona rotundifolia.* It is a tall, tropical tree. When young, and in small containers, it will remain small. The numerous fan leaves look like fringed dinner plates. The effect is charming. This species is not as commonly grown today as some years ago, but it deserves a return of popularity. Its more hardy relative, *L. chinensis,* a fairly common plant in Florida, is not as suitable for interiors as *L. rotundifolia.*

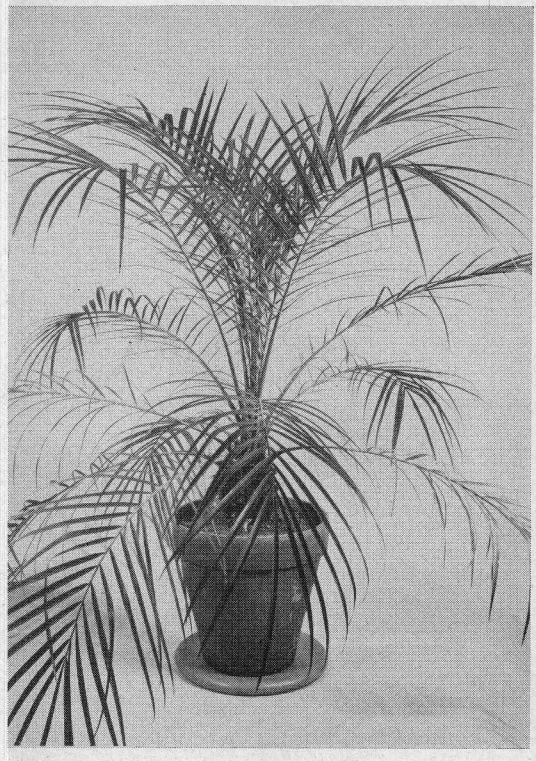
The kinds of palms currently used in interiors are few compared to the great many species that could be used. Palms that are being newly introduced to horticulture will find their way into homes and conservatories. Many of them are of exceptional beauty and interest. Among the future house palms will be such dainties as the species of *Reinhardtia* with numerous slender trunks and "windows" in their leaves. Many other *Chamaedorea* species and small palms from Madagascar will find their way to interior use. The same prospect holds for new *Rhapis* palms, such as the variegated form, and a very diminutive one. Also there are several species of *Licuala* which may do well as potted plants.

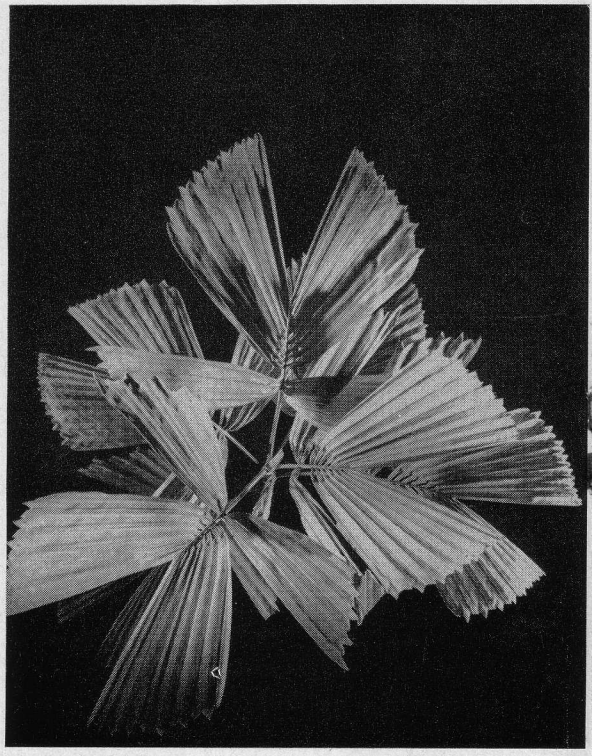
For the present, there is available among nurseries and florists in the United States a sufficient variety of palms to fulfill with their beauty, exotic quality, and dependability any interior requirement.

Palms Suitable as House and Conservatory Plants

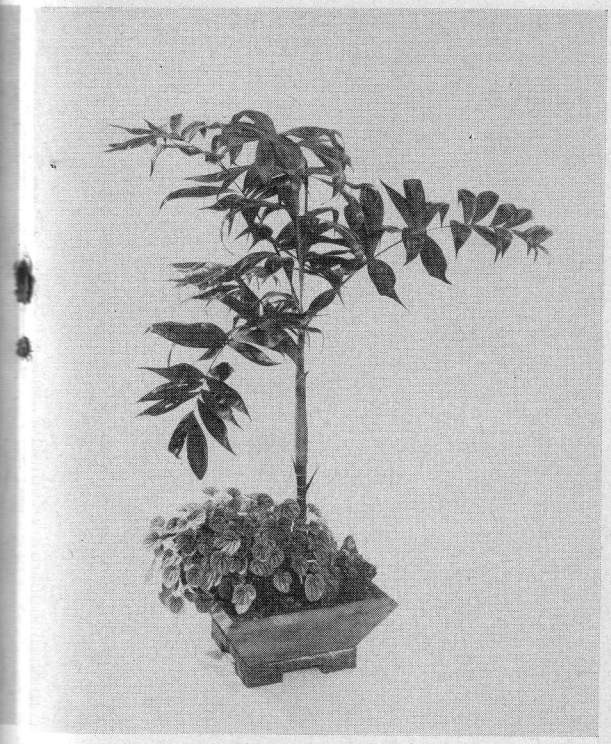
List 1: species which are dwarf or semi-dwarf for pots or tubs.







8. Palms grown indoors. *Rhapis excelsa* (top left); *Licuala* sp. (top right); *Phoenix Roebelenii* (bottom left); *Reinhardtia gracilis* var. *rostrata* (bottom right). Photographs by G. Hampfler from plants grown at Longwood Gardens.



9. *Chamaedorea Klotzchiana* (top left); *C. Ernesti-Augusti* (top right); *C. costaricana* (bottom left); *C.* sp. known erroneously as *C. cataractarum* in the trade by not yet satisfactorily identified. The plant is female with bright red fruit (bottom right). Photographs by George de Gennaro.

Balaka Seemannii, Calamus ciliaris, Chamaedorea sp. (*C. cataractarum* of trade), *Chamaedorea concolor, Chamaedorea costaricana, Chamaedorea elegans, Chamaedorea Ernesti-Augusti, Chamaedorea erumpens, Chamaedorea geonomaeformis, Chamaedorea Klotzschiana, Chamaedorea Seifrizii, Chamaedorea Tepejilote, Chamaerops humilis, Chrysalidocarpus lutescens, Coccothrinax argentata, Drymophloeus Beguinii, Hedyscepe Canterburyana, Howeia Belmoreana, Howeia Forsteriana, Licuala grandis, Licuala spinosa, Phoenix Roebelenii, Pinanga Kuhlii, Reinhardtia gracilis, Rhapis excelsa, Rhapis humilis, Syagrus Weddelliana.*

List 2: species which, when young, make good pot or tub plants but with age need to be given larger containers or planted in the ground.

Aiphanes caryotaefolia, Archontophoenix Alexandrae, Archontophoenix Cunninghamiana, Areca triandra, Arecastrum Romanzoffianum, Arenga Engleri, Butia capitata, Caryota mitis, Caryota "plumosa", Caryota urens, Cocos nucifera, Dictyosperma album, Heterospathe elata, Livistona chinensis, Livistona rotundifolia, Paurotis Wrightii, Phoenix canariensis, Phoenix reclinata, Phoenix rupicola, Ptychosperma elegans, Ptychosperma Macarthurii, Thrinax parviflora, Trachycarpus Fortunei, Veitchia Merrillii, Washingtonia robusta.

Palms in Decorative Arrangements

LUCITA H. WAIT

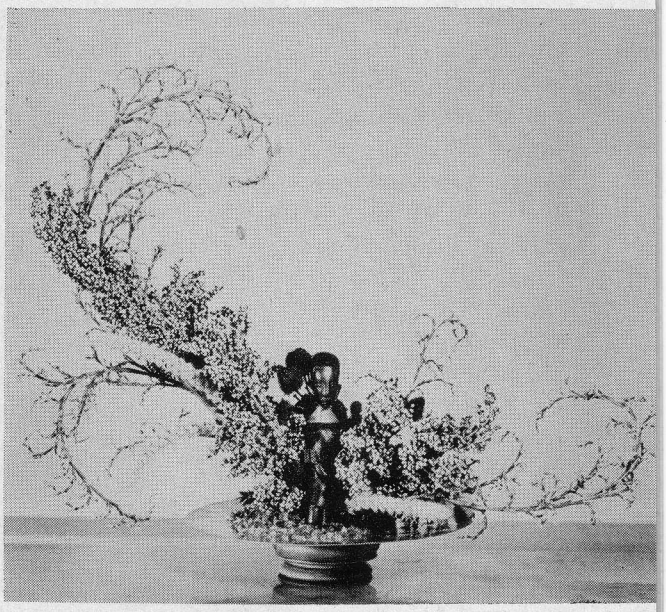
Reprinted with additions from *American Horticultural Magazine*, January, 1961.

The inventive arranger with a fresh approach to his or her material can find many uses for various parts of the palm —be it spathe, leaf, fruit or flower. "There is hardly a palm that does not offer something which can be used in arrangements," observes the superintendent of one of the world's largest private palm collections. Leaves, either feather- or fan-shaped, in their varied tints of green, gray or silver; many-branched inflorescences; fruits which may be scarlet, yellow, brown, or blue, can be gathered for use in fresh arrangements. Dried materials with odd form or shapely curve can be carefully stored and brought out when needed.

The qualities which make palm materials valuable are: their sculptural form, durability (especially when dried), their relative rarity and, in some cases, their color values. Fresh materials can be freely used where palms grow abundantly; they can be used alone or in combination with other plant material. One more often sees them in their dried forms, however, for then they can be kept indefinitely and shipped any distance. An example of the virtues of palm material is a fine cluster of *Raphia Ruffia* fruits (Fig. 11). The seeds of this Madagascar palm are encased in hard shiny shells, beautifully incised in a diamond design. A cluster of several fruits has weight, which makes it excellent as a center of interest or base for a composition. When fresh, the color range is in dull greens, orange and brown, which changes with time to a rich glossy brown. If some dried twigs of the inflorescence are left attached, they add line to the mass.

Using Dried Materials

In creating a dried arrangement using palm materials it is worth while to take time and to give considerable thought in



10. Delicate sprays of *Copernicia glabrescens* form the main line of this arrangement. Heavy heads of beige sorghum cane lead the eye toward the figure, which stands on a dull brass cymbal set on a round butternut bowl. Spikes of cream-colored millet and fuzzy pods of lipstick bush (*Bixa orellana*) give variety. The turquoise background is echoed in the turquoise glass chunks at the foot of the figure. Arrangement: Mora Lincoln. Photograph: Henry J. Rahmlow.

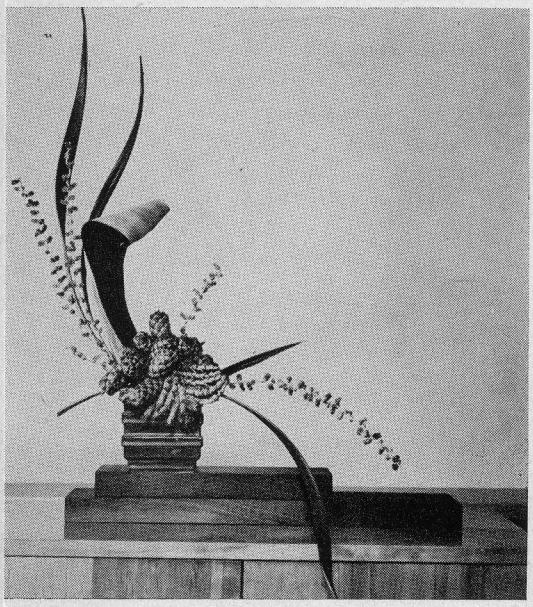
making the arrangement. For if well done an outstanding composition will last indefinitely—it can be displayed for a while, put away, then brought out again and again. A well-known arranger in southern Florida has several of these handsome creations which she not only uses repeatedly herself but has lent to others for demonstration purposes.

Spathes

Spathes are valuable because of their durability, form and sculptural qualities (Fig. 11). The spathe is the protective outer covering of the flower cluster. While immature it is generally green in color and may be shaped like a sword, a horn, a flat pocket, or a long switch. When the flowers are ready to appear, the spathe splits lengthwise. Many palms have thin papery spathes of no value to the arranger; others, however, are strong and hard. They are thick or thin, long and narrow, boat-shaped or spreading, according to the species of palm from which they come. Usually they are smooth inside, with a good natural finish, while outer surfaces may be prickly, woolly, or have fissures running lengthwise. Occasionally there is a difference in color between the inner and outer surfaces.

Spathes can be used in various ways—as containers, as background and for line. The heavy spathe of *Scheelea* has been effectively used in an architectural sense (Fig. 15). In Fig. 11 a thinner variety, darker on one side than the other, has been split into narrow strips and twisted into interesting lines.

The palms of the genera *Attalea*, *Scheelea* and *Orbignya* are almost impossible for the layman to tell apart. All bear enormous spathes which open to reveal great ostrich plumes of flowers in orange-yellow or lavender, followed by huge bunches of fruits. The spathes are from three to six feet long, deeply grooved on the outside, with a projection four or five inches long at the tip. When they open it can be seen that the shell is quite thick, a half inch or even thicker. They usually remain upright



11. Brown vase, 4 inches tall, placed on two 1¼-inch pieces of walnut of different lengths. Vase is filled with a thick block of styrofoam. The main lines are created from strips of palm spathe which was split along the natural fissures, then soaked in water for several hours until pliable. To show the dark brown inside and beige outer surface, the strips were twisted and weighted down until dry. The short stub at lower left is a continuation of the strip of spathe making the low sweeping line on the right, firmly fastened to the styrofoam with wire. A fine cluster of *Raphia Ruffia*, with finger-like pieces of dried flower-stems attached, forms the center of interest. The wide curved piece at upper left is a leaf sheath of *Chrysalidocarpus lutescens*. The delicate sprays are dried date palm fruits, sometimes called "moon berries" by florists. These stems are useful even after the dates have fallen off. Arrangement: Mora Lincoln. Photograph: Henry J. Rahmlow.

after the inflorescence has been released; occasionally, however, they become twisted into odd and ornamental forms. These spathes have a somewhat open, porous texture. After a time they may be attacked by borers, and a fine sawdust begins to sift out of them. This calamity can be avoided or delayed by saturating the spathe with a colorless insecticide.

Coconut spathes have been cheapened in some localities, the writer believes, by being painted rather garishly and sold as souvenirs, made into hors d'oeuvres trays, or, with the inflorescence left in and painted to resemble flowers, used as table centerpieces. In their natural form, however, they remain useful to the arranger. Trees which receive ample fertilizer and water produce larger, thicker spathes.

The queen palm (*Arecastrum Romanzoffianum*) has spathes which vary in size and thickness. There is a tree

in Orlando, Florida, which produces spathes of such good quality that they are in demand for making handsome trays, dishes, etc. Spathes of *Syagrus* are particularly good, being thin but hard, and of an attractive rich brown color. The spathes dry wide open with a graceful twist and are adaptable for use as bases for fruit arrangements and in many other ways. *Arikuryroba schizophylla* has very slender narrow spathes, in demand for adding height without heaviness.

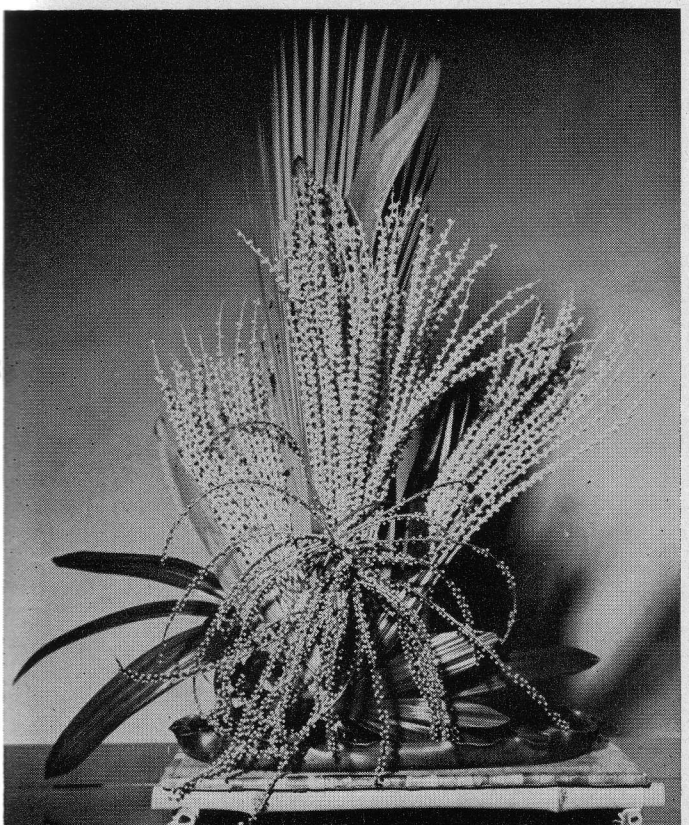
Leaves

Palm leaves are more often used in the fresh state, as they tend to curl up when dried. Some, though, are thicker and have a higher silica content; these can be placed between sheets of newspaper, shaped as desired, weighted down until dry, then trimmed to size. When carefully done, good effects are achieved (Fig. 14).

Leaf sheaths or bases, the part of the petiole which encircles the palm trunk, are sometimes used. The so-called areca palm, *Chrysalidocarpus lutescens*, has a long rather papery leaf-sheath which, when it drops off, curls into very good lines. The petiole is cut to the desired length and used as the "stem," while the sheath, turned upside down, becomes the top. (Fig. 11).

Inflorescences

The inflorescence consists of the spathe, the rachis or stem (usually branched), and the flowers, either pollen-bearing (male) or pistillate (female), or both. Most palms have both kinds of flowers on the same inflorescence, with the female flowers sometimes concentrated toward the base of the branch and the pollen-bearing or male flowers beside the female flowers and paired or solitary at the tip. The male flowers drop off after opening and shed-



12. Supple fronds of *Chamaedorea elatior* make a frame for three unopened spathes of *Phoenix reclinata* in a vibrant orange color, and an open one spilling strands of creamy buds. At lower left a bit of dried palm frond echoes the outer curve and those of the bright green immature *Chamaedorea* inflorescence. An Egyptian bronze vase lends weight to the composition.

13. Three cream-colored inflorescences of *Phoenix reclinata* bursting from their orange spathes, with an unopened spathe curving above them. In the center foreground, an inflorescence of the climbing *Chamaedorea elatior*—green raches and tiny bright yellow flowers. Dark shiny green *Rhapis* leaves at the bottom; at the top, the yellow-green of a half-opened fan palm leaf. Arrangements: Stella Simmons. Photographs: Kent Gatteri.

ding their pollen, leaving the pistillate flowers to form fruits. Thus, we often see the branched panicle with fruit maturing on the lower part of the branches and the upper part bare. Coconut "roses" are persistent sepals and petals from which the immature coconuts have dropped. The excess twigs can be trimmed off and the "roses" used in arrangements.

Other palms, such as the species of *Copernicia*, have dainty inflorescences which dry in intricate and lovely curlicues. *C. glabrescens* is one of the favorites in this respect. If handled gently, the dried flower branches are remarkably durable in spite of their fragile appearance. (Fig. 10).

The species of *Latania* bear male and female flowers on separate trees; the dried stems of both are sought after by arrangers. The inflorescence of a *Geonoma* species, probably *binervia*, has been dried, lacquered bright red and used as a Christmas tree in a home in Panama.

Fruits

Palm fruits lend themselves well to decorative purposes. *Raphia Ruffia*, one of the choicest, has been mentioned above. There are few mature *Raphia* palms in the United States, however, so fruits are at a premium. Anyone owning a good cluster is fortunate, and knows enough to take good care of it.

The species of *Hyphaene* produce fruits with smooth skin, resembling small chocolate or gingerbread cupcakes. They grow singly or in groups along dark brown velvety branches. Carefully treated, they are long-lasting. The sweetish tasting meat around the seed is dry, so there is little danger of shrinkage and wrinkling. (Fig. 14)

Nypa, the famous swamp palm of Indonesian and Philippine areas, has unusual inflorescences and seed heads, the latter reminiscent of a primitive war club. There is some difficulty in keeping the large fruits from falling away from the stalk; harvesting at the proper point of maturity may control this.

Using Fresh Materials

When using fresh palm materials in any quantity, we are more or less restricted to areas in which many palms are grown out of doors so that cutting can be done as needed. More is constantly being learned about palm survival, and in time growing locations may be extended by judicious use of the proper species.

Those who have access to fresh palm materials already know how sensational a good palm exhibit can be. The scarlet fruits of *Veitchia Merrillii*, solitaire and Macarthur palms (*Ptychosperma elegans* and *Macarthurii*), the buccaneer or cherry palm (*Pseudophoenix spp.*) or the newly described *Veitchia Montgomeryana*, have been used with much success in southern Florida shows. Unfortunately, they hold their color and shape for only a few days, and cannot be dried successfully. *Thrinax parviflora* (the key thatch palm) has long sprays of white fruits like porcelain beads, while species of *Livistona* bear blue or olive-green fruits. Harder to find, but very handsome, are the compact bunches of large red or yellow fruits of the peach palm *Bactris Gasipaes*.

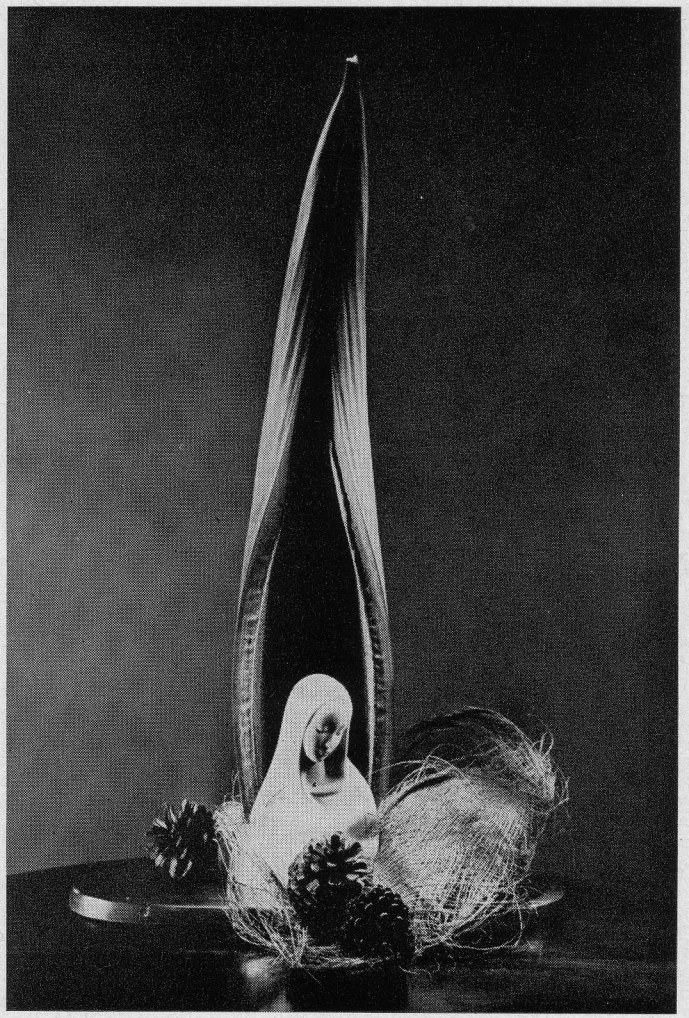
Most palm flowers are cream or white and very fleeting. An immature coconut spathe, for example, can be cut from the tree, slit carefully down one side, and the flowerstalk gently removed. When held upright and twisted from side to side, the branches of the inflorescence will fall outward, forming an ivory fountain which will last for about twenty-four hours, then begin to turn dark and the flowers drop. Churches sometimes use the flowers of queen palm

14. Asymmetrical and monochromatic dried arrangement on a heavy block of oak; needlepoint holder fastened down with florists' clay. Leaves of feather palm, dried and trimmed to size, form the triangle, with a heavy cluster of gingerbread palm fruits as the focal point. With the palm materials are used: two leaves of the gutta percha tree (*Palaquium Gutta*) with the gold underside exposed, glycerined eucalyptus leaves, sea oats, orange bittersweet and pods of *Pithecellobium Junghunianum*. Arrangement by Mora Lincoln; photograph by Henry J. Rahmlow.

(*Arecastrum Romanzoffianum*), prepared in the same way, as decorations on Palm Sunday.

There are brightly colored palm flowers also. Mention has already been made of the gorgeous yellow and lavender plumes of *Attalea, Orbignya,* and *Scheelea. Phoenix reclinata* has orange bracts surrounding white flowers; some jelly palms (*Butia capitata* var.) have lavender flowers. Male blooms of an *Arenga* species, erroneously called in southern Florida "*Wallichia caryotoides,*" are rich golden yellow and extremely fragrant—a two-inch piece will perfume a large room. The spindle palm (*Mascarena lagenicaulis*) is not at all showy unless flowers are seen under a magnifying glass, but its mignonette fragrance is delightful. A few strands of flowers might be introduced into a large arrangement for the sake of the scent.

Leaves of palms, used fresh, offer many opportunities for creative work. Mrs. Yoneo Arai, of Greenwich, Connecticut, has used the leaves of the dwarf palmetto, carefully trimmed and the petioles bent into curves, to make an outstanding arrangement in the Japanese manner. This arrangement has been pic-



15. Pottery head of madonna placed on an oval wood base. The Gothic arch is a *Scheelea* spathe cut in half crosswise and with the spike at the tip removed. A bit of coconut fiber and three pine cones complete this simple but elegant arrangement by Carol Landa. Photograph by G. Hampfler.

tured in numerous books and articles. *Thrinax microcarpa* leaves, fan-shaped, are blue-green on the reverse, and make a charming background for other greens and bright colors. *Livistona rotundifolia* has handsome shiny green leaves; those on mature plants may be too large for most uses, but young specimens, particularly if raised indoors, will furnish beautiful smaller leaves, unmarred by the hazards of outdoor conditions.

Where To Find Palm Materials

Few of us own or have access to large numbers of palm trees which may be plundered for artistic purposes. Therefore, we must have a keen eye for an

interesting piece wherever it can be found and not be timid about going after it.

Thousands of visitors to an area where palms grow, as well as residents, may daily pass by piles of trimmings from private grounds or parks. These trash piles at times are gold-mines for the assiduous seeker. A well-known artist from the Middle West combs trash piles whenever she visits Florida, sends home cartons of material culled from them and wins many blue ribbons. She wisely carries a pair of strong clippers and some work gloves in her car. Most home owners would be pleased and flattered to be asked for permission to look through a trash-pile on their curb or property, and might even offer other bits and pieces if enough enthusiasm is generated by the collector.

Curio and gift shops may stock a few items in their natural state. One that is known and patronized by many serious arrangers is The Palm Spathe, at Fairchild Tropical Garden, Miami 56, Florida, a non-profit botanical garden. Wholesale florist suppliers carry some dried palm articles. There most probably are other sources of which the writer does not know.

Uses of palm parts in arrangements are only in their beginning, and an alert person can find beautiful, interesting, and previously untried elements even in some of our most common palms, that will contribute to unique and pleasing arrangements.

Huntington Botanical Gardens

WILLIAM HERTRICH

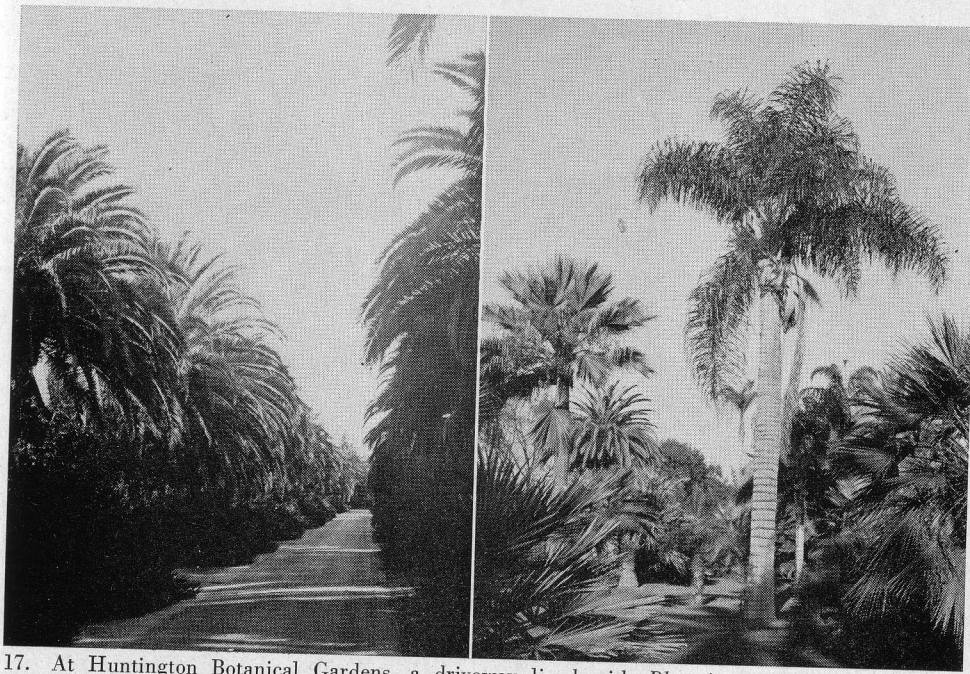
The Henry E. Huntington Botanical Gardens are located in the city of San Marino, about ten miles east of Los Angeles. The Gardens embrace two hundred and seven acres surrounding two large buildings. One building houses the famous eighteenth century art collection, the other the equally famous private library.

The late Henry E. Huntington acquired the property, known as the San Marino Ranch (embracing over five hundred acres) in 1903. At the time of the purchase, approximately a hundred and fifty acres of the land were planted to citrus trees; twenty acres to figs, peaches, walnuts, apricots and olives; seventy-five acres were allowed to stand as nature endowed them with native oak trees, chiefly *Quercus agrifolia* and *Quercus Engelmanii;* the remaining acreage was devoted to farm crops.

Mr. Huntington erected his pretentious residence during 1909 and 1910 and soon after began collecting his outstanding English paintings and other art objects. Then in 1919 he erected the large Library building to house his extensive private library. In that same year, Mr. Huntington established a trust to include the two above mentioned buildings with their contents and two hundred and seven acres of ground surrounding the buildings; the entire unit to be known as the Henry E. Huntington Library and Art Gallery. He also endowed the institution with sufficient funds, administered by a board of trustees, to maintain it in perpetuity.

The writer was engaged in January 1905 to develop part of the ground into a private park for the enjoyment of the Huntington family and, being very much interested in palms, proposed the assembly of a collection of such plants as early as 1906. Mr. Huntington was very much in sympathy

16. Palms at the Huntington Botanical Gardens. *Livistona australis* in the foreground and two *Jubaea chilensis* with thick trunks (top left); *Livistona decipiens* (top right); *Butia capitata* (bottom left); *Butia Yatay* (bottom right). Photographs by William Hertrich.



17. At Huntington Botanical Gardens, a driveway lined with *Phoenix canariensis* (left) and *Arecastrum Romanzoffianum* (right). Photograph by William Hertrich.

with the idea and a favorable location of about five acres in area, sloping slightly towards the south-east and adjacent to the ten acre tract reserved for the collection of cacti and other succulent plants, was set aside for the Palm Section. Since Mr. Huntington was anxious to create an immediate effect, some large specimens of *Phoenix, Washingtonia, Livistona,* and *Arecastrum* were moved in from Los Angeles and other nearby towns. Moreover, two large *Phoenix canariensis,* originally planted on the grounds of the Collis P. Huntington estate on Nob Hill in San Francisco, having survived the earthquake and fire, were moved to San Marino and now stand as part of the above mentioned Palm Collection. However, the bulk of the collection was subsequently assembled in the form of small plants obtained from horticultural establishments in California and other parts of the United States and Europe.

Most of the plants grew very well for some years until the winter of 1913, when low temperatures of twenty and twenty-two degrees Fahrenheit killed most of the tender types. Some replacements were planted in subsequent years in more favorable locations but another severe test of the semitropical palms occurred in 1922 when a limited number of newly introduced species was likewise a total loss. By the time the freeze of 1937 was headline news, proportionately less damage was to be noted. This was largely true because the palms had become well established and were of a mature enough age to withstand such vicissitudes. Some damage from the heavy and protracted low temperature period during January 1949 must be recorded, however, especially with regard to smaller types of palms.

Climatically speaking, the San Marino area is not the most ideal location for the culture of the more tender subtropical palms. In some sections along the coastal belt of Southern California, however, there can be seen some fine specimens of such plants which have been growing for many years. Experience over a fair number of years does show that, despite occasional hazards of unduly cold weather in Southern California, it is possible to maintain an outdoor collection of palms satisfactorily, especially if care is taken to select proper types for the various locations involved.

In the past five or ten years certain genera of palms have shown a noticeable decline, the cause of which is undetermined as yet. Affected mostly are *Arecastrum*, *Butia*, and *Jubaea*. There is a possibility that their life cycle in this area is rather a short one, since the specimens affected were planted forty to fifty years ago.

The following is a list of palms lost or severely damaged by frost during the cold winters mentioned above:

Archontophoenix Alexandrae, Archontophoenix Cunninghamiana, Brahea dulcis, Caryota mitis, Caryota Rumphiana, Caryota urens, Chamaedorea Ernesti-Augusti, Chamaedorea radicalis, Chamaedorea Sartorii, Chamaedorea stolonifera, Chamaedorea Tepejilote, Chrysalidocarpus lutescens, Cocos nucifera, Dictyosperma album, Hedyscepe Canterburyana, Howeia Belmoreana, Howeia Forsteriana, Jubaeopsis caffra, Mascarena lagenicaulis, Mascarena Verschaffeltii, Pritchardia Gaudichaudii, Pritchardia pacifica, Ptychosperma elegans, Rhopalostylis Baueri, Rhopalostylis sapida, Roystonea regia, Syagrus insignis, Syagrus macrocarpa, Syagrus Weddelliana, Wallichia caryotoides.

18. Inflorescence and bract of *Jubaea chilensis*. Photograph by William Hertrich.

The following species of palms have survived the above-mentioned harsh winters and can generally be grown in this area:

Arecastrum Romanzoffianum, Arecastrum Romanzoffianum var. *australe, Arecastrum Romanzoffianum* var. *botryophorum, Arenga Engleri, Butia capitata, Butia eriospatha, Butia Yatay, Chamaerops humilis* (and its many varieties), *Chamaedorea Seifrizii, Chamaedorea elegans, Erythea armata, Erythea Brandegeei, Erythea edulis, Jubaea chilensis, Livistona australis, Livistona chinensis, Livistona decipiens, Livistona Mariae, Paurotis Wrightii, Phoenix canariensis, Phoenix dactylifera, Phoenix humilis, Phoenix paludosa, Phoenix reclinata, Phoenix Roebelenii, Phoenix rupicola, Phoenix sylvestris, Phoenix zeylanica, Rhapidophyllum hystrix, Rhapis excelsa, Rhapis humilis, Sabal causiarum, Sabal mauritiaeformis,*

Sabal mexicana, Sabal minor, Sabal Palmetto, Sabal texana, Sabal umbraculifera, Sabal viatoris, Sabal Yapa, Trachycarpus Fortunei, Trachycarpus Martianus, Trachycarpus, Takil, Trachycarpus Wagnerianus, Trithrinax acanthocoma, Trithrinax campestris, Washingtonia filifera, Washingtonia robusta.

A Method for Germinating Palm Seeds

HARRISON G. YOCUM

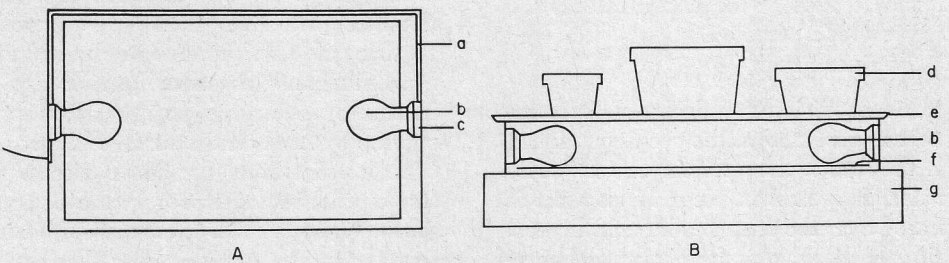
After ten years of importing palm seeds and trying various methods to germinate them, the author wishes to report a method for germinating palm seeds that should be useful and successful for the amateur. It is well adapted for small scale germination when a few seeds are received periodically as the fruits become available.

Previous seed treatments that gave negligible results or even total failure were: (1) Planting the seeds as received with no removal of the outer shell or pericarp when such was present; (2) No artificial heat provided; (3) Planting the seeds too shallow—one-half of the seed exposed above the surface of the sand; (4) Unfamiliarity with location of the micropyle with the seed in question. Many species have the micropyle, through which germination occurs, variously situated.

It is concluded from numerous trials that the most important factor for success in palm seed germination is the provision of artificial heat where the environment is cooler than 80°F. The removal of the pericarp is probably next in importance.

In order to develop a germinator in which bottom heat could be provided simply, a method was improvised to supply artificial heat with incandescent light bulbs. A rectangle box 19″ × 12″ × 3½″ was used as shown in Fig. 19. The size of the box may vary with one's individual needs. A light bulb socket is fastened to one end of the box or, if desired, one may be placed at each end to supply more uniform heat in larger boxes. With the box above, one 75-watt lamp provides sufficient heat. Two bulbs of lower wattage may be used in a larger box, such as a 40-watt lamp for each socket. The important thing is that the lamps provide continuous heat of about 80°F. near the seeds.

The larger the size of the germinator,



19. Layout for a source of bottom heat. Left, box with lamps for heat in top view; right, lateral view of the same on inverted flat with pots on aluminum sheet. a, light cord; b, light bulb; c, socket; d, pot of vermiculite with seeds; e, aluminum sheet; f, thin aluminum strip; g, inverted wire mesh flat.

the higher should be the wattage of the bulb so that enough heat will be distributed over the top. The wire cord is fastened along the side of the germinator and emerges from a hole at one end to be plugged in an outlet. A thin strip of aluminum may be placed in the bottom of the germinator; this is desirable to reflect the heat upwards.

A sheet of metal aluminum is then placed over the box. It is well to set the germinator on a slightly larger box, preferably an inverted wire-bottom flat, so that heat will not injure the surface on which it rests. The pots or other containers with the planted seeds are then laid directly on the aluminum metal sheet as shown in Fig. 19.

The 75-watt incandescent bulb supplies a steady bottom heat through conduction of heat on the metal aluminum sheet. The heat will necessitate frequent waterings of the pots.

Vermiculite has been used as a germinating medium in recent years because of the consistently good results obtained. It is excellent because of its relative freedom from pests and diseases, good drainage, porosity and at the same time high water-holding capacity. Also germinating seeds have been noted to develop well branched root systems in the vermiculite. Its use alleviates the danger of the development of anaerobic conditions. Because of the above factors the coarse grade of vermiculite is preferred to the finer grade.

The provision for drainage is of utmost importance in the seed containers, be they pots, tins, plastic or any other material. A broken piece of clay pot is placed over the drainage hole of the pots with the convex surface upward before putting in the vermiculite. If tins are used, drainage is easily provided by punched holes around the bottom edge. If the holes are about the diameter of an ice pick, no clay pot pieces are needed at the bottom as the vermiculite will not be lost readily.

The container is filled with vermiculite to about one inch from the rim; then the seeds, preferably with the pericarps removed, are placed on the surface. They are then covered with vermiculite till the seeds are buried to a depth of their own diameter. With larger seeds the container may be half-filled with vermiculite and the seeds then placed on the surface to be covered almost to the rim with vermiculite. As a result the top of the seeds will be covered with about one inch of the medium. The vermiculite should not be compacted by pressing down during the filling of containers since watering will result in additional settling.

The mode of insertion of the seeds in the vermiculite is worthy of mention. One may think when planting that it makes no difference how the seeds are placed. From observation it has been found that round seeds may be planted with less care than ellipsoid or ovoid seeds which respond best when the long axis is placed horizontally.

When the seeds are sown in porous clay pots, they may be watered from below, setting the pot in a receptacle of water and removing it when the top becomes saturated. This will prevent settling of the vermiculite and help maintain better aeration. Seeds planted in tins or other non-porous containers may be watered on the surface if care is taken to distribute the water evenly. A slow sprinkling will prevent the danger of dislodging the planted seeds. With surface irrigation, enough water should be applied to saturate the entire contents of the receptacle; this is apparent when the excess escapes as drainage water.

The Problem of Wissmannia

P. B. TOMLINSON

Wissmannia carinensis (Chiovenda) Burret is a little known palm of Somaliland and the Arabian peninsula. Its affinities are rather obscure, chiefly because it is very inaccessible and collections have formerly not been adequate enough for a complete description. Recently, however, it has been accurately described by Monod (1955) from new collections and the history of its discovery and nomenclature summarized. Initially *Wissmannia carinensis* was described as a species of *Hyphaene* based on a leaf specimen but Burret (1943), in creating the genus *Wissmannia,* suggested that it was a member of the subfamily Coryphoideae and not the Borassoideae to which *Hyphaene* belongs. Burret suggested that *Wissmannia* has affinities with *Chamaerops, Nannorrhops, Symphyogyne,* and *Trachycarpus.* On the other hand, Monod suggested that it is most closely allied to *Livistona.*

Having recently completed a survey of the palms from the standpoint of systematic anatomy (see the preliminary account in Tomlinson, 1957) I felt that it might be possible to glean some information about the relationships of *Wissmannia* from a knowledge of its leaf anatomy. Professor Monod very kindly supplied me with a few fragments of the lamina of *Wissmannia* from a herbarium specimen. Revival of this material by boiling in water with a little bleaching solution restored it to a consistency which allowed me to make preparations in which the major anatomical characters of the lamina could be observed. Examination of these at once indicated no close anatomical affinity with any of the genera suggested by Burret to be closely related to *Wissmannia* but, on the other hand, the combination of anatomical characters which were observed did suggest *Livistona.* However, I was already aware that *Livistona* varied considerably in its leaf anatomy, although the anatomy of individual species was very uniform. More recently I was able to collect additional material of *Livistona* from palms cultivated in the Fairchild Tropical Garden, Florida and so was able to obtain a better picture of the range of anatomical variation shown by the genus. One fact which came out of this study was that some species of *Livistona,* e.g. *L. Robinsoniana* and *L. rotundifolia,* are almost indistinguishable anatomically from *Licuala* whereas other species, e.g. *L. chinensis,* are very unlike *Licuala.* Apart from this incidental observation it was possible to make a careful comparison of *Livistona* with *Wissmannia.*

The following anatomical leaf characters are common to both *Wissmannia* and *Livistona*:—Hairs almost absent; 2 kidney-shaped hypodermal cells around each substomatal chamber; strands of fibres mostly hypodermal or sub-hypodermal; longitudinal veins almost equidistant from each surface and rarely in contact with surface layers; phloem of large veins subdivided into 2 separate strands; transverse veins often running below longitudinal veins, each including 2 phloem strands; silica cells common adjacent to transverse veins.

A few of the features present in *Wissmannia* occur in only a few species of *Livistona*:—Leaf isolateral (*L. Woodfordii*); epidermal cell walls not sinuous

(*L. chinensis*) epidermal cell walls more or less uniformly thickened (*L. chinensis, L. decipiens*); hypodermis 1-layered below each surface (*L. rotundifolia, L. Woodfordii*), not with a 2-layered adaxial hypodermis as in other species.

Wissmannia possesses no single anatomical feature by which it can be distinguished from *Livistona*, but it is recognized by a unique combination of anatomical characters. It can be distinguished from all species of *Livistona* because it possesses:—An isolateral leaf structure; non-sinuous epidermal walls which are uniformly thickened; a uniseriate, colourless hypodermis below each surface. It has neither fibre-sclereids nor does the epidermis include short, wedge-shaped, uniformly thickened cells.

The anatomical evidence therefore suggests that *Wissmannia* is a distinct genus which shows some affinity with certain species of *Livistona*. Certain observations about the evolution and geographical distribution of these two genera can be made on the basis of these conclusions. *Livistona* has a wide distribution in the Indo-Malayan region and it is therefore reasonable to suppose that *Wissmannia* represents one line of divergence from the ancestral *Livistona*-stock and has spread westwards to East Africa where it represents the most south-westerly limit of distribution of the Coryphoideae in the Old World. Apart from *Wissmannia* the only other Coryphoid palm which occurs in continental Africa is *Chamaerops* which is found in North Africa and Southern Europe. Another line of descent from the *Livistona*-stock has resulted in the development of *Licuala* in the Eastern Tropics.

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NOTES FROM YASHIRODA JUNKAEN

KAN YASHIRODA

In response to a request from our Executive Secretary on how our palms at the Yashiroda Junkaen have progressed since I last wrote on them [*Principes* 1:60-64. 1957], I am writing some notes about them. One of my griefs is that I lost a fine mature tree of *Erythea edulis* which I did not mention earlier. Our climate is less congenial for it than for *Livistona chinensis* but still it is a fine palm to us. Incidentally, while I was wandering about the deserts of Arizona in 1955—for I have been interested in trying some of the woody desert subjects including cacti—I came across some *Erythea armata* heavily loaded with beautiful long clusters of flowers in some and fruits in others at a mission garden. These were so impressive that my superficial view of the palm formed while I was in charge of the Palm House at the Royal Botanic Gardens at Kew, England, when I was a student there, was resolved quickly and spontaneously and I begged permission from the man in charge to gather some seeds. Contrary to my earlier efforts, the seeds germinated very well and the slow grower in the genus is now growing nicely. The young leaves, particularly the tips, resist the severe frost, cold,

and wind better than those of *Washingtonia robusta.*

The mention of the renowned Palm House at dear old Kew reminded me of a few lines in the *Journal of the Kew Guild*, 1957, that "old Kewites will be interested to learn that one of the most troublesome pests in this part of Kew (Palm House) are 'stick insects.' " When I was there a comparatively old tree of *Bismarckia nobilis* was reputed to be a very rare one in cultivation. Now I learn that it is grown in Florida and elsewhere. However, *Chamaedorea fragrans*, which I had admired so much and wished to grow at home while I was there, seems to be not in cultivation outside some collections. It is a great pity because besides the elegant growth like that of *Sobralia macrantha*, the delicious sweet fragrance of the flowers is wonderful. It reminds one of the powerful fragrance of *Osmanthus fragrans* var. *aurantiacus.* To me it is also a great pity that my garden is too cold to acclimatize these and many others in any way and I like any plant under artificial protection least of all.

Dr. Hodge's article on "Palm Trunks as Living Planters" in *Principes* 3: 93-95, 1959, is most interesting. For years I had been growing a fine large clump of *Haworthia cymbiformis* having not less than 30 heads on the clean trunk —or as clean as a *Phoenix* trunk can be —of *Phoenix canariensis* from which the leaf bases were detached. Three or four years ago a goodly portion of the clump was robbed by someone and the little feature has disappeared—I removed the rest myself as it was painful to behold.

In the chinks of the clean trunk I have "planted" some kinds of plants such as *Echinopsis multiplex*, *E. Eyriesii*, *Aloe* spp. and the epiphytic orchids while on trunks with the leaf bases attached are *Platycerium alcicorne*, other ferns, *Ribes ambiguum*, a native shrub which grows on decaying matter of large trees, creeping and hanging cacti and some other plants. One of the most successful attempts was growing *Conandron ramondioides*, a gesneriad native to our perpendicular mountain cliffs, on the north side of the trunk under the heavy shade of the leaves. As Reginald Farrer has said, this is "a most beautiful Japanese rock-plant." The tiny tuberous-rooted herb covers the face completely with the pretty glossy crinkled fleshy oblong leaves of five to ten or more inches long hanging and purple flowers in summer. If any fellow palm lover wishes to grow it, do not hesitate to tell me so.

The big trunk of the large old *Phoenix canariensis* is so thickly covered with the protruded roots for two feet or so around that it seems as though soil were eliminated from near the base for some feet deep. A year ago, making a tiny hole cutting and removing the tangle of roots, I planted, or to be more exact placed in it, a full-size plant of *Platycerium alcicorne* growing in sphagnum moss. To my surprise, within twelve months the inside of the barren fronds was fully and thickly replaced with new *Phoenix* roots and some root tips came pushing out of the outer barren frond. But it appears not to be affecting the normal growth of the *Platycerium.* Only under the palm is it hardy and it is the one species of this interesting genus able to grow in the open air in my Acclimatization Garden.

Among the thick growth of roots, a good garden variety of amaryllis (*Hippeastrum*) is growing from prewar days. The bulb remains single and has never multiplied, yet it produces good and vigorous leaves and a normal flower

scape with nice blooms annually. I wonder what shape the bulb has formed to adapt to the surrounding condition and continue normal function. It seems to me there is no space for the bulb to occupy. Also, *Iris stylosa* is planted outward from it in the thick tangle of roots from prewar days and its nature of floriferousness is not lessened.

A goodly number of palms, new or old friends, seem to be fairly hardy or worth trying but until now most of them lack in growth to be popular garden palms. But I don't wish to jump to any conclusion nor to write much on the matter now. Only time and our patient endeavor in the coming decade or two will tell us.

I cannot close these notes without expressing my deep regret at the untimely death of Dr. R. Bruce Ledin. Some palms raised from seeds which came from him will keep his memory green.

Tonosho-cho
Kagawa-ken
Japan

[*Ed. Note:* Mr. Yashiroda is interested in obtaining viable seeds of *Sabal Palmetto* and seeds or young plants of the Andean wax palms (*Ceroxylon* spp.) should any Palm Society member have these available.]

WHAT'S IN A NAME?

Brahea (bráy hee a), a small genus of unarmed medium-sized Mexican fan palms, was founded by Martius in 1838 to honor the Danish astronomer Tycho Brahe (1546-1601). It was Brahe's precise observations as recorded in his astronomical tables that later enabled his assistant Johannes Kepler to formulate his renowned three basic laws of planetary motion. The genus *Brahea* was a segregate from the earlier *Corypha* established by Linnaeus. Then as these palms in their turn came to be more closely studied, the genera *Washingtonia* and *Erythea* were created as segregates from *Brahea*. The so-called Mexican rock palm (*B. dulcis*), perhaps the best known member of the genus, has been introduced into southern California.

BRUCE H. BEELER

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WANT TO EXCHANGE

The city of Brownsville, Texas, is collaborating with members of The Palm Society with the purpose of making ours a real Palm City. We have on hand about 500 lbs. each of *Washingtonia robusta* and *Phoenix canariensis* seeds, and soon will have an equal amount of *Sabal texana*. We wish to exchange these for seeds of other genera and species suitable to our climate, that is, any but the most tender kinds. We can ship to either U.S. or foreign countries. Also available are sprouted seedlings, about 6 to 10 inches, with two leaves, which can be sent in exchange for flats or bundles of similar-sized U.S.-grown palms. Address Larry Lightner Inc., Import-Export, Brownsville, Texas.

Limited quantity available, *Raphia Ruffia palms*, source of raffia cordage, leaves to 60 ft. In 3½-gal. containers, too large to ship. $10.00. THAYER NURSERY, North Federal Highway, Stuart, Fla.